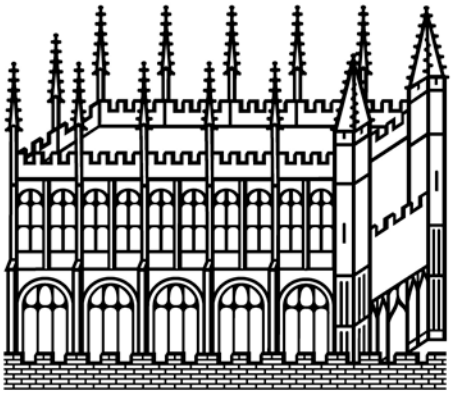

TABLETS
OF
ANATOMY.

BY

THOMAS COOKE, F.R.C.S.


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TABLETS

OF

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Being a Synopsis of Demonstrations given in the Westminster Hospital Medical School in the Years 1871, -72, -73, -74, -75.

FOURTH EDITION,

OR

SELECTION OF THE TABLETS BELIEVED TO BE MOST USEFUL TO STUDENTS GENERALLY.

"The schemes of any of the arts or sciences may be analysed in a sort of skeleton, and represented upon tables, with the various dependencies and connections of the several parts and subjects that belong to them; and the frequent review of these abstracts and epitomes would tend much to imprint them on the brain, when they have been once well learned; this would keep those learned traces always open, and assist the weakness of a labouring memory."

ISAAC WATTS, D.D.,

ON "THE IMPROVEMENT OF THE MIND."

LONGMANS, GREEN, & CO., PATERNOSTER ROW, LONDON.

1885.

PREFACE TO THE FIRST EDITION.

In a Learner's point of view Scientific facts may, the Author thinks, be divided into those which are daily met with by the Student, and which soon become familiar to him, and those which are learned with considerable pains and afterwards easily forgotten, and which require to be constantly recalled to the mind.

The Author has endeavoured to deal with the latter class of facts only. What every one knows, who has at all studied Medicine, he has purposely left out. Greater condensation is thus obtained. - To the non-medical reader the Tablets may appear disconnected, and the descriptions they contain (if descriptions they may be called) may seem dry and naked. The Author believes that the Student will easily supply the links, and give life and shape to the skeleton sketches.

This book is intended neither for the idle, nor for absolute beginners. The idle will find that it contains more details than they will care to master, and that its brevity demands more mental application than would be agreeable to any one, whose mind has not been trained to close study.

Beginners, however, who mean to work, may, after attending a lecture, or reading up in one of the Standard Authors a region they have just been dissecting, advantageously revise the subject in the Tablets; and these partial revisions will be found to fix the main points in the mind, and to facilitate the more important revisional effort, which, even the first year's student is usually called upon to make, whenever his lecturer has finished describing a part, or he himself has finished dissecting one.

The more or less advanced Students, who are doing, or have done, their work honestly and conscientiously, are the ones the Author has had mainly in view.

September, 1871.

PREFACE TO THE FOURTH EDITION.

Fourteen years' experience in the use of the Tablets of Anatomy has shown that, from the point of view of their utility to Students, the Tablets may be divided into two classes:—

I.—Those—the majority,—which may be considered useful to *most* Students.

II.—Those which are of use mainly to such as are preparing for the *higher examinations*.

The Tablets which may be fairly considered to come within Class I., have alone been introduced into this "Fourth Edition, or selection of the Tablets believed to be most useful to Students generally."

The bulk and price of the work have therefore been considerably reduced.

It has also been thought desirable to group the Tablets according to the several regions of the body, so that the book may become a companion to the several Dissectors' Manuals.

With a little trouble to the printer and binder it has further been found possible to arrange the several groups of subjects, Bones of Skull, Bones of Face, Pterygo-maxillary Region, etc. (such groups as form a synopsis, so to speak, of one of the daily classes given by the Author in his private Anatomical School), in such a way that, if it is thought desirable to divide the book into parts for convenience in carrying it about, the several groups of subjects will be found embodied in *separate pamphlets of a size convenient for the coat pocket;* this has involved however a few unavoidable repititions. The separate pamphlets are numbered from 1 to 34 on the lower right hand corner of their front page. The Bones of the Carpus & Tarsus have been placed at the end of the volume.

The Tablets coming within Class II., *i.e.*, those of use mainly to such as are preparing for the higher examinations, will be published separately. They will include all the "Special Dissections," etc.

The minute Anatomy, which is now generally taken under the head of Physiology, and such subjects as have mainly reference to minute anatomy, such as the ear, the eye, etc., have been removed from this edition. It is intended, however, that the Tablets of Physiology and Histology, thoroughly revised and brought up to date, shall be published in the same form as the present; and these publications will embody notes and explanations intended to facilitate the repetition by the student of the great bulk of the practical exercises in Physiology by Professors Burdon-Sanderson, Foster & Langley, and other authors, which are now frequently demonstrated in the Author's private classes.

40, Brunswick Square,
May, 1885.

BONES OF TRUNK.

THE VERTEBRÆ.

Present for examination: –

Body – Forms a short column, which presents:

ANT. SURFACE – Convex from side to side, concave from above downwards; pres
numerous small vascular foran

POST. SURFACE – Concave from side to side, flat from above downwards; pres
one or more irregular apertures for exit of venæ basis verte

OUTER & UNDER SURFACES – Rough & slightly concave, and surrounded by a
minent

Pedicles – Join the body to the laminæ. They are constricted, and their constriction
rise t

Notches – Which latter, by the superposition of the vertebræ, form the *intervertebral*

Laminæ – Broad & flat, rough above & below for the ligamenta subflava; bound poster

Foramen – Which, by the superposition of the vertebræ, forms the spinal canal.

Spinous process – Projects backwards from the point of junction of the laminæ.

Transverse processes – Two. Project outwards from the sides of the arch.

Articular processes – Four. Project upwards & downwards from the point of junct
the pedicles with the laminæ. The superior ones look backwards, the inf
ones look forw

N. — But little, which would be applicable to *each* of the three gr
of vertebræ, can, it is believed, be added to this descrip

THE THREE GROUPS of VERTEBRÆ.

CERVICAL VERTEBRÆ — The smallest. Present: -

BODY — Small, broad from side to side. Presents: -
UPPER SURFACE - Concave from side to side, and rounded off anteriorly.
UNDER SURFACE - Convex from side to side, and prolonged downwards anteriorly
ANTERIOR SURFACE - Situated therefore on a lower level than the posterior.
PEDICLES — Arise from lower part of body, and of the two
NOTCHES — The superior ones are the deepest, and some what the narrowest.
LAMINÆ — Long and narrow.
FORAMEN — Large and triangular.
SPINOUS PROCESS — Projects horizontally backwards, and is short, bifid, & groov
inferio
TRANSVERSE PROCESSES — Short, bifid, grooved superiorly, perforated at th
base for passage of vertebral artery & vein, and situated *on the outer side of*
pedicles, in front of the articular proces
The existence of the foramen at the base of the cervical transverse p
cesses, and the situation of these processes on the outer side of the pedic
are owing to their being formed of two roots, which roots correspond,
anterior one to the transverse processes properly so-called, the poster
one to the ri
ARTICULAR PROCESSES — Form a small vertical column. The superior ones l
upwards & backwards, the inferior ones look downwards & forwar

DORSAL VERTEBRÆ — Intermediate in size. Present: -

BODY — Heart-shaped, thicker behind than in front, and has two demi-facets on e
side, which facets articulate with the heads of the ri
PEDICLES — Arise from upper part of body, and of the two
NOTCHES — The inferior ones are the deepest and broadest.
LAMINÆ — Short & broad.
FORAMEN — Small & round.
SPINOUS PROCESS — Long, triangular, oblique, and ends in a single tubercle.
TRANSVERSE PROCESSES — Long, thick, obliquely directed outwards & backwar
and situated *behind the articular processes & the pedicles.* Their extremity
enlarged, and presents in front an articular facet for tubercle of correspo
ing
From the back of the extremity of the few lower dorsal transverse proc
ses arise three tubercles, termed *external, inferior, & superior,* which tuberc
correspond respectively to the transverse processes of the lumbar verteb
and to the accessory & mammillary tubercles found, the former on the b
of the transverse processes, the latter on the back of the superior articu
processes of the lumbar verteb
ARTICULAR PROCESSES — Nearly vertical. The superior ones look backward
outwards, the inferior ones look forwards & inwa

LUMBAR VERTEBRÆ — The largest. Present: -

BODY — Large, broadest from side to side, rather thicker in front than behind.
PEDICLES — Thick; arise from upper part of body, and of the two
NOTCHES — The inferior ones are the deepest & broadest.
LAMINÆ — Short, broad & thick.
FORAMEN — Triangular, larger than in the dorsal region, smaller than in the cervic
SPINOUS PROCESS — Thick, quadrilateral, and ends in a rough vertical border.
TRANSVERSE PROCESSES — Long, slender, directed transversely outwards,
situated *in front of the articular processes, but behind the pedicles,* and in a
with the external tubercles of the lower dorsal transverse processes, to wh
they correspo
On the back of each, near its base, is a small tubercle the *accessory tuber*
which points downwards & inwards, and which corresponds to the infer
tubercles on the lower dorsal transverse process
ARTICULAR PROCESSES — Thick, strong & vertical. The superior ones are conca
look backwards & inwards, and are farther apart than the inferior ones, wh
they embrace. The inferior ones are convex, look forwards & outwards,
are nearer to each other than are the superior ones.
On the back of each superior articular process is a small tubercle,
mammillary tubercle, which corresponds to the superior tubercles on the lo
dorsal transverse proces

THE THREE GROUPS COMPARED SERIATIM.

Body – CERVICAL – Small, broad from side to side. Presents: –
Upper Surface – Concave from side to side, & rounded off anteriorly.
Under Surface – Convex from side to side, & prolonged downwards anteriorly.
Anterior Surface – Situated therefore on a lower level than the posterior.
DORSAL – Heart-shaped, thicker behind than in front, and has two demi-facet
each side which demi-facets articulate with the heads of the
LUMBAR – Large, broadest from side to side, rather thicker in front than behind.

Pedicles – CERVICAL – Arise from lower part of body.
DORSAL – Arise from upper part of body.
LUMBAR – Thick; arise from upper part of body.

Notches – CERVICAL – The superior ones are the deepest, and somewhat the narrowest.
DORSAL – The inferior ones are the deepest and broadest.
LUMBAR – The inferior ones are the deepest & broadest.

Laminæ – CERVICAL – Long & narrow.
DORSAL – Short & broad.
LUMBAR – Short, broad & thick.

Foramen CERVICAL – Large & triangular.
DORSAL – Small & round.
LUMBAR – Triangular, larger than in the dorsal, smaller than in the cervical.

Spinous Process —
CERVICAL – Projects horizontally backwards, and is short, bifid, & grooved inferio
DORSAL – Long, triangular, oblique, and ends in a single tubercle.
LUMBAR – Thick, quadrilateral, and ends in a rough vertical border.

Transverse Processes —
CERVICAL – Short, bifid, grooved superiorly, perforated at their base for passag
vertebral artery & vein, and situated *on the outer side of the pedicles, in fron*
the articular proce
DORSAL – Long, thick, obliquely directed outwards & backwards, and situated *be*
the articular processes & the pedicles. Their extremity is enlarged, and prese
in front an articular facet for tubercle of corresponding
From the back of the extremity of the few lower dorsal transverse proc
ses arise three tubercles, termed *external, inferior, & superior,* which tuberc
correspond respectively to the transverse processes of the lumbar verteb
and to the accessory & mammillary tubercles found, the former on the b
of the transverse processes, the latter on the back of the superior articu
processes of the lumbar verteb
LUMBAR – Long, slender, directed transversely outwards, and situated *in fron*
the articular processes, but behind the pedicles, and in a line with the exter
tubercles of the lower dorsal transverse processes, to which they correspo
On the back of each, near its base, is a small tubercle the *accessory tube*
which points downwards & inwards, and which corresponds to the infe
tubercles on the lower dorsal transverse proces

Articular Processes —
CERVICAL – Form a small vertical column. The superior ones look upwards & ba
wards, the inferior ones look downwards & forwar
DORSAL – Nearly vertical. The superior ones look backwards & outwards, the infe
ones look forwards & inwar
LUMBAR – Thick, strong & vertical. The superior ones are concave, look backwa
& inwards, and are farther apart than the inferior ones, which they embra
The inferior ones are convex, look forwards & outwards, and are nearer
each other than are the superior on
On the back of each superior lumbar articular process is a sm
tubercle, the *mammillary tubercle,* which corresponds to the superior tuberc
on the lower dorsal transverse proces

PECULIAR VERTEBRÆ.

Are the:

Atlas
Axis } Vide following Tablet.

7th Cervical Vertebra, or Vertebra Prominens

Spinous process thick, long, prominent, nealy horizontal; ends in a single tubercle for ligamentum nuchæ

Transverse process large, but slightly grooved, seldom bifid. Its foramen is usually small, sometimes wanting, and seldom gives passage to both artery & vein

1st Dorsal Vertebra

Body broad from side to side and lipped superiorly & behind; presents a complete facet above for head of 1st rib, and a demi-facet below for upper facet of head of 2nd rib

Spinous process thick & but slightly inclined.

Articular processes somewhat oblique, as in the cervical vertebræ.

9th Dorsal Vertebra

Usually no inferior demi-facet.

10th Dorsal Vertebra

But one costal facet (the superior), which is usually complete.

11th Dorsal Vertebra

But one costal facet, which is always complete.

Transverse processes short, and without articular facets.

12th Dorsal Vertebra

But one costal facet, which is always complete.

Transverse processes short, and without articular facets.

Inferior articular facets, convex and looking forwards & outwards like those of lumbar vertebræ.

5th Lumbar Vertebra

Body much thicker in front than behind.

Spinous process small.

Inferior articular processes, farther apart than superior.

Transverse processes, large, thick, slightly inclined upwards.

ATLAS & AXIS.

THE ATLAS

Presents anterior & posterior arches, foramen, and lateral masses.

ANTERIOR ARCH — Presents:

ANTERIOR SURF. – Convex, in centre of which is a
tubercle for superior oblique portion of longus colli, and for supe
anterior occipito-atloid & superficial anterior atlo-axoid ligar

POSTERIOR SURF. – Concave, in centre of which is an
oval facet, which articulates with odontoid process of axis.

UPPER & LOWER BORDERS – For deep anterior occipito-atloid & deep anterior
axoid ligar

POSTERIOR ARCH — Presents just behind the lateral masses the
Grooves representing the *superior & inferior intervertebral notches.*
superior grooves, which are the deepest and are sometime
verted into complete foramina, transmit the vertebral art
the suboccipital
The posterior arch then becomes rounded, and is
above & below for the posterior occipito-atloid & posterior
axoid ligaments. It ends posteriorl
tubercle for rectus capitis posticus minor.

FORAMEN — Large, and divided by transverse ligament (transverse portion of crucia
ment) into a posterior part, the largest, for spinal cord
membranes, and an anterior part, the smallest, which re
the odontoid process of th

LATERAL MASSES — Short & thick columns of bone, which present internally, exte
above & be
tubercle for the transverse ligament;
Transverse Process – Large, not bifid nor grooved superiorly, perforated
base by a very large for
Sup. Articular Surf. – Large, oval, concave, converging towards its
anteriorly, and looking upwards, inwards & slightly back
Inf. Articular Surf. – Rather smaller, flat, circular, and looking down
& in

THE AXIS

Presents the following peculiarities

Body – A good deal thicker in front than behind. It presents anteriorly a
median ridge & two lateral depressions for part of internal or vertic
tion of longus colli, and is surmounted

ODONTOID PROCESS – Tooth-like, presenting:
Apex – For median or suspensory occipito-odontoid ligament, and, lat
for lateral occipito-odontoid, or check liga
Body – Articular in front & behind for anterior arch of atlas & tra
lig
Neck – Constricted, and bound down by transverse ligament.

Pedicles – Strong & thick, lie beneath the superior articular surface, and are but very
ly grooved supe

Notches – The superior are very shallow, and lie behind the superior articular surface
inferior ones are much deeper and lie in front of the corre
ing articular su

Laminæ – Thick & strong.

Foramen – Large, but smaller than that of atlas.

Spinous Process – Thick, bifid, deeply grooved inferiorly.

Transverse Processes – Small, pointed; foramen oblique upwards & outwards.

Articular Surfaces:
Superior – Rest upon the body, pedicles & transverse processes in fron
notches, and are large, flat, circular, and look upwards

Inferior – Smaller, look downwards & forwards, and are similar to t
the other cervical ve

THE RIBS.

Twelve.

Seven Sternal or True – Connected to the sternum by their costal cartilages; these increase in length from above downwards.

Five False or Asternal – Of which the three first are connected by their cartilages to the cartilage of the rib above, while the two last, or *floating ribs*, are entirely disconnected in front. The asternal or false ribs decrease in length from above downwards.

The *breadth* of the ribs decreases from the 1st to the last; so does also the width of the corresponding intercostal spaces.

The *degree of obliquity* of the ribs increases from the 1st to the 9th, and decreases from the 9th to the 12th. It is most marked between the head & the posterior angle.

The ribs are both *curved* & *twisted* upon themselves. The curve of the ribs is most marked in the neighbourhood of the posterior angle. The twist is such that the outer surface of the shaft looks slightly downwards behind & slightly upwards in front, and that, if the lower border of the shaft be placed upon a flat horizontal surface from the anterior extremity of the bone to the posterior angle, the part of the bone behind the angle, will be found to pass upwards & inwards.

COMMON CHARACTERS — A rib presents two extremities & a shaft.

POSTERIOR EXTREMITY — Presents head, neck & tuberosity.

HEAD – Presents:

two oblique facets, a small superior one & a larger inferior one, which facets articulate with the bodies of two adjoining vertebræ, and are separated by a

horizontal ridge, to which the interarticular ligament is attached.

NECK – Flattened from before backwards, about an inch in length; presents:

Anterior Surf. – Smooth, continuous with inner surface of the shaft.

Posterior Surf. – Rough for interosseous costo-transverse ligament.

Upper Border – Has a rough crest, for superior costo-transverse ligament.

Lower Border – More or less rounded.

TUBEROSITY – Most prominent in the upper ribs. Presents:

Inferior Internal, or Articular Portion – Has a facet for the extremity of the tranverse process of the inferior of the two vertebræ with which the head is connected.

Superior External, or Non-articular Portion – Rough for external costo-transverse ligament.

SHAFT — Thin & flat. Presents:

OUTER SURFACE – Convex, on which is found posteriorly the

Angle, or Posterior Angle – A rough line oblique downwards & forwards, which gives attachment to the tendons of the sacro-lumbalis, its accessory muscle, & the cervicalis ascendens, and which separates a

posterior rounded portion, giving attachment to the longissimus dorsi, and increasing in length from the 2nd rib to the 10th, and an

anterior flattened portion, smooth, looking slightly downwards behind & slightly upwards in front, which presents anteriorly the

Anterior Angle – Similar to the posterior but more faintly marked.

INNER SURFACE – Concave, looks slightly upwards behind & slightly downwards in front, and presents inferiorly a

ridge extending over the posterior two-thirds of the shaft, & most marked behind, which ridge gives attachment to the internal intercostal muscles, and forms the inner boundary of the

Groove – For the intercostal vessels & nerves, which groove is deepest & most marked just in front of the angle.

UPPER BORDER – Rounded; gives attachment to both internal & external intercostal muscles.

LOWER BORDER – Thin & sharp. Forms outer boundary, of foregoing groove, and gives attachment to corresponding external intercostal muscle.

ANTERIOR EXTREMITY — Compressed from before backwards, presents a

deep oval pit, studded with vascular foramina into which pit the corresponding costal cartilage is received.

PECULIAR RIBS.

Are the:

First Rib – Broad, flat, horizontal, the most curved, and usually the shortest. Its
SURFACES – Look upwards & downwards.
Upper Surface – Presents posteriorly a
rough impression for scalenus medius, and anteriorly a slightly
tubercle most prominent internally, for scalenus anticus, which
cle se
two shallow grooves, the anterior one for the subclavian ve
posterior one for the subclavian
Under Surface – Has no ridge nor groove.
BORDERS – Are turned inwards & outwards.
Inner Border – Concave, thin; presents inner part of tubercle for s
Outer Border – Convex & rounded.
HEAD – Small, rounded, with a single facet for 1st dorsal vertebra.
NECK – Short & rounded.
TUBEROSITY – Large, prominent, situated on outer border.
ANGLE – Blended with tuberosity.
ANTERIOR EXTREMITY – Large & thick.

Second Rib – Is longer, less curved, only slightly oblique, and scarcely twisted.
SURFACES – Look slightly outwards & inwards.
Outer or Upper Surface – Rough & prominent towards its middle for se
third digitations of serratus magnus; rough posteri
scalenus p
Inner or Under Surface – Has but a short & slightly marked groove.
TUBEROSITY & ANGLE – Close together; the latter slightly marked.

Tenth Rib
HEAD – Has usually but a single articular facet.

Eleventh Rib
HEAD – But a single articular facet.
NO NECK.
NO TUBEROSITY.

Twelth Rib
HEAD – But a single anterior facet.
NO NECK.
NO TUBEROSITY.
NO ANGLE.
NO GROOVE.
The two last ribs are but slightly curved, and are short &
the twelfth rib being sometimes the shortest

BONES OF SKULL.

THE FRONTAL BONE.

Articulates with sphenoid & ethmoid, and with both parietal, nasal, superior maxillary, la
mal & m

Divided into vertical or frontal, and horizontal or orbito-nasal portions.

VERTICAL OR FRONTAL PORTION — Presents:

Ext. Surface – Presents in median line:

Median suture, usually obliterated a few years after birth, and below which

Nasal eminence; – and laterally from above downwards:

Frontal eminence;

Superciliary ridge caused by projection of frontal sinuses,
inwardly where it joins the nasal emin

Supraorbital arch, presenting at its inner third the

Supraorbital notch or foramen, for supraorbital vessels & ne
and which arch terminates externally and internal
the external & internal angular proc

EXT. ANGULAR PROCESS – Thick & strong; articulates with
bone, and presents externally a part

Temporal ridge.

INT. ANGULAR PROCESS – Thinner; articulates with lachrymal
and bound

Nasal notch, which articulates with nasal bones & nasal
cesses of superior maxilla, and presents belo

Nasal spine.

Int. Surface – Concave. Presents in median line and from below upwards:

Foramen cæcum (completed behind by ethmoid) for small vein to longitu
sinus and a process of falx ce

Frontal crest, which is continued into

Groove for longitudinal sinus & falx cerebri; – and laterally

Cerebral impressions and

Grooves for branches of anterior & middle meningeal arteries.

HORIZONTAL OR ORBITO-NASAL PORTION — Consists of th
orbital plates separated by the ethmoidal

ORBITAL PLATES — Present:

Under Surface – Concave, on which are seen externally the

Lachrymal fossa for lachrymal gland, and internally the

Fovea trochlearis for pulley of superior oblique.

Upper Surface – Convex, forms part of anterior fossa of base of skull
presents well marked cerebral impres

ETHMOIDAL NOTCH – Is filled up by horizontal plate of ethmoid. – The
surface of its margin pres

Several half-cells, which complete & close the ethmoidal cells, and

Two grooves, which form part of

Anterior ethmoidal canal for nasal n. & ant. ethmoidal vessels,

Posterior ethmoidal canal for posterior ethmoidal vessels.

In front of the ethmoidal notch is the

Nasal spine, which articulates with nasal bones & perpendicular pl
the ethmoid and forms part of roof of nose, and on the
of which a

Openings of the frontal sinuses

The circumference of the bone is thick in the vertical or frontal po
where it is serrated for articulation with the parietals, a
bevelled at the expense of the inner table, above, of the outer
below. In the horizontal portion the circumference is thin & ser
for articulation with the lesser wing of the sphenoid. At the jun
of the two portions of the bone the circumference presents a
triangular rough surface for articulation with the greater wi
the sphe

THE OCCIPITAL BONE.

Articulates with parietals, mastoid & petrous portions of temporals, sphenoid & atlas, an
presents

OUTER SURFACE — Convex. Presents from behind forwards:

Ext. occipital protuberance for ligamentum nuchæ;

Ext. occipital crest, from which are given off laterally the

Sup. curved line, for trapezius, sterno-mastoid & occipito-frontalis; and th

Inf. curved line for recti capitis postici major & minor which are also inserte
into depression below. – Between the two curved lines a
inserted the complexus, splenius & superior obliqu

Foramen magnum for cord and its membranes, spinal accessory nerves & vertebr
arteries, on outer side of which foramen are th

Condyles, oblong, converging in front, convex from before backwards, lookin
downwards & outwards; rough inwardly for attachment
check ligaments, and having in fro

Ant. condyloid foramen for hypoglossal nerve; having behind

Post. condyloid fossa sometimes perforated by posterior condyloid for
men for a small vein to lateral sinus, and having on the
outer side th

Jugular process for rectus capitis lateralis & lateral occipito-atlo
ligamen

Basilar process presenting in middle line the

Pharyngeal spine for tendinous raphe & superior constrictor of pharynx, a
laterally

Rough depression for recti capitis antici major & minor.

INNER SURFACE — Concave, presents from behind forwards:

Crucial ridge, to centre of which corresponds the torcular Herophili, and of which th

Upper division ascends to superior angle, and is deeply grooved for superi
longitudinal sinus & falx cerebr

Inf. division, or int. occipital crest, descends to foramen magnum where
bifurcates; gives attachment to falx cerebel

Lateral divisions bound posteriorly the inferior occipital fossæ, and are deep
grooved for lateral sinuses & tentorium cerebell

Foramen magnum, near side of which are the

Ant. condyloid foramina & sometimes the

Post. condyloid foramina.

Basilar groove, which supports medulla oblongata & pons, and on each side of whi
is a h

Groove for inferior petrosal sinus.

BORDERS — Four:

Superior – Form lambdoid suture by articulating with parietals.

Inferior – Articulate with mastoid & petrous portions of temporal, and assi
in forming jugular foramen or foramen lacerum posteriu

ANGLES — Four:

Superior – Received between the two parietal bones, and corresponds
posterior fontanel

Inferior – Joins with body of sphenoid about 18th or 20th year.

Lateral – Received between posterior inferior angle of parietal and masto
portion of temporal; presents on its inner surface outer end of groo
for lateral sinu

THE TEMPORAL BONE.

Is situated at side of base of skull, and articulates with *parietal, occipital, sphenoid, malar & in*
maxillary

Is divided into squamous, mastoid & petrous portions.

SQUAMOUS PORTION — Presents outer & inner surfaces and circumference.

Outer Surface — Convex, forms part of temporal fossa and presents lower pa
temporal ridge behind, *zygomatic process* in front, and *glenoid fossa* b

ZYGOMATIC PROCESS — First projects outwards, and is broad & flattened
above downwards. It then twists forwards and pres

BORDERS – *upper* long & thin for temporal f.; *lower* short & thick for mass

SURFACES – *outer* convex, *inner* concave also for masseter.

APEX – Serrated, articulates with malar bone.

BASE – Presents *three roots:*

Anterior – Wide & transversely directed forming *eminentia articular*

Middle – Forms posterior boundary of glenoid fossa;

Posterior – Forms origin of temporal ridge.

GLENOID FOSSA — Is comprised between anterior & middle roots of the zyg
and present

GLASERIAN FISSURE – For processus gracilis of malleus, laxator tympani
tympanic artery, and divides the foss

Anterior part – Articular, and covered with cartilage which is prolo
over the eminentia articu

Posterior part – Non-articular, bounded behind by vaginal & aud
processes & middle root of zyg

Inner Surface — Concave. Presents cerebral impressions, and grooves for m
meningeal a

Circumference — Thin above and behind, where it is bevelled internally and articu
with parietal; thick in front, where it is slightly bevelled externally
articulates with great wing of sphe

MASTOID PORTION — Presents outer & inner surfaces and borders.

Outer Surface — Rough; presents:

Mastoid foramen for a vein to lateral sinus, and is prolonged into

Mastoid process for insertion of sterno-mastoid, splenius capitis & trachelo-ma
and on the inner side of which

Digastric groove for origin of posterior belly of digastric, and further inward

Occipital groove for occipital artery.

Inner Surface — Forms part of posterior fossa of base of skull and presents descer
port

Groove for lateral sinus.

Borders - Post. & Sup. — Thick & serrated for posterior inferior angle of pa
and lower border of occi

PETROUS PORTION — Vide next Tablet.

PETROUS PORTION of the TEMPORAL BONE.

Pyramidal, directed forwards & inwards and wedged in between the sphenoid & the bas
lar process of the occipital. Presen

Base — Its exposed part presents the
Meatus auditorius externus, the lower part of which is surrounded by the
Auditory process, to which is attached the cartilage of the pinna.

Apex — Presents the
Internal orifice of the carotid canal; and forms the posterior & outer boundaries of t
foramen lacerum mediu

Ant. Surface — Forms posterior boundary of middle fossa of base of skull, and presents fro
before backwards & outwards th
Internal orifice of the carotid canal,
Depression for Gasserian ganglion,
Hiatus Fallopii with *a groove leading to it,* both for large superficial petrosal nerve a
petrosal branch of middle meningeal artery, and near which hiat
are frequently se
Two or three other small foramina for small superficial petrosal nerve, petros
branch of glosso-pharyngeal & branch of glosso-pharyngeal to lar
superficial petrosal nerv
Eminence corresponding to the superior semi-circular canal, on the outer side of which is a
Depression corresponding to the cavity of the tympanum.

Post. Surface — Forms anterior boundary of posterior fossa of base of skull, and presents:
Meatus auditorius internus for facial nerve and auditory artery & nerve;
Opening of Aqueductus Vestibuli for small artery & vein to vestibule & a process of t
dura mat

Inf. or Basilar Surface — Presents in a diagonal line from before backwards & outwards:
Rough surface for origin of levator palati & tensor tympani;
Inferior orifice of carotid canal;
Vaginal process which embraces root of
Styloid process, which gives attachment from above downwards to the stylo-pharyngeu
-hyoideus & -glossus muscles, and to the stylo-hyoid & -maxillary lig
Stylo-mastoid foramen for facial nerve & stylo-mastoid artery. – Behind & on inner si
of the carotid canal & vaginal process are t
Jugular surface, which articulates with jugular process of occipital, and the
Jugular fossa for sinus of internal jugular vein, which fossa assists in formi
jugular foramen or foramen lacerum posterius, and has near to i
Opening for Arnold's nerve, on its outer wall,
Opening for Jacobson's nerve, in front, on bony ridge between it & carot
can
Opening of Aqueductus Cochleæ, in front & to inner side, close to posteri
border of the petrous bon

Borders — Three:
SUPERIOR – Grooved for superior petrosal sinus & attachment of tentorium cerebelli.
POSTERIOR – Grooved in front for inferior petrosal sinus; presents jugular fossa behind.
ANTERIOR – Its INNER PART articulates with spine of sphenoid; its OUTER PART is joined
a suture to the squamous portion of the bone. In the angle of junction of the
two portions are found t
Canal for the tensor tympani muscle above, and the
Osseous portion of the Eustachian tube below, on the outer side of which latter opening is t
Canal of Huguier for exit of chorda tympani.

THE SPHENOID BONE.

Is situated at front part of base of skull, and articulates with the 7 other cranial bones &
Presents for examination: vomer & both malar & palate

BODY — Is cuboid, but presents only four free surfaces, the two lateral surfaces being cont
with the wings & pterygoid pro

UPPER SURFACE — Presents from before backwards:
Ethmoidal spine, which articulates with ethmoid;
Smooth surface slightly elevated in median line, and which supports olfactory ner
Optic groove leading laterally to optic foramen;
Olivary process;
Pituitary fossa or sella turcica bounded laterally & in front by middle clinoid proc
Dorsum sellæ notched laterally for 6th pair of cranial nerves, and presenting pos
clinoid processes at its superior angles. On each side of body
Cavernous groove curved like an italic *S* for internal carotid artery.

ANTERIOR SURFACE — Presents in middle line the
Sphenoidal crest, which articulates with perpendicular plate of ethmoid; on either si
Openings of the sphenoidal sinuses, which are partly closed in front by the
Sphenoidal turbinated bones or bones of Bertin. – This surf. articulates laterall
os planum of ethmoid, and inferiorly with orbital process of palate

UNDER SURFACE — Presents in middle line the
Rostrum, which is received between the alæ of the vomer, and is conti
anteriorly with sphenoidal crest; on each side of the rostrum
Vaginal process, which passes inwards beneath, and articulates with
alæ of the vomer, and externally to which
Pterygo-palatine groove, which forms pterygo-palatine canal with sphe
process of palate

POSTERIOR SURFACE — Articulates with basilar process of occipital bone, with
it unites at age of 18

GREATER WINGS — Present:

SUPERIOR or CEREBRAL SURFACE — Forms part of middle fossa of ba
skull, and presents from before backwards at its inner
Foramen rotundum for superior maxillary nerve;
Foramen ovale for inferior maxillary & small petrosal nerves & small meningeal a
on the inner side of which latter foramen is sometimes see
Foramen Vesalii for a small vein;
Foramen spinosum for middle meningeal artery.

EXTERNAL SURFACE — Is divided by pterygoid ridge into:
Superior part, which enters into formation of temporal fossa, and
Inferior part, which assists in forming zygomatic fossa, and presents posteriorly
Spine of sphenoid for internal lateral ligament of jaw & laxator tympani m

ANTERIOR or ORBITAL SURFACE — Quadrilateral; assists in forming outer w
orbit and sphenoidal & spheno-maxillary fissures, and articulates with fr
& malar bones. Presents a small spine for lower head of external r

CIRCUMFERENCE.
FROM BACK OF BODY TO SPINE – Forms anterior or outer margin of foramen lac
medium, in front, and articulates, behind, with petrous portion of tempo
FROM SPINE TO TIP – Articulates with squamous portion of temporal bone,
bevelled internally below, externally a
FROM TIP TO FRONT OF BODY – Presents externally a broad triangular surfac
frontal bone, and forms, internally, lower boundary of sphenoidal fi

LESSER WINGS or PROCESSES of INGRASSIAS — Long, thin, triang

UPPER SURFACE — Smooth, forms part of anterior fossa of base of skull;

UNDER SURFACE — Forms back of roof of orbit and upper boundary of sphenoidal fi
which latter is bounded internally by body of sphenoid, and transmit
4th & 6th nerves, and ophthalmic nerve &

ANTERIOR BORDER — Articulates with frontal bone;

POSTERIOR BORDER — Forms at its inner extremity the anterior clinoid process.

INNER EXTREMITY — Presents two roots which bound optic foramen.

PTERYGOID PROCESS — Consists of two plates which bound pterygoid fossa, and
separated below by a triangular notch filled up by pterygoid process of palate bone.

ANTERIOR SURFACE — Forms posterior wall of spheno-maxillary fossa, and pre
anterior orifice of vidian c

EXTERNAL PTERYGOID PLATE — Broad, thin, inclined outwards. Forms
& outer walls of zygomatic & pterygoid fossæ respectively, and
attachment to internal & external pterygoid mus

INTERNAL PTERYGOID PLATE — Narrower & longer. Its
Outer & inner surfaces – Form respectively inner boundary of pterygoid fossa & c
boundary of posterior nares. At its apex it pres
Hamular process for reflection of tendon of tensor palati. and at its base
Scaphoid fossa for origin of that muscle.

THE ETHMOID BONE.

Light, spongy, cuboid, projects downwards from between orbital plates of frontal, and enters into formation of orbits & nasal fossæ

Articulates with *frontal, sphenoid & sphenoidal turbinated bones, both nasal, superior maxillary, lachrymal, palate, inferior turbinated & vomer*

May be divided into three parts :

HORIZONTAL OR CRIBRIFORM PLATE — Received into ethmoidal notch of frontal

Forms part of roof of nose & of anterior fossa of base of skull, and presents in the median line the

Crista galli, which gives attachment to falx cerebri, and articulates below & in front with frontal bone, completing foramen cæcum; – and on each side

Three rows of foramina for branches of the olfactory nerve, and more anteriorly a

Fissure for nasal branch of ophthalmic nerve.

PERPENDICULAR PLATE — Descends from under surface of former, and assists in forming nasal septum

Is more or less inclined to one or other side, and presents numerous grooves for branches of olfactory nerve

Articulates in front with frontal spine and nasal bones, behind with crest of sphenoid & vomer, and joins below with triangular cartilage of nose

LATERAL MASSES — Cuboid, and enclose a number of irregular cavities, the ethmoid cells, which are divided into an anterior & a posterior set. Their

Anterior, Upper & Posterior Surfaces – Present numerous half-cells, which are completed respectively by articulation with

Lachrymal bones & nasal processes of superior maxilla,
Frontal bone,
Sphenoidal turbinated bones & orbital processes of palate bones. – The upper surface also presents two grooves which assist in forming the anterior & posterior ethmoidal foramina

Outer Surface – Presents a thin smooth plate of bone the *os planum* which forms inner wall of orbit, and articulates with

Lachrymal bone, in front;
Orbital plate of frontal, above;
Body of sphenoid, behind;
Superior maxillary & orbital process of palate bone, below.

Under Surface – Presents under surface of middle turbinated process and the projecting *Unciform process*, which articulates with inferior turbinated bone, and assists in forming inner wall of the antrum of Highmore

Inner Surface – Forms part of outer wall of nasal fossæ, and presents from above downwards the

Superior turbinated process, small and corresponding to post. part of nasal fossæ
Superior meatus, which communicates with posterior ethmoidal cells;
Middle turbinated process, which extends along whole length of lateral mass;
Middle meatus, which communicates with the anterior ethmoidal cells (and through these with the frontal sinus) by means of a wide funnel-shaped canal, the

Infundibulum.

THE PARIETAL BONE.

Articulates with its fellow, the occipital, temporal, sphenoid & frontal. – Presents

OUTER SURFACE — Convex, and presents:
Parietal foramen at upper & back part;
Parietal eminence;
Temporal ridge, below which it forms part of temporal fossa.

INNER SURFACE — Concave, and presents:
Cerebral eminences & depressions;
Furrows, for ramifications of middle meningeal artery;
Half-groove for superior longitudinal sinus & falx cerebri;
Depressions for Pacchionian bodies.

BORDERS — Four:
Superior – Form sagittal suture by articulating with each other;
Inferior – Are:
In Front – Bevelled externally & overlapped by great wing of sp
& squamous portion of tem
Behind – Serrated for articulation with mastoid portion of temporal
Anterior – Serrated, and form coronal suture by articulating with fronta
Posterior – Serrated, and form lambdoid suture by articulating with occ

ANGLES — Four:
Anterior Superior & Posterior Superior – Correspond to ante
posterior fontanelles, and form part of foregoing su
Anterior Inferior – Received between frontal & great wing of spheno
inch above and behind superior external angle of orbit.
grooved internally and sometimes chanelled for anterior b
of middle meningeal a
Posterior Inferior – Articulates with mastoid portion of temporal, an
sents part of groove for lateral

BONES OF FACE.

SUPERIOR MAXILLARY BONE—1st Tablet.

Forms the whole of upper jaw by its union with its fellow.
Assists in forming:
Roof of mouth, floor & outer wall of nose, floor of orbit ;
Zygomatic & spheno-maxillary fossæ ;
Spheno-maxillary & pterygo-maxillary fissures.
May be described as presenting a body and four processes, malar, nasal, alveolar & palate

BODY — Hollowed out to form Antrum of Highmore. – Presents:

OUTER SURFACE — Convex. Presents from within outwards & backwards
Incisive or myrtiform fossa for depressor alæ nasi,
Canine fossa, large & deep for origin of levator anguli oris & compressor
at upper part of which fossa
Infra-orbital foramen for infra-orbital vessels & nerve;
Vertical ridge, which descends from malar process, and behind which is the
Maxillary tuberosity, which is rough along its posterior border for articul
with the palate bone & sometimes with pterygoid process of sphe

INNER SURFACE — Divided into two unequal parts by palate process.
PART ABOVE PALATE PROCESS – Presents from before backwards the
Inferior turbinated crest, above and below which are
Two wide antero-posterior grooves, which form part of middle & in
meatuses, and the former of which is surmounted b
Superior turbinated crest, which lies on inner surface of nasal proce
A deep groove which is converted into nasal duct by articulation wit
chrymal & inferior turbinated b
Aperture of Antrum of Highmore very large in disarticulated bone
diminished in articulated skull by ethmoid, lachrymal, in
turbinated & palate bones, and presenting inferiorly a f
into which is received the maxillary process of the palate
A rough surface which articulates with palate bone and is divided in
anterior & a posterior portion
Vertical groove, which forms part of posterior palatine canal.
PART BELOW PALATE PROCESS – Forms anterior part of roof of mouth.

UPPER SURFACE — Forms greater part of floor of orbit, and is bounded:
On Inner Side – By a thin edge which articulates from before backw
with lachrymal bone, os planum & orbital process of palate
On Outer Side – By a rounded margin which forms part of sp
maxillary fi
in Front – By lower part of circumference of orbit. – It presents b
Infra-orbital groove for infra-orbital vessels & nerve, which groove becomes
verted in fron
Infra-orbital canal ; – and at its anterior & inner part a
Depression for inferior oblique muscle.

Antrum of Highmore or Maxillary Sinus – Is a large cavity hollowed
body of the superior maxillary
Its walls correspond to the three surfaces of the body of the bone; the
very thin, and contain the infra-orbital & ant. & post. dental c
Its aperture communicates with the middle meatus of the nasal fossæ,
much diminished in size, and generally divided into two by a
lation with ethmoid, lachrymal, inferior turbinated & palate b
Several laminæ of bone project into its cavity, as do also the roots of t
& 2nd molar teeth, which sometimes perforate its

SUPERIOR MAXILLARY BONE—2nd Tablet.

MALAR PROCESS — Triangular, and presents:

Ant. Surface – Concave, forms part of canine fossa;
Post. Surface – Concave, forms part of zygomatic fossa;
Sup. Surface – Rough for articulation with malar bone.

NASAL PROCESS — Triangular, and presents:

Outer Surface – Concave, gives attachment to orbicularis palpebrarum, tendo oculi, levator labii superioris alæque nasi

Inner Surface – Presents from above downwards:
Rough surface, which articulates with ethmoid bone;
Superior turbinated crest which articulates with middle turbinated bone;
Inferior turbinated crest with the two grooves already described.

Ant. Border – Thin, serrated above for articulation with nasal bone, and continuous below with margin of the deep notch, which bounds laterally the anterior aperture of the nasal fossæ

Post. Border – Presents a groove which forms part of nasal duct, of which groove the
Inner margin articulates with lachrymal bone, while the
Outer margin forms part of circumference of orbit, and presents the
Lachrymal tubercle at its junction with orbital surface.

ALVEOLAR PROCESS — Forms a curve of a semi-horse-shoe shape. Is thicker behind than in front, and presents eight alveoli in adults, five in children.

PALATE PROCESS — Presents:

Upper Surface – Concave from side to side. Forms part of floor of nasal fossa, and presents in front the
Incisor foramen or *foramen of Stenson*, which is completed on its inner side by a thin lamina of bone directed backwards from its anterior to its posterior border (from the latter of which this lamina remains disconnected in youth). This foramen leads below into the
Anterior palatine canal formed by the junction of the two bones, into which canal when it is viewed from below, are also seen to open two other small foramina, the
Foramina of Scarpa situated in the suture between the two laminæ. – The foramina of Stenson transmit the anterior palatine vessels while the foramina of Scarpa transmit the naso-palatine nerves of which the right one is said to be posterior to the left.

Under Surface – Concave, rough, forms part of roof of mouth. – Is channelled by a
Groove (sometimes by a canal) for the posterior palatine vessels & anterior or great palatine nerve, and presents behind anterior part of lower orifice of
Posterior palatine canal.

Inner Border – Raised into a ridge which forms with its fellow a groove for vomer, and presents in front the
Anterior nasal spine.

Ant. Border – Forms lower part of anterior aperture of nasal fossæ.

Post. Border – Articulates with horizontal plate of palate bone.

THE PALATE BONE—1st Tablet.

Presents *horizontal* and *vertical plates*, –from the point of junction of which two plates the *pte*
process projects backwards & outwards, –while from the upper border of the vertical plate pr
upwards, the *orbital process* in front, and the *sphenoidal process* be
It articulates with *its fellow, the superior maxilla, sphenoid, ethmoid, inferior turbinated* & *vomer.*
It assists in forming –principally, the *floor & outer wall of the nasal fossa and the roof of the mouth,*
–secondarily, the *floor of the orbit, the pterygoid & spheno-maxillary fossæ, and the inner wall*
Antrum of High

HORIZONTAL PLATE — Presents:

SUP. OR NASAL SURFACE – Smooth and concave from side to side, forms posterior part of flo
nasal

INF. OR BUCCAL SURFACE – Rough, marked posteriorly by a
Transverse ridge for attachment of aponeurosis of tensor palati, and more externally by
Deep notch, which assists in forming the posterior palatine foramen. A little further
on the under surface of the pterygoid process, ar
External & posterior small palatine foramina for external and posterior palatine nerves.

ANTERIOR BORDER – Serrated for articulation with palate process of superior maxilla.

POSTERIOR BORDER – Free for attachment of soft palate.

INNER BORDER – Thick, surmounted by a ridge, which forms with its fellow a groove for vo
presents posteriorl
Posterior nasal spine for azygos uvulæ.

VERTICAL PLATE — Presents:

INNER SURFACE – Presents the
Superior & middle turbinated crests, above, between & below which are seen
A narrow & two wider horizontal grooves, which form part respectively of the superior, m
& inferior meat

OUTER SURFACE – Presents towards its middle a
Smooth surface, which forms the inner wall of the spheno-maxillary fossa, and is prolo
inferiorly i
Vertical groove, which assists in forming the posterior palatine canal. In front of thes
Rough surface, which articulates with the superior maxilla; and further forwards
Narrow smooth surface, which forms part of inner wall of antrum. Behin
Rough surface, which articulates above with the pterygoid process of the sph
below with the superior ma

ANTERIOR BORDER – Thin, irregular, presents a projecting lamina, the
Maxillary process, which assists in closing the lower part of the orifice of the antrum,
forming a schindylesis, penetrates into a fissure of the superior ma
at the lower part of that or

POSTERIOR BORDER – Articulates with the inner plate of the pterygoid process.

UPPER BORDER – Presents the
Orbital process in front, the *Sphenoidal process* behind, which processes are separated by a
Notch forming the greater part of the spheno-palatine foramen (which foramen is comp
above by the sphenoidal turbinated b

THE PALATE BONE—2nd Tablet.

PTERYGOID PROCESS — Fits into the notch between the two plates of the pterygoid proce
of the sphenoid bone, and present

POSTERIOR SURFACE – Triangular, concave, forms part of pterygoid fossa.

TWO LATERAL SURFACES – Rough, articulate with the two plates of the pterygoid process & wi
the superior maxill

UNDER SURFACE – Forms part of the roof of the mouth, and presents the
External & posterior small palatine foramina for external & posterior palatine nerves.

ORBITAL PROCESS — Projects upwards & outwards from the anterior part of the upper bord
of the vertical plate, and present

THREE ARTICULAR SURFACES – *Anterior, posterior & internal,* – which join respectively with the *superi*
maxillary bone, the sphenoidal turbinated bone & the lateral mass of the ethmoi

TWO NON-ARTICULAR SURFACES :–
Superior or Orbital – Forms posterior part of floor of orbit;
External or Spheno-maxillary – Forms part of inner wall of spheno-maxillary fossa, and
separated from the foregoing by
Rounded border, which forms part of spheno-maxillary fissure.

SPHENOIDAL PROCESS — Curves upwards, backwards & inwards, and presents:

UPPER SURFACE – Articulates with sphenoid & sphenoidal turbinated bones, and assists in fo
ming pterygo-palatine cana

OUTER SURFACE – Articulates behind with pterygoid process, and forms in front that small pa
of inner wall of spheno-maxillary fossa, which lies behind spheno-palat. forame

INNER SURFACE – Concave, forms part of outer wall of nasal fossa.

THE SMALL BONES of the FACE.

NASAL BONES — Form bridge of nose. – Narrow & thick above, wide and thin
Pr

Outer Surface – Convex from side to side, concave from above downwards at uppe
Presents several arterial grooves and a foramen for a small

Inner Surface – Inversely curved; presents a groove for external branch of nasal

Borders:

SUPERIOR – Narrow, thick, articulates with frontal;

INFERIOR – Broad, thin, joined to lateral cartilage of nose; has a notch for nasal

EXTERNAL – Articulates with nasal process of superior maxillary bone;

INTERNAL – Thick, articulates with its fellow; is prolonged backwards into a crest
articulates with nasal spine of frontal & perpendicular plate of eth

LACHRYMAL BONES — Form front part of inner wall of orbit. Present

Outer Surface – Presents from before backwards:

Groove, which forms part of nasal duct;

Ridge, which gives attachment to tensor tarsi muscle;

Smooth surface, which forms part of inner wall of orbit.

Inner Surface – Presents a furrow corresponding to foregoing ridge; forms part in
of middle meatus, and articulates behind with ethmoid

Borders:

ANTERIOR, SUPERIOR, POSTERIOR – Articulate respectively with nasal & internal a
processes of superior maxillary & frontal bones, and with os planum of ethm

INFERIOR – Articulates behind with orbital plate of superior maxillary, and, in fr
prolonged downwards into a pointed process, *the hamulus lachrymalis*, whic
culates with lachrymal process of inferior turbinated

MALAR BONES — Articulate with temporal, frontal, sphenoid & superior maxillary
and form part of outer wall & floor of orbit, and of temporal &
matic fossæ. Pr

Outer Surface – Convex; presents a small malar foramen for malar branch of te
malar nerve, and gives attachment to the zygomatic m

Inner Surface – Articulates internally with superior maxillary bone by a rough
gular surface, and is concave externally, where forms part of temporal &
matic fossæ and presents a foramen for temporal branch of temporo-malar

Orbital Process – Projects backwards forming part of outer wall & floor of orbit & o
poral fossa; articulates from above downwards with frontal, sphenoid & su
maxillary bones, and bounds spheno-maxillary fissure anteriorly. – On its
surface it presents one or two temporo-malar fora

Frontal Process – Thick, vertical, articulates with external angular process of fro

Zygomatic Process – Long, horizontal, articulates with zygomatic process of tem

Borders:

ANTERO-SUPERIOR – Forms lower & outer part of circumference of orbit.

ANTERO-INFERIOR – Articulates with superior maxillary bone.

POSTERO-SUPERIOR & POSTERO-INFERIOR – Are continuous with superior and in
margins of zygomatic pr

INFERIOR TURBINATED BONES — Thin, and extend along whole leng
outer wall of nasal fossa. Pr

Outer concave & **Inner** convex **Surfaces,** marked by vascular grooves and canal
the latter of which looks upwards & inv

Upper Border – Which, from before backwards:

Articulates with inferior turbinated crest of superior maxillary;

Forms *lachrymal process*, which articulates with lachrymal & superior max
bones and completes nasal

Presents *maxillary process*, which curves downwards and outwards over
edge of orifice of antrum of High

Presents *ethmoidal process*, which ascends to join unciform process of ethm

Lower Border – Is free and slightly thickened.

VOMER — Forms posterior part of nasal septum, and is frequently bent to one or other
Pres

Lateral Surfaces – Present vascular & nervous furrows, and naso-palatine groo
naso-palatine

Superior Border – Presents a deep groove bounded by two projecting *alæ*, between
the rostrum of the sphenoid is received, and which are overlapped inferio
the vaginal processes of the same

Inferior Border – Articulates with ridge formed by palate plates of superior max
& palate b

Anterior Border – Is grooved above for articulation with perpendicular plate o
moid and joined below to cartilage of the se

Posterior Border – Free, thicker above than below; separates posterior apertu
of the

INFERIOR MAXILLARY BONE.

is curved upon itself, and consists of a middle horizontal portion, the body, and of two lateral vertical portions, the rami.

BODY — Presents:

EXT. SURFACE — Convex from side to side and concave from above downwards. Presents in median line the

Symphysis, a vertical ridge, at the lower part of which is the

Mental process, from which the

External oblique line passes backwards, first horizontally, giving attachment to depressores labii inferioris & anguli oris, and then obliquely & becoming continuous with anterior border of ramus. – Laterally above the oblique line is the

Incisive fossa for levator menti; and more externally the

Mental foramen for mental vessels & nerve.

The Buccinator is attached above oblique line behind, and the platysma, below it, in front.

INT. SURFACE — Concave from side to side and convex from above downwards. Presents the

Symphysis forming a linear depression, close to which near its middle are the superior & inferior pairs of

Genial tubercles giving attachment respectively to the genio-hyo-glossi & genio-hyoidei. Below these tubercles begins the

Internal oblique line or *mylo-hyoid ridge* for mylo-hyoid muscle, faintly marked at first, but becoming more distinct as it passes upwards & backwards. – Above & below this line are seen near the symphysis the

Sublingual fossa for sublingual gland;

Rough depression for anterior belly of digastric; and more externally

Submaxillary fossa for submaxillary gland.

Above posterior extremity of mylo-hyoid ridge is attached the superior constrictor of the pharynx.

SUP. BORDER — Thickest behind, where it is dejected inwards; presents sixteen alveolæ in the adult, ten in the child.

INF. BORDER — Thickest and slightly everted anteriorly.

RAMI — Are quadrilateral, and present:

EXT. SURFACE — Marked by oblique ridges for masseter.

INT. SURFACE — Presents near middle

Aperture of inferior dental canal, of which the anterior margin forms a prominent

Spine for internal lateral ligament of lower jaw; – and from which passes downwards & forwards the

Mylo-hyoid groove for mylo-hyoid vessels & nerve, behind which groove is a

Rough surface for internal pterygoid muscle.

UPPER BORDER — Presents the coronoid & condyloid processes separated by sigmoid notch.

Coronoid process – Triangular, gives attachment by its surfaces & borders to temporal muscle, and presents at its lower & front part a groove which is continued downwards upon the alveolar process, and which gives attachment inferiorly to the buccinator muscle.

Condyloid process – Consists of

Condyle – Oblong, convex from side to side and from before backwards & nearly transverse, its long axis when prolonged, meeting that of its fellow near anterior margin of foramen magnum

Neck – Flattened from before backwards, convex behind, excavated in front for external pterygoid muscle, presenting externally a tubercle for external lateral ligament of jaw.

ANTERIOR BORDER — Continuous with external oblique line; thin above, thicker below where grooved for buccinator.

LOWER & POSTERIOR BORDERS — Thick and form inferiorly the

Angle of the jaw, which gives attachment to masseter & internal pterygoid muscles and to stylo-maxillary ligament.

HYOID BONE.

Horse-shoe shaped, and suspended by stylo-hyoid ligaments from tips of styloid proce of temporal bones. Consists in youth of five parts, the body and the greater & le cornua, which parts are joined together by four arthrodiæ; the cornua usually join the body, the greater ones towards the middle period of life, the lesser ones in adva

BODY — Quadrilateral. Presents:

Anterior Surface - Convex, looks upwards & forwards, and is marked crucial ridge. The part above the ridge gives attachment to the hyo-glo genio-hyo-glossus & genio-hyoid; the part below the ridge gives attachme the mylo-hyoid, the stylo-hyoid & the aponeurosis of the digas

Posterior Surface - Smooth, concave; looks backwards & downwards, and is s rated from the epiglottis & the thyro-hyoid membrane by a quantity of l areolar tissue, in which a bursa is usually fo

Upper Border - Thick & rounded; gives attachment to genio-hyo-glossus by its terior lip, to thyro-hyoid membrane by its posterior

Lower Border - Thinner; gives attachment to sterno-, omo-, & thyro-hyoid.

GREATER CORNU — Projects backwards & slightly upwards, giving attachment su iorly to the hyo-glossus, internally to the middle constrictor of the phary and externally to the thyro-hyoid. It diminishes in size from before backwa and is flattened from above downwards. Its slightly enlarged extremity g attachment to the lateral thyro-hyoid ligam

LESSER CORNU — Small, conical; projects upwards & backwards from point of junc of body & greater cornu, and gives attachment to the stylo-hyoid ligam

SKULL AND FACE IN GENERAL.

UNDER SURFACE of BASE of SKULL.

Is bounded from before backwards by:
Alveolar arch & teeth of upper jaw;
Lower border of malar bone, zygoma & imaginary line **from zygoma to mastoid process;**
Superior curved line of occipital bone.

Grouping points of interest on under surface of skull, the latter may be said to present
before backw

Roof of Mouth;
Posterior Aperture of Nares:
Under Surface of Basilar Process, **on each side of which is a**
Quadrilateral Space, **the angles of which are formed by the** CONDYLE **of the occ**
bone, and by the PTERYGOID, ZYGOMATIC **and** MASTOID PROCESSES.
***Under** Surface of Remaining Part of Occipital Bone.*

ROOF OF THE MOUTH

Is formed by palate processes of superior maxillary & horizontal plates of palate bone
is bounded laterally & in front by alveolar

Is concave, uneven & marked by a crucial suture, and presents from before backwa
outw

Lower opening of anterior palatine canal, **into which may be seen to open, laterall**
Foramen of Stenson **for anterior palatine vessels, and in middle line,**
Foramina of Scarpa **for naso-palatine nerves;**
A groove **leading to**
Posterior palatine foramen **for post. palatine vessels & ant. or great palati**
Transverse ridge **for attachment of aponeurosis of tensor palati;**
Accessory or small palatine foramina, posterior & external, **for posterior or small, an**
external palatine ne

POSTERIOR APERTURE OF THE NARES

Is bounded by body of sphenoid, horizontal plate of palate bone, and inner plates of pter
processes, which latter present infe

Hamular process **for reflection of tendon of tensor palati, and superiorly,**
Scaphoid fossa **for origin of that muscle.**
Is divided into two by vomer, and presents inferiorly
Posterior nasal spine **for origin of azygos uvulæ, and superiorly**
Expanded alæ of vomer, **which articulate with rostrum & with vaginal process**
sphenoid, and on either side of whic
Pterygo-palatine canals **formed in part by sphenoid & in part by palate b**
and giving passage to pterygo-palatine vessels & ne

UNDER SURFACE OF THE BASILAR PROCESS

Presents in middle line
Pharyngeal spine **for median raphe & superior constrictor of pharynx, and latera**
Rough depressions **for insertion of recti capitis antici major & minor.**

QUADRILATORAL SPACE—V. next Tablet.

UNDER SURFACE OF THE OCCIPITAL BONE (REMAINING PART) —
s

Foramen magnum **for cord & its membranes, vertebral arteries & spinal acce**
nerves, on outer side of which forame

Condyles of occipital bone **having**
Jugular process **on their outer side,**
Anterior condyloid foramen **in front,**
Posterior condyloid fossa **sometimes perforated by the** *posterior cond*
foramen **be**

Ext. Occipital Crest **giving off laterally**
Superior & Inferior curved lines, **and ending posteriorly in**
External occipital protuberance,
For parts just mentioned see Occipital Bone.

QUADRILATORAL SPACE.

Is formed by the under surfaces of the occipital bone and of the squamous & petrous por
tions of the temporal and of the greater wing of the sphenoid, and is situated on eithe
side of the basilar proces

It is quadrangular.

ITS ANGLES

Are formed by the Condyles of the occipital bone and by the Pterygoid, Zygomati
& Mastoid processes. (Vide these parts in respective Tablets

It is divided in two by a well marked diagonal line obliquely directed from before bacl
wards & outwards, and presents points of interest both in front of & behind i
diagonal lin

ITS DIAGONAL LINE

Extends from the root of the pterygoid to the mastoid process, and presents from b
fore backwards & outwards th

Foramen lacerum medium closed by cartilage, and crossed superiorly by th
internal carotid artery & the Vidian nerv

Rough surface for origin of levator palati & tensor tympani;
Inf. orifice of Carotid Canal;
Vaginal process;
Styloid process, which gives attachment to the stylo-hyoid & -maxillary ligs
ments and from above downwards to the stylo-pharyngeus, -hyoideus
-glossus muscle
Stylo-mastoid foramen for facial nerve & stylo-mastoid artery.

IN FRONT & on the OUTER SIDE of the DIAGONAL LINE

Are found from before backwards & outwards the
Foramen ovale for inferior maxillary & small petrosal nerves and small menin
geal artery, and on inner side of which is sometimes found th
Foramen Vesalii for a small vein;
Foramen Spinosum for middle meningeal artery;
Spine of the Sphenoid for internal lateral ligament of jaw & laxator tympani m
*Openings of the canal for the tensor tympani muscle (above) & of the osseous portio
of the Eustachian tube (below*
Glenoid fossa divided by Glaserian fissure into
Anterior part, covered with cartilage which latter is prolonged ov
the emimentia articulari
Posterior part non articular, and bounded behind by the vaginal & au
ditory processes and the middle root of the zygom

BEHIND & on the INNER SIDE of the DIAGONAL LINE

Are the:
Jugular fossa for internal jugular vein. This fossa assists in forming the
Jugular foramen or Foramen Lacerum posterius, of which the
Anterior or inner part, smaller and separated from the remainder by
bony ridge, gives passage to the glosso-pharyngeal, pneum
gastric & spinal accessory nerves, while th
Posterior part, the larger, transmits the internal jugular vein;
Jugular process for rectus capitis lateralis & lateral occipito-atloid ligamen
This process has in front of it & to its inner side th
Anterior condyloid foramen for hypoglossal nerve; behind it & to its inner side th
Posterior condyloid fossa sometimes perforated by *posterior condyloid foramen* fo
a small vein to lateral sinu
Openings for Jacobson's & Arnold's nerves, and opening of Aqueductus Cochleæ.

INNER SURFACE of BASE of SKULL.

Presents three fossæ.

ANTERIOR FOSSA — The highest.

Formed by orbital plates of frontal, cribriform plate of ethmoid, lesser wings and
part of upper surface of body of sp
Presents the sutures between the foregoing bones, and in median line and from
downwards and then back
Front part of groove for superior longitudinal sinus,
Frontal crest,
Foramen cæcum,
Crista galli,
A slightly elevated ridge.
On the side of the two latter is the
Olfactory groove deep in front, where it is formed by cribriform p
ethmoid, and pr
Three rows of foramina for olfactory nerves,
Slit-like opening for nasal nerve,
Anterior & posterior ethmoidal foramina for nasal nerve and
rior & posterior ethmoidal ar

MIDDLE FOSSA — Vide next Tablet.

POSTERIOR FOSSA — The deepest.

Formed by occipital, petrous & mastoid portions of temporal and posterior inferior a
parietal, and bounded in front by dorsum sellæ & superior border of p
bones, and behind, by grooves for lateral s
Presents the sutures between the foregoing bones, and in the centre:
Foramen magnum for cord and its membranes, spinal accessory nerves & ver
ar

In Front of the Foramen Magnum is the

Basilar groove, which supports medulla oblongata & pons, and on the s
which are the *petro-occipital sutures,* which are grooved in
for inferior petrosal sinuses and expanded behind into ju
foramen or foramen lacerum pos

Behind the Foramen Magnum is the

Internal occipital crest, which separates the two
Inferior occipital fossæ, and ends in the
Internal occipital protuberance, which is situated at point of junction of th
Grooves for lateral sinuses, and to which corresponds the to
Here

On the Sides of Foramen Magnum are the

Anterior condyloid foramina for hypoglossal nerves, and, occasionally, th
Posterior condyloid foramina for a small vein to lateral sinus;
Jugular foramen or foramen lacerum posterius, of which the
Anterior or inner part, smaller and separated from the rema
by a bony ridge, gives passage to glosso-pharyngeal,
mogastric & spinal accessory nerves, whil
Posterior part, larger, transmits the internal jugular vein;
Posterior surface of petrous portion of temporal bone presenting
Internal auditory meatus for facial nerve and auditory artery
Slit-like aperture of Aqueductus Vestibuli for small artery &
and a process of dura m

MIDDLE FOSSA of BASE of SKULL.

Is narrow in median line & expanded laterally.

Is formed by body & greater wings of sphenoid, squamous portion and anterior surface of petrous portion of temporal and anterior inferior angle of parietal, and is bounded by lesser wings of sphenoid & anterior margin of optic groove, in front, and by superior border of petrous bones behind

Presents the sutures between foregoing bones and

In Median Line from before backwards:

Optic groove leading on either side to
Optic foramen for optic nerve & ophthalmic artery,
Olivary process,
Sella turcica on each side of which is the
Cavernous groove,
Dorsum sellæ presenting at its upper angles the
Posterior clinoid processes.

Laterally:

Cerebral eminences & depressions, and *grooves* for middle meningeal artery; and more internally, and from before backwards
Sphenoidal fissure or foramen lacerum anterius for 3rd, 4th & 6th nerves, and ophthalmic nerve & vein
Foramen rotundum for superior maxillary nerve,
Foramen ovale for inferior maxillary & small superficial petrosal nerve and small meningeal artery, (on inner side of which latter foramen is sometimes see
Foramen Vesalii for a small vein),
Foramen spinosum for middle meningeal artery,
Foramen lacerum medium closed with cartilage.

On Anterior Surface of Petrous Bone:

Internal orifice of carotid canal,
Depression for Casserian ganglion,
Grooves to Hiatus Fallopii for large superficial petrosal nerve and to a small and more external opening for small superficial petrosal nerve; frequently
Two other small foramina for small petrosal branch of glosso-pharyngeal and branch of glosso-pharyngeal to large superficial petrosal nerve
Eminence corresponding to superior semi-circular canal, on outer side of which is
Depression corresponding to cavity of tympanum.

LATERAL REGION of the SKULL.

Presents from behind forwards the:

Mastoid process;

Ext. auditory meatus;

Zygomatic arch & ramus of the jaw, which two latter arch over the temporal, zygon
& spheno-maxillary f

TEMPORAL FOSSA

Is formed by the temporal, frontal, & malar bones, the great wing of the sphe
& the anterior inferior angle of the parietal, and is deeply excavated belo
in

Is bounded above by the temporal ridge, and opens widely below into the zygo
fossa, the boundary line between the two being the zygomatic arch & the pter

ZYGOMATIC FOSSA

Is an irregular and imperfectly enclosed space, the incomplete walls of which are fo
on the anterior, inner, upper & outer aspects respectively b

Tuberosity of the sup. maxillary bone,

Ext. pterygoid plate,

Under surface of great wing of sphenoid as far as pterygoid ridge, and *squ*
portion of tempora

Zygomatic arch & ramus of lower jaw.

Communicates with temporal fossa beneath the zygoma, and with the orbit & sp
maxillary fossæ through the spheno-maxillary & pterygo-maxillary fissures.

Spheno-Maxillary Fissure – Is bounded by superior maxillary, great wing of sph
malar & palate bones, and joins internally at right angles with pte
maxillary fi

Opens up communications between the orbit and the temporal, zygoma
spheno-maxillary

Transmits infraorbital artery, superior maxillary nerve & ascending or o
branches of Meckel's gan

Pterygo-Maxillary Fissure – Is comprised between pterygoid process & tuberos
superior maxillary

Joins superiorly at right angles with spheno-maxillary fissure.

Transmits internal maxillary artery from zygomatic to spheno-maxillary

SPHENO-MAXILLARY FOSSA — Is the narrow & vertically elongated
comprised between the pterygoid process & the maxillary tuberosity, and bo
above & internally by the body of the sphenoid & the vertical plate of the palate

Its upper part is the point of meeting of the sphenoidal, spheno-maxillary & pt
maxillary fis

It communicates with the cranium, orbit, zygomatic & nasal fossæ by the foramen
dum & spheno- & pterygo-maxillary fissures & the spheno-palatine foramen, an
opening into it, the vidian, pterygo-palatine, posterior palatine & accessory pos
palatine c

THE ORBIT.

Quadrilateral pyramidal fossa looking forwards & outwards and formed by seven bones, the frontal, ethmoid, sphenoid (which enter into formation of both orbits), superior maxillary, malar, lachrymal & palate.

Communicates with cranium, and with nasal, temporal, zygomatic & spheno-maxillary fossæ through optic foramen, nasal duct & spheno-maxillary fissure.

Presents:

ROOF — **Formed by orbital plate of frontal & lesser wing of sphenoid. Is concave, and presents the suture between the foregoing bones, and in front the**

Lachrymal fossa **for lachrymal gland, and a**

Depression (fovea trochlearis) **for pulley of superior oblique.**

FLOOR — **Formed by upper or orbital surface of superior maxillary and orbital processes of malar & palate bones. Presents the sutures between foregoing bones, the**

Infra-orbital groove **for infra-orbital vessels & nerve, which becomes converted in front into**

Infra-orbital canal; **and also at its anterior & inner part a**

Depression **for inferior oblique muscle.**

INNER WALL — **Formed from before backwards by nasal process of superior maxillary, lachrymal, os planum of ethmoid, body of sphenoid. Is antero-posterior in direction and parallel to its fellow, and presents the sutures between foregoing bones and the**

Lachrymal groove **for lachrymal sac,**

Crest of lachrymal bone **for tensor tarsi muscle.**

OUTER WALL — **Formed in front by orbital process of malar bone, and behind by anterior or orbital surface of great wing of sphenoid. Is very oblique forwards & outwards being nearly at right angles with its fellow, and presents the suture between foregoing bones, and the**

Orifices **of one or two malar canals,**

Small spine **for lower head of external rectus.**

ANGLES:

SUP. EXTERNAL – Presents:

Articulation **of frontal with malar bone & orbital plate of sphenoid,**

Sphenoidal fissure **or *foramen lacerum anterius*** **for 3rd, 4th & 6th nerves and ophthalmic nerve & vein.**

SUP. INTERNAL – Presents

Suture **connecting frontal with lachrymal & os planum, in which suture are the**

Anterior ethmoidal canal **for nasal nerve & anterior ethmoidal vessels, and the**

Posterior ethmoidal canal **for posterior ethmoidal vessels.**

INF. EXTERNAL – Presents

Spheno-maxillary fissure **for infra-orbital vessels & nerve and ascending branches of Meckel's ganglion.**

INF. INTERNAL – Presents

Articulation **of superior maxillary & palate bones with lachrymal & os planum.**

CIRCUMFERENCE OR BASE — **Quadrilateral, looks forwards & outwards. Is bounded by supra-orbital arch and external & internal angular processes of frontal, anterior border of orbital surface & nasal process of superior maxillary, and anterior border of malar bone. Presents**

Supra-orbital notch or foramen **for supra-orbital vessels & nerve; and assists in forming**

Lachrymal groove **for lachrymal sac.**

APEX — **Corresponds to optic foramen for optic nerve & ophthalmic artery.**

THE NASAL FOSSÆ.

Two narrow irregular cavities comprised between the orbits & superior maxillary
and between the roof of the mouth & the front part of the base of the
Formed by ethmoid, sphenoid, frontal, superior maxillary, nasal, palate, inferior t
ated & vomer (all the bones of the face except malar & inferior maxi
Communicate with orbit (nasal duct), mouth, (anterior palatine canal), cranium (olf
foramina), spheno-maxillary fossa (spheno-palatine foramen), and wi
frontal, ethmoidal, sphenoidal, & maxillary sinuses. – Pr

ROOF — Narrow, and is from before backwards:
Oblique upwards & backwards and formed by nasal bone & nasal spine of frontal,
Horizontal and formed by cribriform plate of ethmoid,
Oblique downwards & backwards and formed by body of sphenoid. – Presents the s
between the foregoing bones and from before backw
Groove on nasal bone for outer branch of nasal nerve;
Half crest for perpendicular plate of ethmoid;
Olfactory foramina & nasal slit for olfactory and nasal nerves;
Openings of sphenoidal sinuses partly closed by sphenoidal turbinated bones;
Articulation of alæ of vomer with body of sphenoid.

FLOOR — Concave from side to side, and formed by palate processes of superior maxil
palate bones. – Presents the suture between foregoing bones
Upper orifice of the anterior palatine canal;
Half crest for vomer, which terminates in front & behind in the
Anterior & posterior nasal spines.

INNER WALL — Formed principally by the perpendicular plate of the ethmoid
& in front, and by the vomer below & behind, and secondari
nasal spine of the frontal, rostrum of sphenoid, crests of superior m
lary, nasal & palate bones. Has an angular deficiency in front wh
filled up by the cartilage of the septum. – Is frequently inclined t
or other side; and presents the sutures between the foregoing bone
Vascular & nervous furrows &
Naso-palatine groove for naso-palatine nerve.

OUTER WALL — Formed by:
Lachrymal bone & nasal process of superior maxillary;
Inner surface of ethmoid, superior maxillary & inferior turbinated bones;
Vertical plate of palate bone & inner plate of pterygoid process. – Presents the sutures be
the foregoing bones and from above downw
Superior turbinated process of ethmoid;
Superior meatus, into which open the sphenoidal & posterior ethmoidal si
and the spheno-palatine foramen. – Both are short and are situa
the posterior and upper part of the m
Middle turbinated process of ethmoid;
Middle meatus, larger than foregoing, into which open the Antrum of High
and through the infundibulum, the anterior ethmoidal cells & f
sin
Inferior turbinated bone;
Inferior meatus, the largest, presents in front the opening of the nasal duct

UPPER LIMB.

I.

AXILLA; FRONT OF ARM.

THE MAMMA.

Rudimentary in the male, small in the female before puberty; increases in size d
pregnancy & after delivery. – Pres

POSTERIOR SURFACE, or BASE — Somewhat concave; nearly circular
slightly elongated from below upwards & outwards. Rests upon pectoralis
& fascia covering it, and extends from 3rd rib to the 6th or 7th, and from s
sternum to a

ANTERIOR SURFACE — Presents, a little below its middle, the nipple surrounde
the a

Nipple – Cylindrical or conical; presents at its apex the openings of the lactif
ducts. Its surface is of a pink or brownish hue, wrinkled, provided
papillæ, and, near its base, with some sebaceous glands. It is suscep
of a sort of erection due mainly to the contraction of its muscular f

Areola – Rosy in the virgin; larger & darker in colour after the second mon
pregnancy & during lactation (when its sebaceous glands enlarge cons
ably), and also somewhat so during the remainder o

CUTANEOUS NERVES.

Superficial Descending – Several large branches from 3rd & 4th.
Descend between sterno-mastoid & trapezius, and divide into branches:

STERNAL – Cross origin of sterno-mastoid to integument of front of che
far as middle

CLAVICULAR – Cross clavicle (sometimes one of them perforates the bon
integument over pectoralis major & deltoid, communicating with
neous branches of the superior intercostal ne

ACROMIAL – Over acromion & clavicular origin of trapezius to integume
outer & back part of shou

Lateral Cutaneous – Pierce intercostals & serratus magnus midway between vert
& sternum, and divide in

Anterior Offset – Forwards to integument of side of chest & mamma, a
upper digitations of external ob

Posterior Offset – Backwards to integument over latissimus dorsi & scapul
The posterior offset of the lateral cutaneous branch of the
intercostal nerve, is called the *intercosto-humeral nerve*. It crosse
axilla, joins with lesser internal cutaneous nerve or nerve of Wri
& with internal cutaneous branch of musculo-spiral, and pierces
fascia to integument of upper inner & back part of arm; its size v
inversely with that of the nerve of Wrisberg. There is frequen
second intercosto-humeral nerve derived from the 3rd intercostal.

Anterior Cutaneous – The termination of intercostal trunk. Pierce internal
costals & pectoralis major by side of sternum, and turn outwards to in
ment of mamma & front of chest. The second joins with the clavi
branches of the superficial cervical pl

MUSCLES of UPPER LIMB—1st TABLET.

ANTERIOR THORACIC REGION.

Pectoralis Major – Anterior surface of inner half of clavicle; corresponding half o front of sternum; cartilages of all the true ribs except 1st or 7th or both; apon eurosis of external oblique.

Anterior or outer edge of bicipital groove of humerus. – S. by internal & external anterior thoracic nerves.

Pectoralis Minor – Outer surface & upper border of the 3rd 4th & 5th ribs near thei extremities.

Inner border of coracoid process of scapula. – S. by internal anterio thoracic nerve.

Subclavius – Cartilage of first rib in front of rhomboid ligament.

Groove on under surface of middle third of clavicle. – S. by one of th supra-clavicular branches of brachial plexus.

LATERAL THORACIC REGION.

Serratus Magnus – By nine digitations from outer surface & upper border of eigh upper ribs (the 2nd rib having two digitations).

Whole length of anterior lip of posterior border of scapula, the two uppe digitations being inserted into triangular smooth surface on anterior aspect o superior angle, the three middle digitations into posterior border between superio & inferior angles, and the four lower digitations into anterior aspect of inferio angle. – S. by posterior or long thoracic nerve or external respiratory nerve o Sir C. Bell.

Latissimus Dorsi – Spinous processes of the 6 or 7 lower dorsal vertebræ; by th posterior layer of lumbar aponeurosis, from the lumbar & sacral spines an the back part of outer lip of crest of ilium; from outer lip of crest of ilium fo an inch or more in front of lumbar aponeurosis; from the last three or four rib interdigitating with external oblique; sometimes by a few fibres from inferio angle of scapula.

Bottom of bicipital groove of humerus a little higher up than teres majo by a broad flat tendon twisted upon itself. – S. by long subscapular nerve.

AXILLARY ARTERY

From outer border of first rib to lower borde1 of tendons of teres major & latissimus
being either straight or slightly curved upwards or downwards according to positi
limb, and lying deeply at its origin & superficially at its termin

May be divided into three parts:

First Part – Above pectoralis minor; rests upon thoracic wall.

Second Part – Behind pectoralis minor; passes obliquely from thorax t

Third Part – Below pectoralis minor; lies on inner side of neck of humer

RELATIONS:

FIRST PART:

In front – Pectoralis major, costo-coracoid membrane; cephalic &
mio-thoracic veins; external anterior thoracic

Behind & on Inner Side – First intercostal space, first digitation
ratus magnus, posterior thoracic

On Inner Side & in Front – Axillary vein.

On Outer Side – Brachial plexus.

SECOND PART:

In Front – Pectorales major & minor.

Behind – Upper part of subscapularis & posterior cord of brachial p

On Inner Side – Axillary vein & inner cord.

On Outer Side – Coraco-brachialis & outer cord.

THIRD PART:

In Front – Pectoralis major (except at lowest part), junction of th
heads of median

Behind – Lower part of subscapularis, tendons of teres major & latis
dorsi, musculo-spiral & circumflex n

On Inner Side – Axillary vein, inner head of median, ulnar, int
cutaneous & lesser internal cutaneous n

On Outer Side – Coraco-brachialis, outer head of median nerve, mu
cutaneous

BRANCHES of the AXILLARY ARTERY

Vary considerably in mode of origin, size & number. Are still usually described after Haller as being given off as follows, from

FIRST PART:

Sup. Thoracic — Small. Inwards along upper border of pectoralis minor, and then between latter muscle & pectoralis major; anastomoses with intercostales & internal mammary

Acromio-thoracic — Short, thick, from fore part of artery. Forwards to upper border of pectoralis minor, and divides into branches;

ACROMIAL – Join with suprascapular & with both circumflex.

THORACIC – Two or three. To pectorales & serratus magnus, and join with intercostales & internal mammary

HUMERAL – One, rather large. Downwards with cephalic vein between pectoralis major & deltoid

SECOND PART:

Long Thoracic or Ext. Mammary — Large branch. Along lower border of pectoralis minor to mamma, pectorales & serratus, and to axillary glands & subscapularis. Joins with the other thoracic & with subscapular

Alar Thoracic — Small & often wanting. To axillary glands & cellular tissue.

THIRD PART:

Subscapular — The largest branch. Along lower border of subscapularis to lower angle of scapula, where joins with posterior scapular. Gives off twigs to surrounding muscles, and

DORSALIS SCAPULÆ – Arises an inch & a half from origin of subscapular. Round outer border of scapula between teres major, teres minor & long head of triceps, and then between teres minor & the bone. Gives off

Branches to subscapular fossa between subscapularis & bone; join with posterior- & suprascapular

Descending br. between teres major & minor.

Branches to infraspinous fossa; join with posterior- & suprascapular.

Ant. Circumflex — The smaller. Outwards beneath coraco-brachialis, short head of biceps & deltoid, giving off twig to shoulder joint; joins with following & with acromial branch of acromio-thoracic

Post. Circumflex — The larger. Through quadrangular space between teres major, teres minor, long head of triceps & humerus, and round neck of humerus beneath deltoid. Gives twigs to shoulder joint, and joins with preceding & with acromial branch of acromio-thoracic

BRACHIAL PLEXUS.

Formed as follows by anterior divisions of 5th, 6th, 7th, & 8th cervical and 1st dors
Fifth & Sixth Cervical unite between anterior & middle scaleni, and fo
OUTER PRIMAR
Eighth & First Dorsal unite behind scalenus anticus, and form the
Seventh forms alone the MIDDLE PRIMARY CORD. [PRIMAR
All three primary cords divide into *anterior & posterior divisions.*
Anterior divisions of *outer & middle* primary cords form the OUTER CORD.
Anterior division of *inner* primary cord forms the INNER CORD.
Posterior divisions of *all three* primary cords form the POSTERIOR CORD.

Broad between anterior & middle scaleni, where anterior divisions of the ner
above 2nd part of subclavian artery; contracted opposite clavicle, where in
outer cords lie at fore part of plexus on outer side of 3rd part of subclavian
& of 1st part of axillary; again expanded in axilla, where the three cords
inner, outer & posterior aspects of 2nd part of axillary, and where they bre
into the large nerves of upper

Communicates with the cervical plexus through loop between 4th & 5th nerves & th
branch from 5th nerve to phrenic, and with middle & inferior ganglia of sympa

BRANCHES — Are

ABOVE THE CLAVICLE:

Post. or Long Thoracic, or Ext. Respiratory of Sir C. Bell -
5th & 6th nerves, the two roots uniting in substance o
lenus a
Deeply along side of chest behind axillary vessels & cords of br
plexus as far as lowest digitation of serratus m

Suprascapular - From back of trunk formed by union of 5th & 6th.
Backwards & outwards beneath trapezius & through suprasc
foramen to supraspinous fossa, where lies between supra
tus & the
Round spine of scapula to infraspinous fossa. - Supplies supra- &
spinati (two twigs to each), shoulder-joint & sc

Muscular - To rhomboidei & frequently to levator anguli scapulæ (fro
nerve), subclavius (from 5th & 6th, anastomoses freq
with phrenic), scaleni & longus colli (variably from 6th

Communicating - From 5th cervical to phrenic on anterior scalenus.

BELOW THE CLAVICLE — The branches are given off from the three
as follows,
Outer Cord - External anterior thoracic, outer head of median
culo-cutaneous or external cuta
Inner Cord - Internal anterior thoracic, inner head of median,
internal cutaneous, lesser internal cutaneous or n. of Wri
Posterior Cord - The three subscapular nerves, musculo-sp
circu

Anterior Thoracic Nerves - Two, connected together by a loop on
side of axillary
EXTERNAL OR SUPERFICIAL - The largest. Crosses both axillary ar
vein to under surface of pectoralis
INTERNAL OR DEEP - The smallest. Between artery & vein, and
twigs to under surface of both pect

Subscapular Nerves - Three:
UPPER - The smallest; to upper part of subscapularis.
LOWER - To lower border of subscapularis & to teres major; the
muscle having sometimes a separate
LONG - The largest. Along lower border of subscapularis to lati

MUSCLES of UPPER LIMB—2nd TABLET.

ANTERIOR BRACHIAL REGION.

Biceps:

SHORT HEAD – Tip of coracoid process of scapula in common with coraco-brachialis

LONG HEAD – Top of glenoid cavity of scapula & glenoid ligament.

Back part of bicipital tuberosity of the radius. – S. by musculo-cutaneous nerve.

Coraco-brachialis – Tip of coracoid process of scapula in common with short head of biceps.

Rough impression a little above middle of inner surface of shaft of humerus. – S. by musculo-cutaneous nerve.

Brachialis Anticus – Lower half of inner & outer surfaces of shaft of humerus; front of internal & external intermuscular septa.

Under surface of coronoid process of ulna. – S. by musculo-cutaneous & musculo-spiral nerves.

BRACHIAL ARTERY

Commences at lower border of tendons of teres major & latissimus dorsi.

Down inner & anterior aspects of arm in groove along inner border of coraco-brachi biceps, lying at first on inner side, and then in front of, humerus,– its more direction being marked by a line drawn from outer side of axilla to midway be condyles of hu

Divides into radial & ulnar half an inch below bend of elbow, or opposite neck of radius.

RELATIONS:

ALONG THE ARM:

In front – Skin and fascia, inner border of coraco-brachialis & biceps; n

Behind – Long and inner heads of triceps, superior profunda artery & mu spiral nerve; coraco-brachialis, brachialis a

On Inner Side – Skin & fascia, internal cutaneous nerve, basilic vein; ulnar in upper part, median nerve in lowe

On Outer Side – Coraco-brachialis & biceps, humerus in upper part.

AT BEND OF ELBOW:

In front – Skin, superficial fascia, median basilic vein, branches of a division of internal cutaneous nerve; bicipital or semilunar

Behind – Brachialis anticus & elbow joint.

On Inner Side – Pronator radii teres, median nerve.

On Outer Side – Tendon of biceps, supinator longus, musculo-cutaneous & culo-spiral

BRANCHES:

Muscular — Irregular, to coraco-brachialis, biceps & brachialis anticus.

Nutritious — From near middle of artery. Enters nutrient canal near in of coraco-brachialis, and descends towards lower extremity of th

Sup. Profunda — From upper part of artery. With musculo-spiral ne groove of same name between inner & outer heads of triceps, and then b supinator longus & brachialis anticus, where joins with radial rec Gives off muscular branches, and an articular branch to back of elbow which joins with interosseous & posterior ulnar recurrent, and with i profunda or anastomotica

Inf. Profunda — Small, from near middle of artery. With ulnar nerve th internal intermuscular septum, and then between inner condyle & olec anastomoses with posterior ulnar recurrent & anastomotica

Anastomotica Magna — From lower part. Through internal intermu septum, and round back of humerus forming an arch above olecranon with articular branch of superior profunda. Joins with anterior & po ulnar recurrent & with inferior pro

UPPER LIMB.

II.

FRONT OF FOREARM.
PALM OF HAND.

SUPERFICIAL VEINS.

Radial – Commences at outer side of arch on dorsum of hand. Receives branches back of thumb & index finger, ascends along front of outer side of fore communicating with median, and joins at bend of elbow with median ce to form the ce

Anterior Ulnar – Commences on anterior aspect of wrist & inner side of palm of ascends along front of inner side of fore-arm communicating with posterior & median, and, at bend of elbow, joins with posterior ulnar, & then with basilic, to form the b

Posterior Ulnar – Commences at inner side of arch on dorsum of hand, rec vena salvatella from little finger, ascends along back of inner side of forearm at bend of elbow, joins with anterior ulnar, & then with median basilic, to for

Median – Commences in superficial structures of palm of hand, ascends along of front of fore-arm communicating with radial & anterior ulnar, and, aft ceiving a large branch from venæ comites of brachial, divides at bend of into median cephalic & median b

Median Cephalic – Usually the smaller. Ascends in groove between biceps inator longus, lying mainly in front of branches of anterior division of ex cutaneous nerve, and joins with radial vein to form the ce

Median Basilic – Usually the larger. Ascends in groove between biceps & pr radii teres, being more or less surrounded by branches of anterior divis internal cutaneous nerve, and lying in front of brachial artery, from which separated by bicipital or semilunar

Cephalic – Somewhat smaller than basilic. Ascends in groove along outer bor biceps and then in interspace between pectoralis major & deltoid, in which situation it is accompanied by humeral or descending branch of acromio-th artery, and ends in axillary vein between coracoid process & clavicle, its o being guarded by a pair of valves. It communicates sometimes with ex jugular or subclavian by a small branch which ascends in front of cl

Basilic – Somewhat larger than cephalic. Ascends in groove along inner bor biceps, pierces deep fascia with internal cutaneous nerve a little below mid arm, and ends in one of the brachial veins or in the ax

N.—Numerous varieties are observed in the disposition of the veins bend of the elbow: the median vein with both its terminal branches may b tirely wanting, or, the vein itself being wanting, its two terminal branches be supplied either by the radial or the anterior

MUSCLES of FRONT of FOREARM.

SUPERFICIAL LAYER.

Pronator Radii Teres.

Large or Superficial Head – Inner condyle & inner border of humerus i
mediately above it, deep fascia of forearm, intermuscular septum betwe
it & flexor carpi radialis.

Small or Deep Head – Ridge on inner surface of coronoid process of ul
below flexor sublimis digitorum.

Rough impression on middle of outer surface of shaft of radius
S. by median nerve.

Flexor Carpi Radialis – Inner condyle by common tendon; deep fascia;
termuscular septa on either side.

Front of base of 2nd metacarpal bone, & slightly into that of 3rd
S. by median nerve.

Palmaris Longus – Inner condyle by common tendon; deep fascia; int
muscular septa on either side.

Anterior annular ligament of carpus and palmar fascia. – S.
median nerve.

Flexor Carpi Ulnaris.

Anterior or Inner Head – Inner condyle by common tendon; deep fasc
intermuscular septum between it & palmaris longus.

Posterior or Outer Head – Inner border of olecranon, and by an aponeuro
which is common to it & to the flexor profundus, from upper two-thirds
posterior border of shaft of ulna.

Pisiform bone and slightly into annular ligament & base of
metacarpal bone. – S. by ulnar nerve.

Flexor Sublimis Digitorum.

Inner Head – Inner condyle by common tendon, and internal lateral li
ment of elbow-joint.

Middle Head – Tubercle on inner surface of coronoid process of ulna ab
pronator radii teres.

Outer Head – Oblique line on front of radius.

Sides of second phalanges. – S. by median nerve.

DEEP LAYER:

Flexor Profundus Digitorum – Depression on inner side of coronoid proc
of ulna, upper two-thirds of anterior & inner surfaces, and, by an ap
eurosis which is common to it & to flexor carpi ulnaris, from upper t
thirds of posterior border of shaft of ulna; inner half of interosse
membrane.

Bases of third phalanges. – S. partly by ulnar nerve, partly by
terior interosseous branch of median nerve.

Flexor Longus Pollicis – Upper two-thirds of anterior surface of shaft
radius; outer half of interosseous membrane; occasionally by a sm
slip from inner side of coronoid process.

Base of last phalanx of thumb. – S. by anterior interosseous bra
of median nerve.

Pronator Quadratus – Lower fourth of anterior surface & inner borde
ulna; aponeurosis which covers inner third of the muscle.

Lower fourth of anterior surface & outer border of radius. – S.
anterior interosseous branch of median nerve.

MUSCLES of OUTER SIDE of FOREARM.

Supinator Longus – Upper two-thirds of external condyloid ridge of humerus,
ternal intermuscular septum.

Outer side of base of styloid process of radius. – S. by musculo-spira

Extensor Carpi Radialis Longior – Lower third of external condyloid ridge
humerus, external intermuscular septum.

Back of base of second metacarpal bone. – S. by musculo-spiral nerv

Extensor Carpi Radialis Brevior – External condyle of humerus by a ten
common to it & to superficial muscles of back of forearm; external lateral li
ment of elbow-joint; deep fascia; intermuscular septa on either side.

Back of base of third metacarpal bone. – S. by posterior interosseou

RADIAL ARTERY

The smaller branch of bifurcation of brachial half an inch below bend of elbow or opp
neck of ra
Down front of outer side of forearm to a little to inner side of styloid process of radius.
Round outer side of carpus beneath extensor tendons of thumb.
Through upper part of first interosseous space between the two heads of abductor indicis.
Over bases of metacarpal bones & interossei, and beneath flexor tendons, lumbricales & ne
to base of 5th metacarpal bone, where inosculates with communicating branch of u
forming deep palmar arch. Lies a finger's breadth above level of superficial pa

RELATIONS in FOREARM:

In Front – Skin, superficial fascia, deep fascia, supinator longus.
Behind – Tendon of biceps, supinator brevis, pronator radii teres, flexor subl
digitorum, flexor longus pollicis, pronator quadratus, lower end of ra
On Outer Side – Supinator longus, radial nerve in middle third.
On Inner Side – Pronator radii teres, flexor carpi radialis.

BRANCHES:

IN FOREARM:

Radial recurrent — From upper part. Between brachialis anticus & supinator
gus, and anastomoses with interosseous recurrent & superior profu

Muscular — Numerous, to muscles on either side.

Ant. carpal — From lower part. Joins with anterior carpal branch of ulnar ben
deep flexor tendons; gives twigs to articulations of ca

Superficialis volæ — From termination of artery in forearm. Small, and end
muscles of thumb; or of more considerable size, and joins with &
pletes superficial palmar

ON BACK OF WRIST:

Post. carpal — Over back of carpus beneath extensor tendons. Joins with post
carpal branch of ulnar to form posterior carpal arch, which anaston
with termination of anterior interosseous artery of forearm, and gives

Dorsal Interosseous Arteries of Third & Fourth Spaces – Anastomos
upper part of interosseous spaces with perforating branches of
palmar arch. – Are usually exhausted in sheaths of tendons, inter
& integument over back of first phalanges, but are sometimes la
than usual, and are then prolonged upon dorsum of fingers in the s
of dorsal digital branches similar to those of thumb & outer si
index, and of

Metacarpal, or Dorsal Interosseous Art. of Second Space — Arise
neath extensor tendons of thumb, sometimes in common with posterior
pal, and is similar to, but larger than, the foregoing interosseous arteri

Dorsales pollicis } Correspond together to a first dorsal interosseous ar
Dorsalis indicis } The former supplies dorsal digital branches to both sides of
of thumb, the latter forms the dorsal digital branch of outer
of back of index.

IN PALM OF HAND:

Princeps pollicis } Correspond together to a first palmar interosseous ar
Radialis indicis } The former supplies palmar digital branches to both sid
front of thumb, the latter forms the palmar digital bran
outer side of front of index.

Perforating — Three. Through upper part of three inner interosseous spaces,
anastomose with corresponding dorsal interosseous art

Deep palmar interosseous — Usually three or four, but very variable in s
number. Descend in front of interosseous spaces, join with superficial
mar interosseous branches from superficial palmar arch, and then bifu
to form palmar digital branches to 3½ fingers on inner side of

ULNAR ARTERY

The larger branch of bifurcation of brachial half an inch below bend of elbow, or opposit neck of radiu

Deeply to near middle of inner border of forearm, lying upon brachialis anticus & flexo profundus and beneath median nerve and all the superficial muscles except flexo carpi ulnaris, and being at a distance from ulnar nerv

Beneath skin and fascia only along front of inner border of forearm, lying, with ulnar nerv on its inner side, between flexor carpi ulnaris & flexor sublimis digitorun

Over anterior annular ligament on outer side of pisiform bone & slightly in front of nerve.

Crosses palm of hand beneath skin & fascia and in front of flexor tendons & divisions o median & ulnar nerves, forming superficial palmar arch. This arch lies on a leve with lower border of abducted thumb, a finger's breadth below deep palmar arch and usually joins with superficialis volæ or radialis indicis, or sometimes wit princeps pollicis

BRANCHES:

Ant. ulnar recurrent — Small. Between pronator radii teres & brachialis anticus, and anastomoses with inferior profunda & anastomotica magna

Post. ulnar recurrent — Larger. Beneath flexor sublimis, and then betwee olecranon & inner condyle beneath flexor carpi ulnaris, and anastomose with interosseous recurrent, and with inferior profunda & anastomotica magna

Interosseous — Thick, an inch in length, to upper border of interosseous membrane where divides into

ANT. INTEROSSEOUS — Down front of interrosseous membrane with corresponding branch of median nerve and between flexors longus pollicis & profundus digitorum. Behind pronator quadratus, and through lower part of interosseous membrane to back of carpus where joins with posterior interosseous & posterior carpal arch. — Gives off a long slender twig to median nerve, and their nutrien arteries to radius & ulna

POST. INTEROSSEOUS — Between interosseous membrane & oblique or roun ligament, and then between superficial & deep muscles of back o forearm to back of carpus, where anastomoses with termination o anterior carpal & with posterior carpal arch; gives o

INTEROSSEOUS RECURRENT — Beneath anconeus & supinator brevis t interval between olecranon & external condyle, and anasto moses with superior profunda & posterior ulnar recurrent

Ant. Carpal — Joins with anterior carpal branch of radial beneath deep flexo tendons; gives twigs to articulations of carpus

Post. carpal — Beneath tendon of flexor carpi ulnaris, and over back of carpu beneath extensor tendons, joining with posterior carpal branch of radial and forming posterior carpal arch (Vide Radial artery). Sends a smal branch along metacarpal bone of little finger

Communicating — Between abductor & flexor brevis minimi digiti, and join with termination of radial to complete deep palmar arch

Superficial palmar interosseous (DIGITAL) — Usually four, but rather vari able in size & number. Descend with terminal branches of median & ulna nerves, first in front of, and then between, the flexor tendons (and on inne side of the innermost), and join with deep palmar interosseous branches from deep palmar arch. The trunks thus formed divide at clefts betwee fingers to form digital branches to 3½ fingers on inner side of hand

MEDIAN & MUSCULO-CUTANEOUS NERVES.

MEDIAN NERVE.

From inner & outer cords of brachial plexus by two roots which surround 3rd part of a
artery. – Lies at first on outer side (more or less so, but never quite in front)
part of axillary & upper part of brachial a
Crosses brachial artery usually in front, and lies on its inner side at bend of elbow.
Between the two heads of pronator radii teres, and down middle of front of forearm
deeply at first between flexor sublimis & flexor profundus digitorum, and then
ficially between tendon of flexor carpi radialis & outermost tendons of flexor s
Beneath anterior annular ligament to palm of hand, where lies in front of flexor tendo
becomes enlarged and flattened, and divides i

TERMINAL BRANCHES:

External – Supplies abductor, opponens & outer head of flexor brevis pollicis, a
palmar digital branches to thumb & outer side of index

Internal – Supplies the two outer lumbricales, and gives palmar digital bran
contiguous sides of index, middle and ring fingers. – The digital ner
superficial to the digital a

LATERAL BRANCHES:

None in upper-arm. In fore-arm:

Muscular – Arise near elbow; to all the superficial muscles of front of fore-arm
flexor carpi

Ant. Interosseous – With anterior interosseous artery between flexor longus
& flexor profundus digitorum, supplying the former & the outer half
latter, and ends in pronator qua

Palmar Cutaneous – From lower part. Pierces deep fascia a little above a
annular ligament and supplies integument of palm of hand & ball of
joining with palmar cutaneous branch of ulnar, and with radial or a
branch of external cut

MUSCULO-CUTANEOUS or EXTERNAL CUTANEOUS NERV

From outer cord of brachial plexus in common with outer head of median.
Through coraco-brachialis, and between biceps & brachialis anticus to a little above e
condyle, where perforates deep fascia, and divides, behind median cephal

Anterior Branch – Along front of radial side of fore-arm as low as wrist, wh
in front of radial artery, and joins with radial nerve. Sends filamen
ball of thumb, and accompanies radial artery to back of

Posterior Branch – Along back of radial side of fore-arm, joining with rad
with external cutaneous branch of muscul

Supplies coraco-brachialis, biceps & brachialis anticus, and sends twigs to humer
elbo

ULNAR, INT. CUTANEOUS, & LESSER INT. CUTANEOUS NERVES.

ULNAR NERVE.

From inner cord of brachial plexus in common with inner head of median, internal cutaneous & lesser internal cutaneous nerves. – Lies at first on inner side of 3rd part of axillary & upper part of brachial arteries.

Pierces internal intermuscular septum with inferior profunda, and descends in groove between olecranon & internal condyle.

Enters fore-arm between the two heads of flexor carpi ulnaris.

Descends on flexor profundus, being covered in upper part of fore-arm by flexor carpi ulnaris, lying superficially in lower part between tendon of latter muscle & innermost tendons of flexor sublimis digitorum. – Ulnar artery lies on outer side of nerve, and is distant from it in upper part of fore-arm.

Crosses anterior annular ligament a little behind artery & on outer side of pisiform bone, and divides into two.

TERMINAL BRANCHES:

Superficial – To palmaris brevis, integument & 1½ fingers on inner side of hand, joining with median.

Deep – Between abductor & flexor brevis minimi digiti, and beneath flexor tendons with deep palmar arch. Supplies muscles of little finger, interossei, the two inner lumbricales, adductor pollicis & inner head of flexor brevis.

LATERAL BRANCHES:

None in upper-arm. In fore-arm:

Articular to Elbow Joint – Several, small, arise behind elbow.

Muscular – To flexor carpi ulnaris & inner half of flexor profundus.

Palmar Cutaneous – Arises a little below middle of fore-arm. With ulnar artery to integument of front of wrist & palm of hand, joining with palmar cutaneous branch of median & frequently with internal cutaneous.

Dorsal Cutaneous – Large, arises a little above wrist. Winds inwards beneath tendon of flexor carpi ulnaris, and supplies integument & 1½ fingers on inner side of back of hand, joining with radial.

Articular to the Wrist.

INTERNAL CUTANEOUS NERVE.

From inner cord of brachial plexus in common with inner head of median, ulnar & lesser internal cutaneous nerves.

Along inner side of brachial artery in front of lesser internal cutaneous, giving off a cutaneous filament to integument over biceps.

Pierces deep fascia with basilic vein, and divides into:

Anterior Branch – In front of, or sometimes behind, median basilic vein to integument of front of inner side of fore-arm as low as wrist, frequently joining with palmar cutaneous branch of ulnar.

Posterior Branch – Over internal condyle to integument of back of inner side of fore-arm to near wrist, joining with lesser internal cutaneous & dorsal cutaneous branch of ulnar.

LESSER INTERNAL CUTANEOUS N. or N. of WRISBERG.

From inner cord of brachial plexus in common with inner head of median, ulnar & internal cutaneous nerves.

Along inner side of axillary vein & brachial artery & behind internal cutaneous nerve to integument of back of lower third of arm, joining with intercosto-humeral & posterior branch of internal cutaneous.

Its size & communications vary considerably. Frequently intercosto-humeral nerve is large, and takes the place of nerve of Wrisberg, joining brachial plexus by a small filament only, or not at all.

MUSCLES of PALM of HAND.

MUSCLES of the THENAR EMINENCE or MS. of the THU

Abductor Pollicis or Trapezo-phalangeal – Ridge on anterior surface of
zium & anterior annular ligament of wrist.
Outer side of base of first phalanx of thumb. – S. by median nerve.

Opponens Pollicis or Trapezo-metacarpal – Front of trapezium below the
& annular ligament.
Whole length of outer border of metacarpal bone of thumb. – S. by me

Flexor Brevis Pollicis or Trapezocarpo-phalangeal.
Outer or Superficial Head – Lower part of trapezium & anterior annular lig
Inner or Deep Head – Trapezoides, os magnum, base of 2nd & 3rd metacarpal
Either side of base of first phalanx of thumb, a sesamoid bone being
loped in each tendon. – S. by median nerve, & deep branch of ulnar.

Adductor Pollicis or Metacarpo-phalangeal – Lower two-thirds of anteri
face of 3rd metacarpal bone.
Inner side of base of first phalanx of thumb. – S. by deep branch of u

MS. of HYPO-THENAR EMINENCE or MS. of LITTLE FIN

Palmaris Brevis – Annular ligament & inner edge of central palmar fascia.
Skin over inner border of hand. – S. by superficial branch of ulnar

Abductor Minimi Digiti, or Pisi-phalangeal – Pisiform bone, and slightl
tendon of flexor carpi ulnaris.
Inner side of base of first phalanx of little finger. – S. by deep bra
ulnar nerve.

Flexor Brevis Minimi Digiti, or Unci-phalangeal – Unciform pro
unciform bone & annular ligament.
Inner side of base of first phalanx of little finger. – S. by deep bra
ulnar nerve.

Opponens or Adductor Minimi Digiti, or Unci-metacarpal* – Un
process of unciform bone & annular ligament.
Whole length of inner border of metacarpal bone of little finger.
deep branch of ulnar nerve.

*These names, expressive of the origin & insertion of the
ponding muscles, are due to Cruv

MUSCLES of the CENTRAL PALMAR REGION.

Lumbricales – First, and sometimes Second, from outer side of correspondin
flexor tendon. – Third and Fourth, from adjoining sides of 2nd & 3rd a
& 4th deep flexor tendons respectively.
Outer side of expansion of corresponding extensor tendon on b
first phalanges. – S., the two outer by median nerve; the two inner b
branch of ulnar nerve.

Palmar Interossei – Three. – They arise from the whole length of one side of the
carpal bone of one finger, and are inserted into the same side of the base
first phalanx of the same finger & into the expansion of the extensor
which covers it. – They are situated respectively on the inner side of th
metacarpal bone & index finger, and on the outer side of the 4th & 5th
carpal bones and corresponding ring & little fingers. They adduct these
towards an imaginary line drawn through the long or middle finger.
are supplied by the deep branch of the ulnar nerve.

Dorsal Interossei – Four – They arise by two heads from the adjacent sides
metacarpal bones, but more extensively from the side of that metacarpa
which corresponds to the finger into which the muscle is inserted. Th
inserted into the corresponding side of the base of the first phalanx of t
responding finger & into the expansion of the corresponding extensor te
They are situated respectively on the outer side of the 2nd metacarpal
index finger, on both sides of the 3rd metacarpal bone & middle finger,
inner side of the 4th metacarpal bone & ring finger. The 1st dorsal inter
muscle is larger than the others, and is sometimes called the abductor i
the radial artery passes between its two heads. – They abduct the finge
an imaginary line drawn through the long or middle finger. – They are s
by the deep branch of the ulnar nerve.

UPPER LIMB.

III.

PARTS ABOUT SHOULDER, BACK OF UPPER LIMB.

MUSCLES of UPPER LIMB—5th Tablet.

Deltoid – Upper surface & anterior border of outer half of clavicle; upper surfac outer border of acromion; whole length of lower lip of posterior border of s of scapula.

Rough triangular prominence a little above middle of outer surfac shaft of humerus. – S. by circumflex nerve.

Subscapularis – Inner two-thirds of subscapular fossa ; tendinous laminæ attache ridges of said fossa; aponeurosis which separates it from teres major.

Into lesser tuberosity of humerus and by fleshy fibres into the neck f short distance lower down. – S. by the two upper subscapular nerves f posterior cord of brachial plexus.

Supraspinatus – Inner two-thirds of supraspinous fossa & fascia which covers it.

Highest of the three facets on greater tuberosity of humerus. – S suprascapular nerve.

Infraspinatus – Inner two-thirds of infraspinous fossa & ridges on its surface; fa which separate it from the teres major & minor.

Middle facet on greater tuberosity of humerus. – S. by suprascapular ne

Teres Minor – Upper two-thirds of dorsal aspect of axillary border of scap intermuscular septa which separate it from infraspinatus & teres major.

Lowest facet on greater tuberosity of humerus and by fleshy fi into the neck for a short distance lower down – S. by a branch of circum nerve.

Teres Major – Dorsal aspect of inferior angle of scapula; intermuscular septa wh separate it from infraspinatus & teres minor.

Inner or posterior edge of bicipital groove of humerus. – S. by a bra from lower subscapular nerve.

Latissimus Dorsi – Spinous processes of the 6 or 7 lower dorsal vertebræ; by posterior layer of lumbar aponeurosis, from the lumbar & sacral spines the back part of outer lip of crest of ilium; from outer lip of crest of ilium an inch or more in front of lumbar aponeurosis; from the last three or four interdigitating with external oblique; sometimes by a few fibres from infe angle of scapula.

Bottom of bicipital groove of humerus a little higher up than teres m by a broad flat tendon twisted upon itself. – S. by long subscapular nerve.

Levator Anguli Scapulæ – Posterior tubercles of transverse processes of the 3, 4, upper cervical vertebræ between splenius & scalenus medius.

Posterior border of scapula between spine & superior angle. – S. by o the deep branches of the cervical plexus and by one of the supra-clavic branches of the brachial plexus.

Rhomboideus Minor – Ligamentum nuchæ and spinous processes of 7th cervical & dorsal vertebræ.

Posterior border of scapula opposite triangular smooth surface at roo spine. – S. by one of the deep branches of cervical plexus and by one of the su clavicular branches of the brachial plexus.

Rhmoboideus Major – Spinous processes of the 4 or 5 upper dorsal vertebræ and su spinous ligament.

Base of scapula between spine and inferior angle (Quain, Ellis), or ra nto a tendinous arch attached to the triangular smooth surface at roo spine & to the inferior angle and connected to posterior border of scapul a thin membrane (Gray). – S. by one of the deep branches of the cer plexus and by one of the supra-clavicular branches of the brachial plexus.

MUSCLES of UPPER LIMB—6th Tablet.

MUSCLES of BACK of FOREARM.

SUPERFICIAL LAYER.

Extensor Communis Digitorum – External condyle of humerus by the common tendon; deep fascia; intermuscular septa on either side.
Bases of 2nd & 3rd phalanges of the four fingers. – S. by posterior interosseous nerve.

Extensor Minimi Digiti – External condyle of humerus by the common tendon; deep fascia; intermuscular septa on either side.
Joins corresponding tendon of extensor communis. The common tendon thus formed is inserted into bases of 2nd & 3rd phalanges of little finger. – S. by posterior interosseous nerve.

Extensor Carpi Ulnaris – External condyle of humerus by the common tendon; middle third of posterior border of shaft of ulna; deep fascia; septum between it & foregoing muscle. Usually it simply covers, but sometimes it arises from, narrow portion of posterior surface of shaft of ulna internal to the vertical ridge.
Base of metacarpal bone of little finger. – S. by posterior interosseous n.

Anconeus – Back of outer condyle of humerus; deep fascia.
Rough triangular surface on outer side of olecranon & upper third of shaft of ulna. – S. by musculo-spiral nerve.

DEEP LAYER.

Supinator Brevis – External condyle of humerus; external lateral ligament of elbow-joint; orbicular ligament of radius; triangular depression below lesser sigmoid cavity & ridge behind the depression.
Inner, anterior, and outer aspects of radius above bicipital tuberosity & oblique line as low down as insertion of pronator radii teres. – S. by posterior interosseous nerve.

Extensor Ossis Metacarpi Pollicis – Outer half of posterior surface of shaft of ulna below insertion of anconeus; posterior surface of interosseous membrane; middle third of posterior surface of shaft of radius.
Base of first metacarpal bone. – S. by posterior interosseous nerve.

Extensor Primi Internodii Pollicis – Posterior surface of radius below foregoing muscle; interosseous membrane.
Base of first phalanx of thumb. – S. by posterior interosseous nerve.

Extensor Secundi Internodii Pollicis – Middle of outer half of posterior surface of shaft of ulna; posterior surface of interosseous membrane.
Base of terminal phalanx of thumb. – S. by posterior interosseous nerve.

Extensor Indicis – Posterior surface of shaft of ulna below foregoing muscle; interosseous membrane.
Joins corresponding tendon of extensor communis. The common tendon thus formed is inserted into bases of 2nd & 3rd phalanges of index finger. – S. by posterior interosseous nerve.

POSTERIOR BRACHIAL REGION.

Triceps:

Long Head – Rough triangular depression below glenoid cavity of scapula, and slightly from capsule of shoulder-joint.

Outer Head – Posterior surface of shaft of humerus above musculo-spiral groove; outer border of humerus; external intermuscular septum.

Inner Head – Posterior surface of shaft of humerus below musculo-spiral groove; inner border of humerus; internal intermuscular septum.

By a strong tendon into back part of upper surface of olecranon process of ulna. – S. by musculo-spiral nerve.

Subanconeus – Posterior surface of humerus above olecranon fossa.
Posterior ligament of elbow joint. – S. by musculo-spiral nerve.

MUSCULO-SPIRAL & CIRCUMFLEX NERVES.

MUSCULO-SPIRAL NERVE

The largest branch of brachial plexus. Arises from posterior cord in commo
circumflex, and lies at first behind 3rd part of axillary artery &
part of br
Downwards & outwards in front of tendons of teres major & latissimus dorsi,
spiral groove with superior profunda
Between brachialis anticus & supinator longus to front of external condyle, wh
divides into radial & posterior interosseous nerves. Its branche

Muscular – To triceps, anconeus, brachialis anticus, supinator longu
tensor carpi radialis l

Cutaneous – Three, small, one internal, two external; to integum
inner & posterior, and of outer & anterior aspects of arm,
outer aspect of for

RADIAL NERVE — The smaller.

Down front of outer side of fore-arm beneath supinator longus, lying on
side of radial artery, which artery is distant from it in upper third
to it in middle third. Winds outwards & backwards beneath ten
supinator longus about three inches above wrist, pierces deep fasci
divides into bra

EXTERNAL – The smaller. To outer side & ball of thumb; join
posterior branch of external cuta

INTERNAL – The larger. To integument, & remainder of 3½ fing
outer side of hand; joins with external cutaneous & with
cutaneous branch of ulnar. – Adjoining sides of middle
fingers may be supplied by same nerve, which may be eith
radial or the

POSTERIOR INTEROSSEOUS NERVE — The larger.

Through substance of supinator brevis to back of fore-arm.
Between superficial & deep muscles of posterior aspect of fore-arm, sup
them all except anconeus, supinator longus, & extensor carpi radialis l
Beneath extensores secundi internodii pollicis & communis digitorum to b
carpus, where it becomes ganglionic and supplies articulations of

CIRCUMFLEX NERVE

From posterior cord of brachial plexus in common with musculo-spiral.
Downwards & outwards behind axillary artery in front of subscapularis.
Backwards, with posterior circumflex vessels, through quadrilateral space bo
by teres major, teres minor, long head of triceps, & hu
Gives off a small twig to shoulder-joint, and divides

Superior Branch – The larger. Round neck of humerus as far as
ior border of deltoid; supplies deltoid, and gives off cuta
filaments which perforate the muscle to integument over
part of sh

Inferior Branch – The smaller. Supplies teres minor, back
of deltoid, & integument over back of shoulder; has freq
a gangliform enlargement on branch to teres

MUSCULAR ATTACHTS. of BS. of UPPER LIMB—1st T.

The muscles attached to the

CLAVICLE — Are six in number, and are attached as follows: –

Sterno-Cleido-Mastoid – Anterior surface & upper border of inner third.
Pectoralis Major – Anterior surface & anterior border of inner half.
Deltoid – Upper surface & anterior border of outer half.
Trapezius – Upper surface & posterior border of outer third.
Subclavius – Groove on under surface of middle third.
Sterno-Cleido-Hyoid – Sometimes, from back of inner extremity.

SCAPULA — Seventeen in number, and are attached as follows: –

Supraspinatus – Inner two-thirds of supraspinous fossa.
Infraspinatus – Inner two-thirds of infraspinous fossa & ridges on its surface.
Teres Major – Posterior aspect of inferior angle.
Teres Minor – Upper two-thirds of posterior aspect of axillary border.
Deltoid – Upper surface & outer border of acromion, whole length of lower lip posterior border of spin
Trapezius – Upper surface and inner border of acromion, whole length of upper lip posterior border of spin
Subscapularis – Inner two-thirds of subscapular fossa & ridges on its surface.
Serratus Magnus – Whole length of anterior lip of posterior border.
Rhomboideus Major – Posterior border between spine & inferior angle.
Rhomboideus Minor – Posterior border opposite triangular smooth surface at root of spine.
Levator Anguli Scapulæ – Posterior border between spine & superior angle.
Omo-Hyoid – Upper border on inner side of suprascapular notch.
Long Head of Triceps – Rough triangular depression below glenoid cavity.
Pectoralis Minor – Inner border of coracoid process.
Coraco-Brachialis, *Short Head of Biceps* – Tip of coracoid process.
Long Head of Biceps – Top of glenoid cavity.
Latissimus Dorsi – Sometimes, from back of inferior angle.

MUSCULAR ATTACHTS. of BS. of UPPER LIMB—2nd

The muscles attached to the

HUMERUS — **Are twenty-four in number, and are attached as follows: –**

Supraspinatus – Highest of the three facets on greater tuberosity.
Infraspinatus – Middle facet on greater tuberosity.
Teres Minor – Lowest facet on greater tuberosity, and by a few fleshy fibres int
neck for a short distance lower
Subscapularis – Lesser tuberosity, and by a few fleshy fibres into the neck for a
distance lower
Teres Major – Inner or posterior edge of bicipital groove.
Pectoralis Major – Anterior or outer edge of bicipital groove.
Latissimus Dorsi – Bottom of bicipital groove.
Deltoid – Rough triangular prominence a little above middle of outer surface of shaf
Coraco-Brachialis – Rough impression a little above middle of inner surface of shaft.
Brachialis Anticus – Lower half of inner & outer surfaces of shaft.
Inner & Outer Heads of Triceps –
Inner head – Posterior surface of shaft below musculo-spiral groove, inner bor
Outer head – Posterior surface of shaft above musculo-spiral groove, outer bor
Supinator Longus – Upper two-thirds of external condyloid ridge.
Extensor Carpi Radialis Longior – Lower third of external condyloid ridge.
Extensor Carpi Radialis Brevior – External condyle.
Extensor Communis Digitorum – "
Extensor Minimi Digiti – "
Extensor Carpi Ulnaris – "
Anconeus – "
Supinator Brevis – "
Pronator Radii Teres (Inner Head) – Inner condyle & internal condyloid ridge im

Flexor Carpi Radialis – Inner condyle.
Palmaris Longus – "
Flexor Carpi Ulnaris (Anterior or Outer Head) – Inner condyle.
Flexor Sublimis Digitorum (Inner Head) – "

MUSCULAR ATTACHTS. of BS. of UPPER LIMB—3rd T

The muscles attached to the

RADIUS — Are nine in number, and are attached as follows: –

Biceps – Back part of bicipital tuberosity.
Supinator Brevis – Inner, anterior & outer aspects of the bone above bicipital tuberosi & oblique line as low down as insertion of pronator radii ter
Flexor Sublimis Digitorum (Outer Head) – Oblique line.
Pronator Radii Teres – Rough impression on middle of outer surface of shaft.
Flexor Longus Pollicis – Upper two-thirds of anterior surface of shaft.
Pronator Quadratus – Lower fourth of anterior surface & outer border.
Extensor Ossis Metacarpi Pollicis – Middle third of posterior surface of shaft.
Extensor Primi Internodii Pollicis – Posterior surface of shaft below foregoing.
Supinator Longus – Outer side of base of styloid process.

ULNA — Are thirteen in number, and are attached as follows: –

Supinator Brevis – Triangular depression below lesser sigmoid cavity & ridge behind t depressi
Brachialis Anticus – Under surface of coronoid process.
Flexor Sublimis Digitorum (Middle Head) – Tubercle on inner surface of coronoid proc above pronator radii ter
Pronator Radii Teres (Outer Head) – Ridge on inner surface of coronoid process bel flexor sublim
Flexor Profundus Digitorum – Depression on inner surface of coronoid process, upper tw thirds of anterior & inner surfaces, and, by an aponeurosis which is comm to it & to flexor carpi ulnaris, upper two-thirds of posterior bord
Flexor Carpi Ulnaris (Posterior Head) – Inner border of olecranon, and by an aponeuro which is common to it & to flexor profundus, upper two-thirds of posterio. bord
Triceps –Back part of upper surface of olecranon.
Anconeus – Rough triangular surface on outer side of olecranon & upper third of shaft.
Pronator Quadratus – Lower fourth of anterior surface & inner border.
Extensor Carpi Ulnaris – Middle third of posterior border. Usually it simply cove but sometimes it arises from, narrow portion of posterior surface internal to t vertical rid
Extensor Ossis Metacarpi Pollicis – Outer half of posterior surface below insertion of ancone
Extensor Secundi Internodii Pollicis – Middle of outer half of posterior surface.
Extensor Indicis – Posterior surface below foregoing.

THE SHOULDER-JOINT.

Is an enarthrodial articulation, though not a typical one; for the glenoid cavity of the sc
is, in comparison with the head of the humerus, remarkably small & shallow, and
is little more than a mere apposition between the two bones. Considerable mobil
thus provided for. Displacement is, on the other hand, prevented to a great extent b
presence of the acromion & coracoid processes & coraco-acromial ligament. —
articular cartilage is thickest in the centre, on the head of the humerus, thickest
periphery, on the glenoid c

LIGAMENTS:

Capsular – From
Neck of scapula round margin of glenoid cavity to
Anatomical neck of humerus, extending farthest down humerus along its inner aspe

This capsule is thicker above than below. It is strengthened by the c
humeral ligament externally, by the tendons of the supra- & infraspinatus &
minor behind, and by that of the subscapularis in

It has two, sometimes three openings, through which the synovial
brane is prolonged upon the tendons of the subscapularis & biceps, and some
upon that of the infraspinatus. The tendon of the long head of the biceps
forates the lower part of the capsule, and becomes surrounded, within the
by a complete sheath of synovial mem

It is remarkably loose, and, when the muscles are cut, it admits of the
being separated more than an inch. The bones are therefore kept in appo
less by the ligaments themselves than by muscular action & atmospheric pre

Coraco-humeral, or Accessory – Strong flat band intimately blended with the ca
and extending obliquely
Root & outer border of coracoid process to
Front of great tuberosity of humerus.

Glenoid – Would be better described as an extension of the glenoid cavity than as a
ment, for, unlike the cotyloid ligament of the hip-joint, it does not ass
keeping the bones together. It is a fibro-cartilaginous ring triangular on se
its thickest portion is attached to the circumference of the glenoid cavity, a
sharp edge is free. It is continuous above with the tendon of the long head
biceps, by the bifurcation of which it is partly fo

SYNOVIAL MEMBRANE — Is prolonged through the above mentioned openings
c
Upon the tendon of the biceps, in the shape of a complete sheath, which allows the t
to traverse the articular cavity without being contained th
Upon the tendon of the subscapularis in the shape of a pouch of variable size com
between the tendon & the subscapular fossa; and som
Upon the tendon of the infra-spinatus in a similar manner; an independent bursa
ing at other times between the muscle & the infraspinous fossa.
independent bursa exists between the upper part of the caps
the coraco-acromial ligament & d

VASCULAR & NERVE SUPPLY — From the circumflex & supra-scapular vessels & n

MOVEMENTS — The shoulder joint is the freest of all the joints of the body, and adm
movement in every direction. The acromion & coracoid processes & the c
acromial ligament prevent displacement upwards of the head of the hu
and limit, unless the scapula be displaced, the elevation of the arm to abo
horizontal po

THE ELBOW-JOINT.

Is a ginglymoid articulation between the trochlea & the radial tuberosity or capitellum
the humerus, on the one hand, and, on the other, the greater sigmoid cavity of the ulna & th
cup-shaped depression on the head of the radius. – The articular surfaces of the radius
ulna are continuous with those of the superior radio-ulnar articulatio

LIGAMENTS — Are:

Anterior – Broad & pretty thick layer of superficial oblique & deeper vertical fibre
extending fro

Inner condyle & front of humerus just above coronoid fossa to
Orbicular ligament of radius & under surface of coronoid process of ulna, – to whic
vertical & oblique fibres a few transverse ones are adde

Posterior – Thin & membranous; consists of a few irregular fibres mainly trans
verse, which connec

Apex & sides of olecranon process to
Margin of olecranon fossa.

External Lateral – Thick, strong, triangular, shorter & narrower than the internal
fro

External condyle to
Orbicular ligament of radius & outer border of ulna.

Internal Lateral – Thick, strong, triangular; longer & broader than foregoing, an
divided into anterior & posterior portions extending respectively fro

Front, and from *lower & back part of inner condyle*, respectively to
Inner border of coronoid process, and *inner border of olecranon.*

SYNOVIAL MEMBRANE — Lines the coronoid & olecranon fossæ, and dips down be
tween the articular surfaces of the superior radio-ulnar articulation

VASCULAR & NERVE SUPPLY – From the superior & inferior profunda, & the radial
ulnar & interosseous recurrent arteries, and from the ulnar & musculo-cutaneou
nerve

MOVEMENTS — Flexion & extension only, which are limited by the locking of the coronoid
& olecranon processes in their respective fossæ. – The inner border of the trochlea
descending lower than the outer one, the axis of rotation is oblique downwards &
inwards; the path of motion lies, therefore, in a plane, oblique downwards & out-
wards, which circumstance, as is remarked by Cruveilhier, brings the hand
during flexion naturally and without effort towards the mouth

RADIO-ULNAR ARTICULATIONS.

Three in number, superior, middle, & inferior, the middle one consisting merely of two ligar
the interosseous & the oblique or

SUPERIOR RADIO-ULNAR ARTICULATION — Lateral ginglymus or diar
rotatorius between circumference of head of radius, on the one hand, and less
moid cavity & inner surface of orbicular ligament of radius, on the other, the
sigmoid cavity corresponding to the broad inner part, and the orbicular ligar
the narrow outer part of the radial articular surface. – The only ligament

Orbicular Ligament – Strong flat band, the four-fifths of a ring, which e
round head & upper part of neck of radiu

Anterior extremity to *Posterior extremity of lesser sigmoid cavity of ulna.*

The circumference of its lower border is narrower than that of its
border, so that the head of the radius is maintained by it both agai
ulna & against the capitellum of the humerus. Its inner surface is li
the synovial membrane, and forms part of the articular surfaces of th
Its outer surface gives attachment to external lateral ligament of elbo
and to supinator brevis

MIDDLE RADIO-ULNAR ARTICULATION.

Interosseous Ligament – Strong aponeurotic plane of fibres which pass ob
downwards & inwards b

Contiguous borders of radius & ulna.– It is broadest towards middle, per
inferiorly for anterior interosseous vessels, and deficient above from
an inch below tubercle of radius, thus leaving for posterior inter
vessels an opening bounded superiorly

Oblique or Round Ligament – Narrow fasciculus oblique downwards
war

Coronoid process to
Radius half an inch below bicipital tuberosity.

INFERIOR RADIO-ULNAR ARTICULATON — Lateral ginglymus or dia
rotatorius between head of ulna & sigmoid cavity of radius, to which is
an arthrodia between under surface of head of ulna & the triangular fibro-c
of the articulation. – The ligamer

Ant. Radio-Ulnar – Narrow band from
Anterior extremity of sigmoid cavity to
Front of head of ulna.

Post. Radio-Ulnar – Narrow band from
Posterior extremity of sigmoid cavity to
Back of head of ulna.

Triangular Fibro-Cartilage – The principal band of union, triangular, from
Lower margin of sigmoid cavity of radius to
Depression at root of styloid process of ulna.

Its upper & under surfaces are lined respectively with the synovi
branes of the inferior radio-ulnar & radio-carpal articulations, a
come in contact, the one with the head of the ulna, the other with th
form bone. Its margins are blended with the surrounding ligamer
is thinnest in the centre, and sometimes perforated; the two synovi
branes above mentioned are then continuous with eac

Synovial Membrane – Is very loose, and is termed the *membrana sac*
It extends between the triangular fibro-cartilage & the head of the u
becomes continuous, when the former is perforated, with the synovi
brane of the wri

THE WRIST-JOINT.

Is a condyloid articulation.

ARTICULAR SURFACES:

THE CONDYLE – Is formed by three bones, the scaphoid, semilunar, & cuneiform.

THE RECEIVING CAVITY – Is formed by the under surface of the radius & by the triangular fibro-cartilage of the inferior radio-ulnar articulation. – The under surface of the radius is divided by a linear elevation into two portions, the outer triangular, the inner quadrilateral, which portions correspond respectively to the scaphoid and the semilunar; the cuneiform articulates with the under surface of the triangular fibro-cartilage.

LIGAMENTS:

External Lateral – Short strong band, from

Apex of styloid process of radius to

Outer side of scaphoid & trapezium, & anterior annular ligament of carpus.

Internal Lateral – Round cord, from

Apex of styloid process of ulna to

Cuneiform & pisiform bones, & anterior annular ligament.

Anterior – Strong & broad membrane, from

Front of head of ulna, anterior margin of radius & its styloid process to

Scaphoid, semilunar, cuneiform, & slightly to os magnum.

Posterior – Thinner, from

Posterior margin of radius to

Scaphoid, semilunar & cuneiform.

VASCULAR & NERVE SUPPLY — Anterior & posterior carpal branches of radial & ulnar, anterior & posterior interosseous arteries, ascending branches of deep palmar arch. – Ulnar nerve.

MOVEMENTS — All but rotation.

FASCIÆ & SYNOVIAL MEMBRANES of the HAN
WRI

FASCIÆ — Are rather ligaments than fasciæ proper, and are therefore described here.

Anterior Annular Ligament of the Wrist – Continuous above with deep fa
forearm, and below with palmar fascia; extend
Pisiform bone & unciform process of unciform to
Tubercle of scaphoid, & ridge on anterior surface of trapezium.
It is pierced by tendon of flexor carpi radialis.
Beneath it pass the flexores sublimis & profundus digitorum enclosed in one sy
sheath, the flexor longus pollicis enclosed in another sheath, and the med
Into its anterior surface & upper border are inserted a few fibres of the pa
longus & flexor carpi u
From its lower border arise in part the abductor, opponens & outer head of
brevis pollicis, and the flexor brevis & opponens minimi

Posterior Annular Ligament of the Wrist – Thinner than foregoing, from
Cuneiform & pisiform bones, and lower part of ulna to
Styloid process & ridges on posterior aspect of radius.
Presents six divisions or compartments lined each of them with a separate sy
membrane, and which, from without inwards, correspond to the following c
grooves, and transmit the following mus
1. – Corresponds to shallow groove on outer side of styloid process of radius. –
mits extensores ossis metacarpi & primi internodii
2. – Corresponds to broad & shallow groove on posterior aspect of styloid pr
Transmits extensores carpi radiales longior &
3. – Corresponds to narrow & deep groove on back of lower extremity of ra
Transmits extensor secundi internodii
4. – Corresponds to broad & shallow groove on back of lower extremity of ra
Transmits extensores indicis & communis digi
5. – Corresponds to groove at point of articulation of radius & ulna. – Tra
extensor minimi
6. – Corresponds to groove on back of head of ulna. – Transmits extenso

Palmar Fascia — Consists of
Two Lateral Portions – Thin. Cover muscles of thumb & little finger, and ren
cesses between
Central Portion – Thick, strong, triangular; firmly adherent to integument;
superficial palmar arch, flexor tendons, & median & ulnar nerves, and gives
internally to palmaris brevis. It is narrow above, where it receives exp
tendon of palmaris longus, and is attached to anterior annular ligament
broad below, where it divides into four slips bound together by transverse
Each slip subdivides into two processes, which processes embrace the
tendons, and become attached to bases of first phalanges & glenoid liga
Between the slips are seen the palmar interosseous & digital arteries, the te
branches of the median & ulnar nerves, & the tendons of the lumbr

SYNOVIAL MEMBRANES — Are articular & tendinous.

Articular – Five: –
1. – *Membrana Sacciformis* of the inferior radio-ulnar articulation.
2. – *Synovial membrane of the radio-carpal articulation*, comprised betwe
first row of carpal bones & the under surface of the radius &
gular fibro-ca
3. – *General synovial membrane of the carpus*, comprised between bones
row, between bones of second row, between the two rows of
between the second row of carpal bones & the four inner meta
bones, and finally between the four inner metacarpal
4. – *Synovial membrane of the carpo-metacarpal articulation of the thumb.*
5. – *Synovial membrane of the articulation between the cuneiform & pisiform*

Tendinous – Vide Anterior & Posterior Annular Ligaments.

LOWER LIMB.

I.

FRONT & INNER SIDE OF THIGH.

MUSCLES of LOWER LIMB—1st Tablet.

ILIAC REGION.

Psoas Magnus – Bases of transverse processes of lumbar vertebræ, and by five from sides of bodies of lumbar & last dorsal vertebræ & from c ponding intervertebral substances; the slips being connected by tend arches which extend across the constricted part of the bodies of the verteb
Lesser trochanter of femur. – S. by anterior branches of lumbar n

Psoas Parvus – Sides of bodies of last dorsal & first lumbar vertebræ & correspo intervertebral substance.
Ilio-pectineal eminence. – S. by anterior branches of lumbar ner
Is frequently absent.

Iliacus – Iliac fossa & inner lip of crest of ilium; ilio-lumbar ligament; ba sacrum; anterior superior & anterior inferior spines of ilium & notch bet them; capsule of hip-joint.
Outer side of tendon of psoas, and upper part of line from lesse chanter to linea aspera in front of pectineus. – S. by anterior crural nerve.

ANTERIOR FEMORAL REGION.

Tensor Vaginæ Femoris – Anterior superior spinous process and anterior pa outer lip of crest of ilium.
Fascia lata about ¼ down outer side of thigh. – S. by superior gluteal n

Sartorius – Anterior superior spinous process of ilium & upper half of notch below i
Upper part of inner surface of shaft of tibia covering tendons of gr & semitendinosus. – S. by middle or internal cutaneous branch of anterior c nerve.

Rectus Femoris – Anterior inferior spinous process of ilium (straight tendon); g above brim of acetabulum (reflected tendon).
Upper border of patella in common with vasti & crureus. – S. by ant crural nerve.

Vastus Externus – Anterior border of great trochanter & horizontal ridge on its surface; rough line from great trochanter to linea aspera; whole length of lip of linea aspera & line from linea aspera to outer condyle; external i muscular septum.
Outer border of patella & slightly into head of tibia. – S. by ant crural nerve.

Vastus Internus – Line from inner side of neck of femur to linea aspera; whole le of inner lip of linea aspera & line from linea aspera to inner condyle; inner face of femur; internal intermuscular septum.
Inner border of patella & slightly into head of tibia. – S. by ant crural nerve.

Crureus – Anterior & outer surfaces of femur reaching from anterior intertrochan line to within a few inches of condyles.
Upper border of patella in common with rectus & vasti. – S. by ant crural nerve.

Taking the vastus internus & the crureus as forming but one muscle, describing the *Quadriceps extensor femoris* as a *Triceps*, we may say tha "VASTUS INTERNUS" arises from: – line from inner side of neck of f to linea aspera; whole length of inner lip of linea aspera & line from linea as to inner condyle; nearly whole of *inner*, *anterior* and *outer* surfaces of sh femur; internal intermuscular septum; – and that it is inserted into tend rectus & borders of patella, and slightly into head of tibia.

Subcrureus – Lower part of anterior surface of femur.
Upper part of synovial membrane of knee-joint. – S. by anterior c nerve.

FEMORAL ARTERY

Commences beneath Poupart's ligament midway between antero-superior spine of ilium
symphysis pubis, and a little to inner side of head of fem
Passes down front & inner side of thigh, being at first at a distance from, and then close
the shaft of the bo
Terminates at junction of middle and lower thirds of thigh, becoming popliteal artery in openi
in lower part of adductor magnus. – Some Authors describe a *common* femoral arte
descending as low down as the origin of the *deep* femoral, the main trunk below t
branch being called the *superficial* femor
Its direction is marked by a line drawn from midway between antero-superior spine of ili
and symphysis pubis to inner side of inner condyle of fem

RELATIONS — Must be examined in Scarpa's triangle, or in upper third, and in midd
third of thig

IN SCARPA'S TRIANGLE — The artery divides the triangle into two nea
equal parts, and h

In Front – Skin, superficial fascia, fascia lata (except opposite saphenous op
ning, where latter is replaced by cribriform fascia), sheath; internal c
taneous nerve & filaments of crural branch of genito-crural n.; inguin
lymphatic glan

Behind – Posterior part of sheath; psoas, pectineus, adductor longus; profun
artery & ve

On Inner Side at Upper Part – Femoral vein, which becomes posterior belo
On Outer Side – Psoas muscle, anterior crural & long saphenous nerves.

IN MIDDLE THIRD OF THIGH — It lies behind sartorius in Hunter's can
–a deep depression between vastus internus & tendons of adductors longus
magnus closed in anteriorly by a band of fascia,–and has femoral vein behi
it & to its outer side, and long saphenous nerve to its outer side & in fro

BRANCHES:

Superficial Epigastric — Arises close to Poupart's ligament. Through saph
nous opening, and then upwards and inwards in superficial fascia of abdome
and anastomoses with deep epigastric & internal mamma

Superficial Circumflex iliac — Arises close to Poupart's ligament. Pierc
fascia lata on outer side of saphenous opening, and upwards & outwards
low Poupart's ligament to crest of ilium. Anastomoses with circumflex ili
& gluteal arteri

Superficial or Sup. External Pudic — Arises near preceding. Inwar
through saphenous opening, and then across spermatic cord or round lig
ment to integument of abdomen, penis & scrotum, or lab

Deep or Inf. External Pudic — Arises with or near preceding. Inwards
neath fascia lata, which it pierces opposite pubes, to integument of perinæ
& to scrotum or labi

Profunda Femoris, or Deep Femoral — Vide next Tablet.

Muscular Brs. — Numerous, and given off along entire course.

Anastomotica magna — Arises in Hunter's canal. Descends upon tendon
adductor magnus, and divides int

Superficial Branch – With internal saphenous nerve to integument of inn
side of kn

Deep Branch – Through substance of vastus internus to inner side of front
knee, and anastomoses with superior internal & superior external artic
lar arteries & with recurrent branch of tibi

COLLATERAL CIRCULAT. — Is reestablished after ligature of the common femor
through the gluteal, ilio-lumbar & circumflex iliac arteries, which join wi
the external circumflex, through the obturator & sciatic, which join with t
internal circumflex, through the comes nervi ischiadici, which join wi
the terminal & perforating branches of the profunda. – After ligature of t
superficial femoral it is reestablished mainly through the deep femoral
its perforating branches, which join with the articular branches of the pop
te

INTERNAL or LONG SAPHENOUS VEIN — Commences at
side of arch on dorsum of foot. Accompanies long or internal saphenous
in front of internal malleolus, along inner side of leg, & behind inner cor
it then inclines forwards along inner aspect of thigh, and, passing th
saphenous opening, terminates in the femoral about an inch & a half
Poupart's ligament. It receives numerous cutaneous branches from
thigh, (the branches from inner aspect of thigh frequently uniting int
large trunk); and it also receives near its termination, the superficial e
tric, superficial circumflex iliac & superficial external pudic. It com
cates with the internal plantar, anterior & posterior tibial, & femoral
contains from two to six valves, which valves are usually more numero
the thigh than in th

ANTERIOR CRURAL NERVE.

The largest branch of lumbar plexus. — Arises mainly from 3rd & 4th lumbar nerves, b
receives also a fasciculus from the 2n
Descends through substance of psoas, and emerges from lower part of its outer border.
Passes down between psoas & iliacus, giving off small branches to iliacus & femoral artery.
Enters thigh beneath Poupart's ligament half an inch to outer side of femoral artery, ar
divides into anterior & posterior division

ANTERIOR DIVISION - Gives off:

Middle Cutaneous Nerve - Pierces fascia lata & generally sartorius also (whic
muscle it then supplies) about *three or four inches below Poupart's ligamen*
and divides into two branches to integument of front of thigh as low
knee. - Joins with crural branch of genito-crural, internal cutaneous
internal saphenou

Internal Cutaneous Nerve - Crosses upper part of sheath of femoral vessels givi
off a few cutaneous filaments, and divides int

ANTERIOR OR EXTERNAL BRANCH - Pierces fascia lata about *lower third of thig*
and divides into branches to integument of inner & outer sides
knee; joins with middle cutaneous & long saphenou

INNER OR POSTERIOR BRANCH - Along posterior border of sartorius, joining
a plexiform network beneath fascia with long saphenous & obturato
Pierces fascia lata *a little above inner side of knee;* supplies integument
inner sides of thigh & upper part of leg, joining with int. saphenou

Long or Internal Saphenous Nerve - The largest branch of anterior divisio
(arises sometimes from posterior division
Along whole length of outer side of femoral artery, lying first at a slight dis
tance from it, and then close to i
Pierces fibrous band which extends from vastus internus to tendons of addu
tors longus & magnus and forms anterior wall of Hunter's cana
Pierces deep fascia *between tendons of sartorius & gracilis*, and joins with intern
cutaneou
Passes with internal saphenous vein along inner side of leg & divides into tw
branches; one terminates at inner ankle, the other passes in front
ankle to integument of inner side of foo
Joins in plexiform network above mentioned with internal cutaneous & obtur
tor nerves; - gives off to integument of front of knee a large branc
nervus cutaneus patellæ, which, joining with external, middle & intern
cutaneous nerves & other branches of long saphenous, forms plexu
patellæ in front of knee; - gives off numerous branches to integument
front & inner side of le

POSTERIOR DIVISION - Gives off:

Muscular Branches

To all the muscles of front of thigh except tensor vaginæ femoris supplied b
superior gluteal n., and Sartorius supplied by filaments from middle
sometimes from internal cutaneous nerve. [pectineus is partly supplied b
obturator nerve

Articular Branches

Two: - one from nerve to vastus externus, long & slender & distributed to front
capsule; one from nerve to vastus internus, accompanies deep branch
anastomotica magna to inner side of capsu

MUSCLES of LOWER LIMB—2nd Tablet.

INTERNAL FEMORAL REGION.

Pectineus – Ilio-pectineal line & surface in front of it.

Upper part of line from trochanter minor to linea aspera, & into
behind trochanter minor. – S. by obturator or anterior crural nerve; – by
sory obturator nerve when the latter exists.

Gracilis – Inner margin of rami of pubes & ischium & lower half of inner margin of
of pubes.

Upper part of inner surface of shaft of tibia above semitendinosus
beneath sartorius. – S. by obturator nerve.

Adductor Longus – Front of pubes immediately below the crest & close to angle.

Middle third of inner lip of linea aspera between vastus internus
ductor magnus. – S. by obturator nerve.

Adductor Brevis – Front of pubes for about two inches below adductor long
between gracilis & obturator externus.

Upper part of linea aspera & lower part of line from it to lesser tro
ter below & behind pectineus. – S. by obturator nerve or anterior crural ne

Adductor Magnus – Lower part of descending ramus of pubes; ascending ra
outer side of tuberosity of ischium.

Lower part of line from great trochanter to linea aspera, whole leng
inner lip of linea aspera & line from it to inner condyle; by a strong te
into tubercle at upper & back part of inner condyle. – S. by obturator &
sciatic nerves.

DEEP FEMORAL ARTERY

From outer & back part of femoral one or two inches below Poupart's ligament, and nearly equals superficial femoral in size

Passes: -

Downwards & outwards in front of iliacus, on outer side of femoral artery;
Downwards & inwards behind femoral vessels & profunda vein, and in front of pectineus

Backwards between pectineus & adductor longus;
Downwards behind adductor longus, in front of adductors brevis & magnus; -
and ends in a small branch, which perforates lower part of adductor magnus to muscles of back of thigh, and anastomoses with inferior perforating & with branches of poplitea

BRANCHES:

EXTERNAL CIRCUMFLEX — The larger. From outer side of artery close to its origin

Outwards between branches of anterior crural nerve and beneath sartorius & rectus, and divides into branches

ASCENDING - Beneath tensor vaginæ femoris, and anastomose with gluteal & circumflex iliac

DESCENDING - Usually three or four & of considerable size. - Beneath rectus muscle to vasti, principally the external. One large branch descends with nerve to vastus externus as low as knee, and anastomoses with articular branches of poplitea

TRANSVERSE - Smaller. Wind round femur below trochanter major in substance of vastus externus, and anastomose with internal circumflex, sciatic & superior perforating

INTERNAL CIRCUMFLEX — The smaller. From inner & back part close to origin

Backwards between pectineus & psoas, and winds round inner side of neck of femur to interval between quadratus femoris and adductor magnus, and anastomoses with external circumflex, sciatic & superior perforating. Gives off branches

ASCENDING - To adductor muscles, gracilis & obturator externus; anastomoses with obturator

DESCENDING - Between adductors brevis & magnus, which it supplies.

ARTICULAR - Into acetabulum through notch beneath transverse ligament, supplies adipose tissue, and sends twigs along round ligament to head of femur

PERFORATING — Usually three & of good size. - Arise behind adductor longus above, in front of, and below, adductor brevis, and pass to back of thigh, the

SUPERIOR, — Perforating the adductor magnus above the brevis (some perforating adductor brevis also)

MIDDLE, — Perforating both these adductors;

INFERIOR, — Perforating the adductor magnus below the brevis;
and supply hamstring muscles & anastomose with each other, sciatic, internal circmflex & termination of profunda, the middle one, the largest, giving off ascending & descending branches, and nutrient artery of femur.

OBTURATOR NERVE.

Arises mainly from 3rd & 4th lumbar nerves, but receives also a fasciculus from th
(Sappey, Hirschfeldt, & Quain's diagram of lumbar pl
Descends through inner fibres of psoas, and emerges from inner border of that m
opposite brim of
Along outer wall of pelvis above obturator vessels to upper part of obturator for
enters thigh, and divides

Anterior Branch – The smaller. Descends in front of adductor brevis, and behind
tineus & adductor longus, to femoral artery, upon which it is distri
below the latter muscle. Gives off branc

ARTICULAR – To hip-joint; arises near obturator foramen.

MUSCULAR – To gracilis & adductor longus, and sometimes to pectineus & ad

ANASTOMOTIC TO INTERNAL CUTANEOUS & INTERNAL SAPHENOUS NERVES –
opposite lower border of adductor longus, and forms with the for
nerves a plexiform network beneath deep fascia of

Sometimes this anterior branch of the obturator nerve, and its communi
offset to the internal cutaneous & internal saphenous nerves, are
than usual. The latter then gives off cutaneous filaments to the s
the lower & inner part of the thigh, and descends along the posteri
der of the sartorius to the inner side of the knee-joint; here it pier
deep fascia, communicates again with the internal saphenous nerve
is then smaller than usual), and supplies the skin of the inner side
leg as low as its m

Posterior Branch – The larger. Pierces upper fibres of obturator externus, an
cends behind adductor brevis in front of adductor magnus; giv
branc

MUSCULAR – To obturator externus & adductor magnus (and to adductor
when the latter is not supplied by the anterior branch of the
ARTICULAR – Through opening in lower part of adductor magnus, and upon th
liteal artery to back of knee

ACCESSORY OBTURATOR NERVE

Arises (when it exists) either directly from obturator nerve, or, by se
filaments, from the 2nd, 3rd, & 4th l
Descends along inner side of psoas, crosses front of pubes, gets behind pec
and divides into branches to pectineus & hip-joint. Communicate
anterior branch of obturator nerve; the communicating branch is
times large, and is then prolonged as a cutaneous nerve to the
& leg

LOWER LIMB.

II.

FRONT OF LEG & DORSUM OF FOOT.

MUSCLES of LOWER LIMB—3rd Tablet.

ANTERIOR TIBIO-FIBULAR REGION.

Tibialis Anticus – Outer tuberosity & upper two-thirds of outer surface of shaft of t
adjoining part of the interosseous membrane; intermuscular septum betwe
& extensor longus digitorum; deep fascia.
Inner & under surfaces of internal cuneiform bone & base of first
tarsal. – S. by anterior tibial nerve.

Extensor Longus Digitorum – Outer tuberosity of tibia; upper three-fourths
terior surface of shaft of fibula; interosseous membrane; septa between i
tibialis anticus & peronei muscles; deep fascia.
Bases of 2nd & 3rd phalanges of four outer toes. – S. by anterior tibial n

Extensor Proprius Pollicis – Middle two-fourths of anterior surface of shaft of
internally to extensor longus digitorum; interosseous membrane.
Base of last phalanx of great toe. – S. by anterior tibial nerve.

Peroneus Tertius – Lower fourth of anterior surface of shaft of fibula; lower p
interosseous membrane; intermuscular septum between it & peroneus b
Base of 5th metatarsal bone. – S. by anterior tibial nerve.

FIBULAR REGION.

Peroneus Longus – Head & upper two-thirds of outer surface & of anterior & post
borders of fibula; intermuscular septa between it & muscles of front & back of
deep fascia.
Outer side of base of first metatarsal bone. – S. by musculo-cutan
branch of external popliteal nerve.

Peroneus Brevis – Lower two-thirds of outer surface of shaft of fibula, passing upv
in a pointed process beneath peroneus longus; intermuscular septa bet
it & muscles of front & back of leg.
Base of fifth metatarsal bone. – S. by musculo-cutaneous branch of
nal popliteal nerve.

MUSCLES of the FOOT.

DORSAL REGION.

Extensor Brevis Digitorum – Outer & upper surfaces of greater process
calcis, calcaneo-astragaloid ligament, anterior annular ligament of t
First phalanx of great toe & outer sides of long extensor te
of 2nd, 3rd, & 4th toes. – S. by external branch of anterior tibial ner

ANTERIOR TIBIAL ARTERY

Anterior & smaller branch of bifurcation of popliteal opposite lower border of poplitæu muscle

Forwards between the two heads of tibialis posticus, and between tibia & fibula throug opening in upper part of interosseous ligament

Downwards in front of interosseous ligament, shaft of tibia & ankle joint (where become dorsalis pedis), passing between tibialis anticus & extensor longus digitorum between tibialis anticus & extensor proprius pollicis, between tendon of extensor pro prius pollicis, which crosses it, and innermost tendon of extensor longus digitorum – lying in a line from inner side of head of fibula to midway between malleoli, an being deeply situated, above, between muscles on either side & beneath tendon o extensor proprius pollicis, and superficially, below, beneath skin, anterior annula ligament & fascia

Has two venæ comites. Anterior tibial nerve is first external, then anterio then again external to i

BRANCHES:

Recurrent tibial — Arises in upper part of leg. Upwards through tibialis anticu to front of knee, and anastomoses with inf. articular branches of poplitea

Muscular — Numerous small branches to muscles on either side.

Malleolar — Two; rather variable in size. Arise near ankle, and pass, the

INTERNAL, – To inner ankle beneath tendons of extensor proprius pollicis & tibia lis anticus

EXTERNAL, – To outer ankle beneath extensor longus digitorum,

and anastomose respectively with posterior tibial & internal planta and with tarsal & peronea

DORSALIS PEDIS ARTERY

From bend of ankle to back of first interosseous space, resting upon bones of tarsus be tween tendon of extensor proprius pollicis & innermost tendon of extensor brevi digitorum, which crosses it near termination, and having anterior tibial nerve on it outer side

BRANCHES:

Tarsal — Arches outwards beneath extensor brevis digitorum, and anastomoses wit metatarsal, external malleolar & external planta

Metatarsal — More or less obliquely forwards in front of preceding. Gives off th

THREE OUTER DORSAL INTEROSSEOUS ARTERIES – Along corresponding interosseou spaces. Are joined by anterior & posterior perforating branches, an supply dorsal digital branches to 3½ toes on outer side of foo

Dorsal Art. of Great Toe — Is the first dorsal interosseous artery, and supplie dorsal digital branches to 1½ toes on inner side of foo

Communicating — Between the two heads of first dorsal interosseous muscle, an inosculates with external plantar, completing plantar arch. Gives o plantar digital branches to 1½ toes on inner side of foot.

EXTERNAL POPLITEAL NERVE.

The smaller of the two terminal branches of great sciatic.
Along outer side of popliteal space close to biceps.
Pierces peroneus longus an inch below head of fibula, and divides into anterior & musculo-contaneous. Gives off branch

Articular - Three; accompany the two external articular & the recu tibial arteries to knee

Cutaneous - Two or three; supply integument of outer & back part o one, the communicans fibularis, crossses outer head of ga nemius, and joins the communicans tibialis to form extern short saphenous nerve (V. next Ta

Anterior Tibial Nerve - Beneath extensor longus digitorum to front of interos membrane; along outer side, in front of, and again along side of anterior tibial artery to front of ankle-joint. - Su muscles of front of leg, and divides

EXTERNAL BRANCH - Beneath extensor brevis digitorum, which it sup becomes ganglionic, and supplies articulations of t

INTERNAL BRANCH - With dorsalis pedis artery along inner side of dorsu foot; supplies adjoining sides of great & second toes, and with musculo-cutan

Musculo-Cutaneous Nerve - Between peronei muscles, which it supplies, and ext longus digitorum; pierces deep fascia about lower third of of leg, and divides

INTERNAL BRANCH - Supplies inner side of great toe, adjoining sides of 2 3rd toes, & integument of inner side of foot; joins with int saphenous & anterior t

EXTERNAL BRANCH - Supplies adjoining sides of 3rd, 4th, & 5th toes, and i ument of outer side of foot; joins with external or short saphe

External Saphenous Nerve—Behind outer malleolus with ext saphenous vein, and supplies integument of outer side of & little toe; joins with musculo-cutaneous. Is some larger than usual, and then supplies both sides of little and outer side o

EXTERNAL or SHORT SAPHENOUS VEIN — Commences at side of arch on dorsum of foot. Accompanies external or short saph nerve behind outer malleolus, along outer border of, & over, tendo Ac and between the two heads of gastrocnemius; it then perforates deep at lower part of popliteal space, and opens into the popliteal. It rec numerous branches from back of leg, and communicates with deep vei dorsum of foot & behind external malleolus. It is provided with two v one of which is always found near its termin

LOWER LIMB.

III.

GLUTEAL REGION, BACK OF THIGH, POPLITEAL SPACE.

MUSCLES of LOWER—4th Tablet.

GLUTEAL REGION.

Gluteus Maximus – Superior curved line on dorsum ilii & rough surface between posterior fifth of crest of ilium; sides of lower part of sacrum and coccyx & dinous expansion over back of sacrum; posterior surface of great sacro-sc ligament.

Fascia lata covering outer side of thigh, & rough line from great troc ter to linea aspera. – S. by inferior gluteal nerve.

Gluteus Medius – Dorsum ilii between superior & middle curved lines & outer crest between them; fascia covering anterior part of the muscle.

Oblique line on outer surface of great trochanter. – S. by superior gl nerve.

Gluteus Minimus – Dorsum ilii between middle & inferior curved lines.

Anterior border of great trochanter. – S. by superior gluteal nerve.

Pyriformis – By three fleshy digitations from front of sacrum between first, second, t & fourth anterior sacral foramina & from grooves leading from them; marg great sacro-sciatic foramen & anterior surface of great sacro-sciatic ligame

Posterior part of upper border of great trochanter. – S. by one of the cular branches of sacral plexus.

Obturator Internus – Whole of inner surface of true pelvis in front of and behin turator foramen; inner surface of obturator membrane & fibrous arch w completes canal for obturator vessels & nerve.

Upper border of great trochanter in front of pyriformis. – S. by one o muscular branches of sacral plexus.

Gemellus Superior – Outer surface of spine of ischium.

Upper part of tendon of obturator internus. – S. by one of the mus branches of sacral plexus.

Gemellus Inferior – Upper part of outer lip of tuberosity of ischium.

Lower border of tendon of obturator internus. – S. by one of the mus branches of sacral plexus.

Quadratus Femoris – Outer border of tuberosity of ischium.

Upper part of linea quadrati on back of great trochanter. – S. by o the muscular branches of sacral plexus.

Obturator Externus – Inner two-thirds of outer surface of obturator membrane cumference of obturator foramen, and fibrous arch which completes cana obturator vessels & nerve.

Digital fossa of femur. – S. by obturator nerve.

GLUTEAL ARTERY.

The largest branch of internal iliac, and the continuation of its poste. or division.
Through great sacro-sciatic foramen above pyriformis, and then between latt
muscle and gluteus medius, and divides int
SUPERFICIAL BRANCH – Gives off numerous branches to gluteus maximus & i
tegument over sacru
DEEP BRANCH – Forwards between glutei medius & minimus, and divides int
Superior Division – Along upper border of gluteus minimus towards a
terior superior spine of ilium, and joins with circumflex ili
Inferior Division – Crosses gluteus minimus towards great trochanter, a
joins with ascending branch of external circumfl

SUPERIOR GLUTEAL NERVE.

From back of lumbo-sacral cord.
With gluteal vessels through upper part of great sacro-sciatic foramen abo
pyriformis, and divides int
SUPERIOR BRANCH – Along middle curved line on dorsum ilii with superi
division of deep branch of gluteal artery. Supplies glutei medius
minim
INFERIOR BRANCH – Directly forwards between glutei medius & minimus, whi
it also supplies, and terminates in tensor vaginæ femor

SCIATIC ARTERY.

The larger of the two terminal branches of anterior division of internal iliac arte
and the largest branch of the artery after glute
Downwards in front of pyriformis & sacral plexus, lying a little behind & to outer si
of internal pud
Through great sacro-sciatic foramen below pyriformis and between great sciatic ner
& pudic vessels & ner
With small sciatic nerve over gemelli, obturator internus & quadratus femoris and
front of gluteus maxim
Gives off branches:
MUSCULAR, ARTICULAR to hip-joint;
COCCYGEAL, INFERIOR GLUTEAL;
COMES NERVI ISCHIADICI – Long, slender; with, and subsequently with
sheath of, great sciatic nerve to lower part of thig

SMALL SCIATIC NERVE.

From lower & back part of sacral plexus.
With sciatic vessels through lower part of great sacro-sciatic foramen below pyriform
Descends beneath gluteus maximus on inner side of great sciatic nerve.
Along back of thigh beneath fascia lata to lower part of popliteal space.
Perforates deep fascia, and accompanies external saphenous vein to skin of back
leg; communicates with external saphenous ner
Gives off branches:
INFERIOR GLUTEAL – Several, large; to under surface of gluteus maximus.
INFERIOR PUDENDAL – Forwards below tuber ischii to skin of perinæum and upp
& inner part of thigh, and to scrotum or labiu
CUTANEOUS – *Descending.* To skin of inner & outer sides of back of thigh, poplite
space and back of le
Ascending. Wind round lower border of gluteus maximus to integ
ment over its surfa

MUSCULAR BRS. OF SACRAL PLEXUS.

To pyriformis, obturator internus, gemelli & quadratus femoris.
The nerve to obturator internus passes behind spine of ischium and through less
sacro-sciatic foramen to inner surface of the musc
The gemellus inferior and the quadratus femoris are supplied by a common branc
which runs between capsule of hip-joint and the obturator intern
& gemelli, and gives off an articular filament to the joi

PUDIC ARTERY.

The smaller of the two terminal branches of anterior division of internal iliac artery.
Descends in front of pyriformis & sacral plexus, lying to the inner side & a little in fro
sciatic ar
With pudic nerve through lower part of great sacro-sciatic foramen below pyriformis on i
side of sciatic nerves & sciatic ar
Winds round spine of ischium and re-enters pelvis through lesser sacro-sciatic foramen.
Forwards along outer wall of ischio-rectal fossa below pudic nerve, being covered by obtu
fascia, and lying at first 1½ inches above lower extremity of tuber ischii, but approac
surface as it progre
Pierces deep layer of deep perinæal fascia, and ascends along pubic arch between the
layers of that fascia to near symphysis p
Pierces superficial layer of deep perinæal fascia, and divides into artery of corpus cavern
and dorsal artery of p
It gives off: – *Inferior Hæmorrhoidal, Superficial Perinæal, Transverse Perinæal, Artery o*
Bulb, & Artery of the Corpus Caverno

PUDIC NERVE.

From lower part of sacral plexus.
With pudic artery through lower part of great sacro-sciatic foramen on inner si
great sciatic n
Winds round spine of ischium, and re-enters pelvis through lesser sacro-sciatic fora
where it gives off inferior hæmorrhoidal n
Forwards along outer wall of ischio-rectal fossa above pudic artery, both nerve & a
being covered by obturator fascia, and divides into perinæal nerve & d
nerve of the

MUSCLES of LOWER LIMB—5th Tablet.

POSTERIOR FEMORAL REGION (Hamstring Musceles).

Biceps.

LONG HEAD – In common with semitendinosus from lower & inner of the two su
faces on back part of tuberosity of ischium.

SHORT HEAD – Whole length of outer lip of linea aspera between adductor magn
& vastus externus and from inferior external division of linea aspera to with
two inches of outer condyle.

Outer side of head of fibula by a strong tendon, which divides into t
parts to embrace long external lateral ligament of knee-joint, sends a fibro
prolongation to outer tuberosity of tibia, and gives off an expansion to fascia
leg. – S. by great sciatic nerve.

Semitendinosus – In common with long head of biceps from lower & inner of the t
surfaces on back part of tuberosity of ischium.

Upper part of inner surface of shaft of tibia below gracilis & beneath s
torius – S. by great sciatic nerve.

Semimembranosus – Upper and outer of the two surfaces on back part of tuberosi
of ischium above & on outer side of origin of biceps & semitendinosus.

By a tendon which divides into three portions, into:

Posterior part of inner tuberosity of tibia, sending an expansion ov
poplite
Groove on inner side of inner tuberosity of tibia beneath intern
lateral ligament of knee-join
Posterior & upper part of outer condyle of femur, forming chief pa
of posterior ligament of knee-joint. – S. by great sciatic nerv

PARTS CONCERNED in LATERAL LITHOTOMY.

Parts to be divided: -

1. *Integument, superficial fascia, inferior hæmorrhoidal vessels & nerve;*
2. *Posterior fibres of accelerator urinæ & transversus perinæi muscles; probably al*
   transverse perinæal artery and superficial perinæal vessels & n
3. *Deep perinæal fascia, left deep transversus perinæi muscle & posterior fibres of*
   pressor urethræ; the anterior fibres of levator
4. *Membranous & prostatic portions of urethra, and part of prostate gland.*

Parts to be avoided: -

1. *The bulb and its artery* are endangered if incision is begun too far forward
   if the artery arises further back than usual it is exposed to be div
   whatever care be ta
2. *The rectum* is endangered if incision is begun too far inwards;
3. *The pudic artery*, if incision is carried too far outwards;
4. *Entire breadth of prostate with prostatic veins & accessory pudic artery, if the*
   exist, may be divided if incision into the deep parts is carried too far l
   wards, and the urine may then become infiltrated between the bla
   & rec

ABDOMEN.

I.

PERITONEUM, &c.

MUSCLES of the ABDOMEN.

External Oblique – Outer surface & lower borders of the *eight lower ribs*, interdi
ting by four or five slips with serratus magnus & by three or four
latissimus dorsi.

By fleshy fibres into anterior half of outer lip of crest of ilium, ar
aponeurosis forms in succession:

Poupart's ligament;
Gimbernat's ligament;
Outer pillar of external abdominal ring;
Inner pillar of external abdominal ring:
Superficial part of linea alba by decussating with its fellow,
perhaps also after decussatin
Triangular ligament & intercolumnar fascia of opposite side. (Vid
dominal Aponeu

Internal Oblique – Outer half of Poupart's ligament; anterior two-thirds of m
lip of crest of ilium; posterior layer of lumbar fascia.

Lower border of *cartilages of four lower ribs*; linea alba; crest of
& pectineal line behind Gimbernat's ligament to the extent of about ½ an
forming part of the conjoined tendon.

Transversalis – Outer third of Poupart's ligament; anterior three-fourths of
lip of crest of the ilium; inner surface of *cartilages of six lower ribs* interdi
ting with Diaphragm; by lumbar fascia from tips of spinous processes
& bases of transverse processes of all the lumbar vertebræ.

Linea alba; crest of pubes & pectineal line behind Gimbernat's liga
to the extent of about ½ an inch, forming part of the conjoined tendon.

Rectus Abdominis – By two heads from crest of pubes & ligamentous fibres cov
symphysis.

Cartilages of 5th, 6th & 7th ribs & side of ensiform cartilage.

This muscle is traversed by from 3 to 5 *lineæ transversæ*, irregula
dinous intersections, which interrupt the superficial fibres and adhere firm
anterior wall of sheath; these are situated opposite umbilicus, between umb
& ensiform cartilage, and, frequently, one or two less complete ones, ne
below umbilicus.

Pyramidalis – Front of pubes & anterior pubic ligament.

Linea alba midway between pubes & umbilicus. – Is often absent o
or both sides.

Cremaster – From middle of Poupart's ligament internally to lowest fibres of int
oblique & transversalis, and by a small pointed tendon from front of pub
sheath of rectus, forming large external, and smaller & less constant int
bundles. Is the everted gubernaculum testis with a few additional fibres o
internal oblique, and sometimes of the transversalis, drawn or pushed dow
the testicle during its descent (Curling).

Quadratus Lumborum.

ANTERIOR PORTION – Upper border of transverse processes of the two or three l
lumbar vertebræ.

Inner half of lower border of last rib.

POSTERIOR PORTION – Ilio-lumbar ligament, and for about 2 or 3 inches from p
rior part of inner lip of crest of ilium.

Apices of transverse processes of the 4 upper lumbar vertebræ, and
half of lower border of last rib,

N.—These muscles are supplied by the lower intercostal, ilio-hypogastr
ilio-inguinal nerves. The quadratus lumborum also rec
branches from the anterior divisions of the lumbar nerves.

PERITONEUM —1st Tablet.

The peritoneum is by far the most extensive & complex serous membrane of the body. To describ completely it is necessary to trace:

1. – The two sacs separately in the vertical direction & in the middle line;
2. – The two sacs together in the vertical direction;
3. – The greater sac horizontally below the level of the umbilicus;
4. – The two sacs together horizontally above the level of the umbilicus, or through foramen of Winslo
5. – The ligaments formed by the peritoneum, and the omenta & mesenteries.

Along the colon & upper part of the rectum the peritoneum is thrown into numerous pen lous processes filled with adipose tissue and termed the appendices epiploicæ.

THE TWO SACS SEPARATELY.

THE GREATER SAC.

Starting from umbilicus the peritoneum passes: –

Over anterior wall of abdomen & diaphragm;
Over upper surface of liver, forming *suspensory or falciform ligament & upper laye coronary ligam*
Over under surface of liver to transverse fissure;
To lesser curvature of stomach & first portion of duodenum, forming *anterior l of lesser or gastro-hepatic omentu*
Over anterior surface of stomach;
Downwards in front of intestine, forming *anterior layer of great omentum;*
Upwards to transverse colon, forming *posterior layer of great omentum;*
Over under surface of transverse colon;
To spine, forming *inferior layer of transverse meso-colon* & covering under surface transverse portion of duodenu

(In the fœtus, also occasionally in the child, and even, though very rar in the adult, the layer of peritoneum which continues the posterior layer the great omentum ascends in front of the transverse colon without adher to it, or adhering to it but slightly, and then passes backwards to the sp *above the transverse meso-colon.* The transverse meso-colon is then formed the peritoneum *again passing forwards from the spine to the transverse colon,* s rounding the latter, *and for the second time passing backwards to the spine.* pouch between the transverse meso-colon & the posterior layer of the gr omentum subsequently disappears by degrees, adhesions amounting finally complete fusion of the two layers into one, being established between two walls of the pouch before adult age is reached).

Along superior mesenteric artery, round small intestine and back to spine, form *mesente*
Downwards in front of spine & Aorta;
Over upper part of rectum, forming *meso-rectum;*
Forwards:

In Male: – To bladder, forming *posterior false ligaments of bladder & re vesical pou*
In Female: – To vagina & uterus, forming *posterior ligaments of uterus & re vaginal pouch*; and then over uterus & from uterus to bladd forming *anterior ligaments of uterus & utero-vesical pou*

Over bladder and from bladder to anterior wall of abdomen;
Up to umbilicus, covering urachus & obliterated hypogastric arteries.

THE LESSER SAC, or SAC of the OMENTUM.

Begins at the foramen of Winslow.

Foramen of Winslow – Is a constriction of the peritoneum bounded by:
In Front – Lesser omentum containing first part of duodenum, hepa artery, bile duct & portal ve
Behind – Right crus of diaphragm & inferior vena cava;
Above – Lobus Spigelii of liver (or rather lobus caudatus);
Below – Hepatic artery as it passes forwards from Aorta.

From this point the peritoneum passes: –

Downwards to lesser curvature of stomach, forming *posterior layer of lesser or gas hepatic oment*
Over posterior surface of stomach;
Downwards in front of intestine and then upwards, forming the *two internal layer great omentu*
Over upper surface of transverse colon;
To spine, forming *upper layer of transverse meso-colon;*
Over pancreas;
To under surface of liver, forming *inferior layer of coronary ligament,* and over poster part of under surface of liver to foramen of Winsl

PERITONEUM —2nd Tablet.

The two Sacs traced together in Vertical Direction.

From transverse fissure of liver: –
To lesser curvature of stomach, forming *lesser or gastro-hepatic omentum;*
Separate to surround stomach;
Descend in front of intestine, forming the *two anterior layers of great omentum;*
Ascend to transverse colon, forming the *two posterior layers of great omentum;*
Separate to surround transverse colon;
Backwards to spine, forming *transverse meso-colon;*
Separate:
One descends and forms in succession the mesentery, meso-rectum, recto-ve
pouch (or recto-vaginal & utero-vesical pouches)
The other ascends in front of pancreas and passes over back part of under su
of liver to foramen of Wins
(In the fœtus, also occasionally in the child, and even, though very ra
in the adult, the two posterior layers of the great omentum ascend in fro
the transverse colon without adhering to it, or adhering to it but slightly,
then pass backwards together to the spine *above the transverse meso-colon.*
they separate: – One layer descends, and forms in succession *the tran*
meso-colon, the mesentery, meso-rectum, &c.; the other layer ascends, as a
stated, over the pancreas & liver. The pouch between the transverse m
colon & the great omentum subsequently disappears by degrees, adhe
amounting finally to complete fusion of the two layers into one, being e
lished between the two walls of the pouch before adult age is reached.

Greater Sac traced Horizontally below Level of Umbilicus.

From median line of anterior wall of abdomen: –
To right iliac fossa, where it forms *meso-cæcum* & lower part of *ascending meso-colon;*
Along lateral & posterior walls of abdomen to spine, where it meets superior mesen
vessels and forms mesent
To left iliac fossa, where it forms *sigmoid meso-colon;*
Along lateral & anterior walls of abdomen to median line.

The two sacs traced together Horizontally above Level of Umbili or through Foramen of Winsl

From median line of anterior wall of abdomen: –
Over anterior & lateral walls of abdomen & over right kidney;
Through foramen of Winslow;
Over front of pancreas;
To spleen & then to back of stomach, forming *posterior layer of gastro-splenic omentum*
Over posterior surface of stomach;
Back to foramen of Winslow, forming *posterior layer of lesser or gastro-hepatic omentum*
Reflected outwards in front of bile duct, hepatic artery & portal vein, forming *an*
layer of lesser or gastro-hepatic omen
Over front of stomach;
Round spleen & to under surface of diphragm, forming *anterior layer of gastro-s*
omentum & suspensory ligament of sp
Over left kidney;
Over lateral & anterior walls of abdomen to median line.

PERITONEUM —3rd Tablet.

LIGAMENTS — Reflexions of peritoneum from walls of the abdomen or pelvis to visc
which are not portions of the intestinal ca

Belong to liver, bladder, uterus, & spleen.

Ligaments of the Liver – Four:

SUSPENSORY OR FALCIFORM LIGAMENT – Triangular or sickle-shaped fold reflec
over obliterated umbilical vein or round ligament, and attached to up
surface of liver, diaphragm, & sheath of rec

CORONARY LIGAMENT – Consists of two layers separated by a considerable int
space, in which interspace the posterior border of the liver is connec
to the diaphragm by firm areolar tissue. Its superior layer & the ri
half of its inferior layer are formed by greater bag; the left half of
inferior layer is formed by lesser b

LATERAL LIGAMENTS – The two triangular & pointed extremities of coronary li
ment. The left one is the longest & most distin

Ligaments of the Bladder – Five in number, and termed false ligaments:

POST. FALSE LIGAMENTS – The margins of recto-vesical pouch, in the male,
utero-vesical pouch, in the female. Contain obliterated hypogast
arteries & uret

LATERAL FALSE LIGAMENTS – From sides of bladder to sides of pelvis.

SUP. FALSE LIGAMENT – Over urachus and obliterated hypogastric arteries
umbilic

Ligaments of the Uterus – Six:

BROAD LIGAMENTS – From sides of uterus to sides of pelvis. Their free mar
contains from before backwards round ligament, Fallopian tube, & ova

ANT. & POST. LIGAMENTS – The margins of utero-vesical & recto-vaginal pouch
Obliterated hypogastric arteries & ureters are contained in both th
fo

Suspensory Ligament of the Spleen – Connects upper end of spleen to diaphrag

OMENTA — Folds proceeding from one viscus to another. Three:

Lesser or Gastro-hepatic Omentum – From transverse fissure of liver to les
curvature of stomach. – Its right free border contains hepatic artery,
duct & portal vein, and forms anterior boundary of foramen of Winsl

Great or Gastro-colic Omentum – Consists of four layers, of which the most
terior & the most posterior belong to greater bag, and the two internal
lesser bag. The two anterior layers descend from great curvature of stom
& spleen; the two posterior ascend to transverse colon (at least in adult;
arrangement in fœtus see foregoing Tablet

Gastro-splenic Omentum – Connects hilum of spleen to great cul de sac
stomach. Contains splenic vessels & vasa brevia, and is continuous
feriorly with great omentu

MESENTERIES — Folds connecting greater part of intestine to posterior wall of abdom
Sev

Mesentery Proper – Its root extends from left side of 2nd lumbar vertebra to ri
sacro-iliac synchondrosis. Its free border contains the small intesti
It is continuous superiorly with inferior layer of transverse meso-col
inferiorly with meso-cæcum & ascending meso-colon.

Meso-cæcum – Usually peritoneum merely passes in front of cæcum; and also mer
in front of ascending colon, forming

Ascending Meso-colon.

Transverse Meso-colon – Formed by junction behind transverse colon of the t
ascending layers of the great omentum. Backwards from transverse co
to spine, where it meets transverse portion of duodenum, and becon
continuous with mesente

Descending Meso-colon – Similar to ascending meso-colon.

Sigmoid Meso-colon – Broad & well marked fold, which allows of considera
mobility on the part of sigmoid flexu

Meso-rectum – Surrounds almost completely first portion of rectum, and cov
second portion in front & at sides above, in front only towards middle,
at all bel

SUPERIOR MESENTERIC ARTERY.

From front of aorta just below cœliac axis and behind splenic vein & pancreas.
Forwards between pancreas & transverse portion of duodenum, and crosses front of the la
Curves downwards to the right between layers of mesentery to right iliac fossa, and in
lates with its own ileo-colic bra

BRANCHES:

Inferior Pancreatico-duodenal – Given off behind pancreas.
Ascends along concave border of duodenum and joins with superior pancrea
duod

Vasa intestini tenuis – Ten or twelve or more, and arise from convex side of ar
Descend between layers of mesentery and divide each of them into two bran
by junction of each of which with the neighbouring branch, a first s
of arches is formed, to which 2nd, 3rd, 4th, & even 5th rapidly
nishing tiers succeed, the terminal branches encircling the inte
and ramifying in its c

Ileo-colic – The lowest branch from concavity.
Between layers of mesentery towards ileo-colic valve, and divides into:
ASCENDING BRANCH – To beginning of colon, and inosculates with c
de
DESCENDING BRANCH – To end of ileum, and inosculates with terminati
superior mesenteric, both branches forming arches as al

Colica dextra – From middle of concavity.
Beneath peritoneum and in front of right kidney to middle of ascending c
and divides
ASCENDING & DESCENDING BRANCHES, – Which inosculate respectively wit
colica media & the ileo-colic, also forming arches as a

Colica media – From upper part of concavity.
Between layers of transverse meso-colon towards middle of transverse colon,
ding as preceding arteries, and similarly inosculating with colica d
& colica sin

INFERIOR MESENTERIC ARTERY.

From left side of aorta one or two inches above bifurcation.
Descends along left side of aorta and front of psoas towards left iliac fossa, and then,
the name of superior hæmorrhoidal, curves to the right in front of left common i
ureter, and descends into the pelvis behind rectum, between layers of meso-re

BRANCHES:

Colica sinistra – Beneath peritoneum and in front of left kidney to middle of de
ding colon, and divide
ASCENDING & DESCENDING BRANCHES, – Which inosculate respectively
the colica media and the sigmoid artery, and supply intesti
above descr

Sigmoid Artery – Across psoas to sigmoid flexure of colon, and divides int
branches, which inosculate with colica sinistra and sup. hæmorrh

Superior hæmorrhoidal – The continuation of the inferior mesenteric.
Follows course above described, and divides opposite middle of sacrum int
branches, which descend on each side of rectum to near its lowe
and join with middle hæmorrh

CŒLIAC AXIS.

Short thick trunk, from front of aorta between pillars of diaphragm.
Forwards above pancreas and between lobus Spigelii & right semilunar ganglion on the right, an
left semilunar ganglion & cardiac end of stomach on the left, for about half an inch, an
divides into

GASTRIC, OR CORONARIA VENTRICULI – The smallest.
Upwards and to the left to cardiac orifice of stomach.
Along lesser curvature between layers of lesser or gastro-hepatic omentum to pylorus
where inosculates with pyloric branch of hepatic; gives branches to both sur
faces of stomach

HEPATIC – Intermediate in size in the adult; the largest in the fœtus.
Upwards and to the right in front of foramen of Winslow, between the two layers an
along right border of lesser or gastro-hepatic omentum, – ductus communi
choledochus lying to the right, and the vena portæ behind, – and divides i
transverse fissure of liver into two branches, which accompany divisions
vena portæ & hepatic duct to right & left lobes. Gives off branches

Pyloric – To pylorus, and along lesser curvature, inosculating with gastric.

Gastro-duodenalis – Large; downwards behind duodenum, and divides into:
GASTRO-EPIPLOICA DEXTRA – Along greater curvature of stomach betwee
layers of great omentum, giving branches to both surfaces of stomac
and to omentum, and inosculates with gastro-epiploica sinistr
PANCREATICO-DUODENALIS SUPERIOR – Descends between pancreas and duo
denum and anastomoses with inferior pancreatico-duodenalis,
branch of superior mesenteri

Cystic – Arises from right division. – Upwards to neck of gall bladder, an
ramifies on its under surface, and between it & live

SPLENIC – The largest.
Tortuous course to the left behind upper border of pancreas and above splenic vei
and divides into numerous branches which enter hilum of spleen.
Gives of

Pancreaticæ parvæ – Numerous, small.
Pancreatica magna – From left to right along posterior surface of pancrea
Vasa brevia – From five to seven in number; between layers of gastro-spleni
omentum to splenic end of stomach
Gastro-epiploica sinistra – Along greater curvature of stomach betwee
layers of great omentum, giving branches to both surfaces of stomach
to omentum, and inosculating with gastro-epiploica dextr

THE STOMACH.

Is situated in the left hypochondriac, epigastric, & part of right hypochon
regions, and pres

Ant. Surface – Looks upwards & forwards, and is in contact with under surfa
liver, diaphragm, and anterior wall of abdomen opposite *pit of sto*

Post. Surface – Directed downwards & backwards, and covered with peritoneu
lesser sac, by which sac it is separated from pancreas, great vessels of abdo
crura of diaphragm & solar plexus. Rests upon transverse meso-c

Great or Splenic End, Great Cul-de-sac or Fundus – Lies beneath th
lower left ribs, in contact with the spleen to which it is connected by
gastro-splenic omen

Lesser or Pyloric End – In contact with anterior wall of abdomen, under su
of liver, & neck of gall-bla

Greater Curvature – Lies above transverse colon, and gives attachment to
omen

Lesser Curvature – Connected to transverse fissure of liver by lesser or gastro-he
omentum, and to under surface of diaphragm by gastro-phrenic ligan

Œsophageal or Cardiac Opening – Funnel-shaped, and situated above & be
the pyloric ope

Pyloric Opening – Guarded by pylorus, and is more movable than the œsophageal

When the stomach is distended its greater curvature is elevated & ca
forwards, while its anterior surface is turned upwards, and its posterior su
downw

THE SMALL INTESTINE.

Is a slightly narrowing convoluted tube about 20 feet long, connected to the spine by the mesentery in the greatest part of its extent

It is divided into:

DUODENUM — Vide below.

SMALL INTESTINE PROPER — Is rather arbitrarily divided, no defined limit existing, into

JEJUNUM — The upper two fifths. Wider, thicker, & more vascular, and has its villi & valvulæ conniventes more, and its Payer's patches less numerous & developed

ILEUM — The lower three-fifths. Narrower, thinner, & less vascular, and has its villi & its valvulæ conniventes less, and its Payer's patches more numerous & developed

THE DUODENUM

Is the shortest, widest & thickest part of the small intestine, and has no mesentery. Its length is from 8 to 10 inches, or about twelve finger breadths. – Into it open by common orifice the common bile & pancreatic ducts, and the villi & valvulæ conniventes are larger & more numerous immediately below this opening than in any other part of the small intestine. – Its course is

Upwards & to the right to under surface of liver & neck of gall-bladder :
Downwards in front of right kidney ;
Transversely to the left to left side of 2nd lumbar vertebra, where it is crossed by superior mesenteric artery, and where mesentery begins

RELATIONS:

First, or Ascending Portion –

ABOVE – Under surface of liver & neck of gall-bladder;
BEHIND – Right border of lesser omentum, hepatic artery, bile duct portal vein

Second, or Descending Portion –

IN FRONT – Hepatic flexure of colon;
BEHIND – Right kidney;
ON INNER SIDE – Head of pancreas, ductus communis choledochus, pancreatico-duodenal arteries

Third, or Transverse Portion –

IN FRONT – Descending layer of transverse meso-colon, superior mesenteric vessels
BEHIND – Aorta, inferior vena cava, crura of diaphragm;
ABOVE – Lower border of pancreas, superior mesenteric vessels.

THE LARGE INTESTINE.

About 5 feet long, sacculated. Diminishes in size till just above anus, where it is consider enlar

Consists of *cæcum, ascending, transverse, & descending colon, sigmoid flexure & rectum.*

CÆCUM or CAPUT CÆCUM COLI — The cul-de-sac situated below entrance of s intestine into the large; is the most dilated part of c

Lies in right iliac fossa, where it is retained by the peritoneum which covers its fro sides, and sometimes surrounds it entirely in a distinct fold, the meso-cæ

Presents:

Appendix Vermiformis - A tubular prolongation from 2 to 6 inches long & of a the diameter of a goose-quill connected with lower & back part of cæc usually directed upwards & inwards behind it, and retained by a fold of ton

Ilio-Cæcal or Ilio-Colic Valve, or Valve of Bauhin - Situated at entranc small intestine into the large at upper inner & back part of cæ

Formed by two crescentic folds of the mucous & submucous coats & circular cular fibres of the gut, which folds are separated by a narrow antero-poste aper

The upper fold is nearly horizontal, and is the smallest.

The lower fold is oblique, and is the largest.

At their points of coalescence they are continued upon wall of gut into two minent folds, the *fr*

Their surface turned towards the small intestine is covered with villi, the surface has no villi, and is quite sm

ASCENDING COLON —

Upwards to under surface of liver on right side of gall-bladder, where it curves to left, forming *hepatic fle*

Bound down against quadratus lumborum & right kidney by peritoneum which cover front & sides, and sometimes encloses it in a distinct fold, the ascending meso-c

TRANSVERSE COLON or ARCH of the COLON —

Curves forwards & to the left between confines of umbilical & epigastric region left hypochondrium, where it bends downwards, forming *splenic flexure*. Is movable, being comprised between the two ascending layers of great omen which layers join again behind it to form transverse meso-c

Its relations are:

Above **– Liver, gall-bladder, great curvature of stomach, lower end of splee**

In Front **– Great omentum, anterior wall of abdomen;**

Behind **– Transverse meso-colon, 3rd portion of duodenum.**

DESCENDING COLON —

Downwards in front of left crus of diaphragm, left kidney & quadratus lumborur left iliac fossa, where it ends in sigmoid flexure. Covered by peritoneum in fro at sides, sometimes entirely surrounded by a distinct fold, the descending meso-c

SIGMOID FLEXURE —

Commences at crest of ilium, ascends to right or left, descends, and ends in re opposite left sacro-iliac synchondrosis. Freely movable, being retained by a loose fold of peritoneum, the sigmoid meso-c

THE PANCREAS.

Lies behind stomach & lesser bag of peritoneum opposite first lumbar vertebra. It is lon narrow, flattened from before backwards, & of a reddish cream-colour, and present

Head, or Right Enlarged Extremity – Curves downwards, and is embraced by co cavity of duodenum, the ductus communis choledochus & the pancreatic duodenal arteries lying between the two organs, the former behind, the latt in front. – The lower & back part of the head (sometimes detached from t remainder of the gland, and then called the *lesser pancreas)*, passes to the le behind superior mesenteric vessels, forming the posterior wall of an incomple canal in which these vessels are enclose

Body, or Central Flattened Portion – Presents:

ANTERIOR SURFACE – Convex, covered by peritoneum belonging to lesser bag, & posterior surface of stomac

POSTERIOR SURFACE – Concave; in relation with:

Pillars of diaphragm, left quadratus lumborum, left kidney & left suprarer capsu

Aorta, vena cava, mesenteric vessels, commencement of vena portæ, & left re vess

UPPER BORDER – Thick, corresponds to cœliac axis, and is deeply grooved for splen artery & ve

LOWER BORDER – Thinner, separated from transverse portion of duodenum by superi mesenteric vesse

Lesser End, or Tail – Lies a little higher than the head, in contact with left kidney left suprarenal capsule, & lower & back part of spleen, to which latter organ is slightly adhere

PANCREATIC DUCT, or CANAL OF WIRSUNG — Runs from left to rig through whole length of the gland, lying in the vicinity of its anterior surfa & lower border. In the head it curves downwards on left side of ductus co munis choledochus. Both ducts then perforate together the muscular co of the intestine, run side by side for about three-quarters of an inch benea mucous membrane, and open by a common orifice situated on inner wall descending portion of duodenum a little below its middle, about three or fo inches from pylorus. The duct from the lesser pancreas opens into canal Wirsung near its termination, or, sometimes, forms a supplementary can which opens separately into duodenum an inch or more above canal Wirsu

STRUCTURE — The pancreas is a racemose or conglomerate gland and is very similar the salivary glands, excepting that its tissue is somewhat softer & loos

VESSELS & NERVES – *Arteries* from the splenic and superior & inferior pancreatic duodenal. – *Veins* open into the splenic & mesenteric. – *Lymphat* open into the lumbar glands. – *Nerves* are from solar plex

THE SPLEEN.

Is compressed & oval in form, soft, brittle, & of a dark reddish-blue colour, and lies i
hypochondrium, embracing cardiac end of stomach, to which it is connected by g
splenic omentum. It pres

Outer Surface – Convex, in relation with under surface of diaphragm; corresponds t
10th, & 11th

Inner Surface – Concave. Presents a little behind its middle the hilum, a vertical f
pierced by several irregular foramina for the blood-vessels, lymphat
nerves, and is related

In Front – Great cul-de-sac of stomach;
Behind – Left crus of diaphragm, left suprarenal capsule & usually a proc
lesser sac of perito

Below – Tail of pancreas.

Upper Extremity – Thick, rounded, attached to diaphragm by suspensory ligament.

Lower Extremity – Pointed, in relation with splenic flexure of colon.

Anterior Border – Thin, frequently notched.

Posterior Border – Thick, rounded, lies on left kidney.

THE EXTERNAL BILE DUCTS.

Hepatic Duct – Formed in transverse fissure by junction of the two large excreto
ducts from right & left lobe
Downwards & to the right between the two layers of lesser or gastro-hepa
omentum & behind first portion of duodenum, having hepatic artery on t
left & vena portæ behind, and joins with cystic duct to form ductus co
munis choledochus. Is about an inch & a half long, and is intermediate
size between cystic duct & ductus communis choledoch

GALL-BLADDER — Pear-shaped, three or four inches long, an inch wide at larg
part; holds from 8 to 12 drachms. Obliquely directed downwards, forwar
& to the right, & lies in a fissure or fossa on under surface of liver betwe
lobus quadratus & right lobe proper. Present
UNDER SURFACE – Covered by peritoneum, which in most cases merely passes o
it; in relation with hepatic flexure of colon & first part of duodenum; so
times with pyloric end of stomach. – Occasionally the peritoneum entir
surrounds the gall-bladder, which latter is then connected to the liver b
small mesente
UPPER SURFACE – Connected to the liver by firm areolar tissue & vessels; sometin
by a small mesente
ANTERIOR ENLARGED EXTREMITY, OR FUNDUS – Covered by peritoneum; touches
dominal parietes opposite tip of 10th costal cartila
POSTERIOR CONSTRICTED EXTREMITY, OR NECK – Forms two turns upon itself like
italic *f*, and is continued into the cystic du

Cystic Duct – Downwards & to the left between the two layers & along the ri
border of lesser or gastro-hepatic omentum and behind ascending portion
duodenum, having the cystic artery on the left & the vena portæ behind, a
joins with hepatic duct to form ductus communis choledochus. Is about
inch long, and is rather narrower than the hepatic du

Ductus Communis Choledochus – Downwards & slightly to the left between
two layers & along the right border of lesser or gastro-hepatic omentu
having hepatic artery on the left & vena portæ behind.
Between head of pancreas & descending portion of duodenum on right s
of pancreatic duct, and with pancreatico-duodenal arteries which lie sligh
in fr
Perforates muscular coat of intestine in common with the latter duct. B
ducts then run together for about three-quarters of an inch between co
of intestine, and, becoming slightly constricted, open by a common & pro
nent orifice situated on inner wall of descending portion of duodenum a li
below its middle, about three or four inches from pylorus. – The common
duct is about three inches lo

THE LIVER.

The largest gland in the body, of a dull reddish brown colour, situated in right hypocho
epigastric & part of left hypochondriac regions. – Its transverse & antero-posteri
meters, and its greatest thickness are usually about twelve, six, & three inches respec
It weighs from three to four pounds. – Presents:

UPPER SURFACE — Smooth, convex, divided into right, largest, & most conve
and left lobe, smaller & flatter, by suspensory or falciform ligament. In r
with under surface of diaphragm, & the six or seven lower ribs, and to a slight
in the upright posture & during deep inspirations, especially in women & ch
with anterior wall of abdomen.

UNDER SURFACE — Vide next Tablet.

ANTERIOR BORDER — Thin, inclined downwards & to the right, notched
opposite round & falciform ligaments, and usually more slightly so opposite
of gall-bladder. In recumbent posture & during expiration it usually corre
to lower border of ribs & costal cartilages, in upright posture & during deep i
tions, especially in women & children, it descends a little lower.

POSTERIOR BORDER — Thick & rounded, especially to the right, in relatio
pillars & under surface of diaphragm, to which it is connected by coronary lig
and with aorta & inferior vena cava, for passage of which latter vessel it is
grooved & sometimes channelled.

RIGHT EXTREMITY — Thick & rounded, attached to diaphragm by right
ligament; descends lower than the left.

LEFT EXTREMITY — Thin & flattened, attached to diaphragm by left latera
ment; ascends higher than the right.

LIGAMENTS OF THE LIVER — Five in number:

Round Ligament – The obliterated remains of umbilical vein & ductus ve
Ascends in free margin of falciform ligament from umbilicus to longit
fissure on under surface of liver, where it joins inferior vena cava.

Falciform or Suspensory Ligament
Coronary Ligament . . . .
Lateral or Triangular Ligaments .
} Formed by peritoneum. – Vide Perito

UNDER SURFACE of the LIVER.

Concave uneven, looks downwards & backwards, and covers stomach, duodenum, hepatic flexure of colon, right kidney & right suprarenal capsule

Presents four fissures, one of which is divided into two, and two primary lobes, of which the right one, or right lobe proper, presents three sub-lobes or lobules

FISSURES — Are the:

Longitudinal Fissure – Separates right & left lobes, and extends from deep notch on anterior border as far backwards as posterior border. It is divided into:

UMBILICAL FISSURE – Its anterior & deepest two-thirds, situated in front of transverse fissure; contains umbilical vein in the fœtus, and its obliterated remains in the adult. Is often bridged over posteriorly by a band of liver substance, the pons hepaticus.

FISSURE FOR THE DUCTUS VENOSUS – Its posterior & shallowest third; contains the ductus venosus in the fœtus, & its obliterated remains in the adult.

Transverse Fissure – Extends transversely to the right from longitudinal fissure for about two inches, lying nearer to posterior than to anterior border. – It transmits hepatic artery, bile duct, portal vein, lymphatics & nerves, the hepatic artery lying to the left & in front, the bile duct to the right & in front, and the portal vein behind.

Fissure or Fossa of the Gall-Bladder – Shallow, broadest in front, nearly parallel to longitudinal fissure on right side of which it is situated, and extends from anterior border to near right extremity of transverse fissure.

Fissure for the Inf. Vena Cava – Extends from behind lobus caudatus to posterior border of liver, where it joins with fissure for ductus venosus. Is often transformed into a complete foramen, by a prolongation of the lobus Spigelii. It gives exit to the hepatic veins which here open into the inferior cava.

LOBES — Are the:

Right Lobe – The largest. Presents the three last named fissures, and also, further to the right, the *impressio colica* for hepatic flexure of colon, behind which is the *impressio renalis* for right kidney & right suprarenal capsule. – It also presents the three following sub-lobes:

LOBUS QUADRATUS – Situated in front of transverse fissure, between fissure for the gall-bladder & umbilical fissure; quadrilateral & broadest from before backwards

LOBUS SPIGELII – Situated behind transverse fissure, between fissure for ductus venosus & fissure for inferior vena cava; more prominent than former, but less regular in shape. Projects into lesser sac of peritoneum.

LOBUS CAUDATUS – A prominent ridge extending from front part of lobus Spigelii to under surface of right lobe proper; forms anterior boundary of fissure for inferior vena cava & upper boundary of foramen of Winslow.

Left Lobe – Is smaller than the right. Its under surface rests upon the stomach, and sometimes extends as far as upper border of spleen.

PORTAL SYSTEM.

PORTAL TRUNK — Formed by junction of splenic & superior mesenteric veins behind
border of head of pan

Upwards & to the right in right or free border of lesser or gastro-hepatic ome
lying between & behind hepatic artery & bile duct, in front of foramen of Wi
Expands near right extremity of transverse fissure of liver into the *sinus of the*
vein, and divides into right branch, the larger & shorter, and left branc
smaller & longer; which branches ramify in portal canals with branches of h
artery, bile ducts, deep lymphatics, & nerves. (For distribution of portal
in the liver and its continuation into the hepatic veins, vide Structu
Liver). – Receives
Gastric & Cystic – The former runs from cardia to pylorus; the
frequently opens into right branch of portal

Splenic Vein – Arises by five or six branches of considerable size, which emerge
hilum of spleen and join to form one large trunk, which trunk takes a str
course from left to right behind upper border of pancreas, below s
artery, and, at upper border of right extremity or head of pancreas,
with superior mesenteric to form the portal trunk. Receives
Inferior Mesenteric (Vide below), *Vasa Brevia*, *Left Gastro-E*
Pancreatic & Pancreatico-Du

Superior Mesenteric Vein – Arises from area of distribution of superior mese
artery, (small intestine, cœcum, ascending portion & right half of t
verse portion of colon), its branches corresponding to those of the a
Its trunk lies to the right & a little in front of the artery, and passes
it in front of transverse portion of duodenum & behind pancreas, and, at
border of head of pancreas, joins with splenic vein to form the portal t

Inferior Mesenteric Vein – Arises from area of distribution of inferior m
teric artery (upper part of rectum, sigmoid flexure, desce
portion & left half of transverse portion of colon), – its su
hæmorrhoidal branch anastomosing with the middle & inferior h
rhoidal branches of the internal iliac & pudic, and thus establi
an important communication between the portal & general v
systems, which communication is supplemented, accordin
Kiernan, by communications between the right renal vein & the
of the ascending colon & duodenum, and by communications i
coronary ligament of the liver between the phrenic & the super
branches of the portal vein. Ascends beneath peritoneum
behind transverse portion of duodenum & pancreas, and opens
sp

The portal system contains no valves.

ASCENDING VENONS TRUNKS.

COMMON ILIAC VEINS — Formed by junction of external & internal iliacs op
site sacro-vertebral articulation (some authors say opposite sacro-iliac synchon
osis). Obliquely upwards, the left one more obliquely than the right, to a little
the right side of intervertebral disc between 4th & 5th lumbar vertebræ, where t
unite to form the inferior ca

RIGHT COMMON ILIAC — Shorter & less oblique than the left one; lies at f
behind & then on outer side of its artery. Recei

Tributary Branches: - *Ilio-Lumbar*, & sometimes *Lateral Sacral.*

LEFT COMMON ILIAC — Longer & more oblique than the right one; lies at f
on inner side of its artery, and then passes behind artery of ri
side. Recei

Tributary Branches: - *Ilio-Lumbar*, & sometimes the *Lateral* & *Mi*
Sacral. - The common iliac veins have no valv

INFERIOR VENA CAVA — Formed by junction of the two common iliacs a lit
to the right side of intervertebral disc between 4th & 5th lumbar verteb

Along right side of aorta in front of right lumbar & renal arteries & right crus of d
phragm, passing in succession behind attached border of mesentery, transverse p
tion of duodenum, pancreas, & portal tru

Through groove or canal in posterior border of liver, where the hepatic veins open into

Perforates central or cordiform tendon of diaphragm between its middle & right leafle

Enters fibrous bag of pericardium, becomes invested anteriorly by serous layer of sa
sac, and opens into lower & back part of right auricle near interauricular septu
its opening being guarded by the Eustachian valve. Recei

Tributary Branches: - *Middle Sacral, Lumbar, Renal, Hepatic, Right Sp*
matic, Suprarenal, & Inferior Phrenic, the middle sacral sometim
opening into the left common ilia

ABDOMINAL AORTA.

Curves slightly backwards & to the left from aortic opening in front of 12th d
vertebra to a little to the left of 4th lumbar vertebra, where it di
into the two common i

RELATIONS:

In Front – Lesser omentum, stomach, cœliac axis, solar plexus;
Splenic vein, pancreas, left renal vein;
Transverse portion of duodenum, mesentery, aortic plexus.

Behind – Vertebræ, left lumbar veins, receptaculum chyli, thoracic duc

To the Right – Inferior vena cava, vena azygos major, receptaculum
thoracic duct, right semilunar gan

To the Left – Cord of sympathetic, left semilunar ganglion.

BRANCHES — Phrenic, Cœliac Axis, Superior Mesenteric;
Suprarenal, Renal, Spermatic;
Inferior Mesenteric, Lumbar, & Sacra-Media.

BRANCHES of the ABDOMINAL AORTA.

Inferior Phrenic – Two. Arise separately or by a common trunk either from cœliac axis, from aorta immediately above the latte
Upwards and outwards behind œsophagus on left side, behind vena cava on right sid to central tendon of diaphragm, and divide int
INTERNAL BRANCH – To front part of diaphragm communicating with its fellow & wi musculo-phren
EXTERNAL BRANCH – To side of thorax, communicating with intercostals.
Gives off small *superior capsular branches* to suprarenal capsule.

Cœliac Axis – Vide next Tablet.

Superior Mesenteric – Vide next Tablet but one.

Suprarenal – Two. Small in adult, but in fœtus as large as renal. To suprarenal capsule anastomosing with capsular branches of phrenic & rena

Renal or Emulgent – Two. Large, from sides of aorta just below superior mesenteric.
Nearly horizontally outwards behind renal vein, and divide, each of them, into four five branches, which penetrate into hilum of kidney in front of pelvis. – Give small *inferior capsular branches* to suprarenal capsule, and twigs to pelvis & urete
Right artery passes behind inf. vena cava, is longer than left one, and lies a little lowe
Renal arteries vary considerably in coincidence with variations of kidneys in situatio size, and number. – They may arise from front of aorta near its bifurcatio or from common or internal iliac; – they may divide into branches sooner tha usual, or may be replaced by several arteries which arise separately from sid of aorta; – one may be wanting, or there may be a supernumerary artery corre ponding to a supernumerary kidne

Spermatic – Two; long & slender. From front of aorta a little below renal.
Downwards and outwards beneath peritoneum to brim of pelvis crossing psoas & uret and, on right side, inferior vena cav
Forwards in front of external iliac artery to internal abdominal ring, being crossed right side by termination of ileum, on left side by sigmoid flexure of colo
Through inguinal canal and down to back of testis with other constituents of spermat cord, becoming tortuous near its termination, and giving twigs to epididymi which twigs join with artery of vas deferens; pierces tunica albuginea to su stance of test
OVARIAN ARTERY – In female. Same course down to brim of pelvis, then passes dow wards & inwards to attached margin of ovary between layers of broad ligame of uterus; joins with uterine on side of uterus; gives branches to Fallopian tu and twigs to round ligament, which twigs are sometimes continued through i gu nal canal to integument of labium & groi
Both these arteries are short during first part of fœtal life, when testes & ovaries just below kidneys, and become elongated only when these organs descend in pelv

Inferior Mesenteric – Vide next Tablet but one.

Lumbar – Usually four; from back of aorta.
Round bodies of lumbar vertebræ beneath psoas, the two upper ones passing al beneath pillars of diaphragm, and those of right side beneath inferior ve cava; and divide between transverse processes int
ABDOMINAL BRANCH – Behind quadratus lumborum (the lowest one sometimes in fron and beneath abdominal muscles, joining with epigastric, internal mammar intercostals, ilio-lumbar & circumflex ilia
DORSAL BRANCH – Sends a spinal branch through intervertebral foramen to cau equina & posterior surface of bodies of vertebræ, and passes backwards muscles & integument of bac

Sacra Media – Small; from back of aorta at point of bifurcation.
Descends upon middle of sacrum, anastomosing with both lateral sacral.

COMMON ILIAC ARTERY.

Downwards & outwards from bifurcation of aorta a little to the left of 4th lu
vertebra to opposite sacro-vertebral articulation (some Authors say opposite sacro
synchondrosis), where it divides into external & internal iliacs. Is about two i
long, the right artery being slightly the lo

RELATIONS :

Right Side:

IN FRONT – Small intestine, peritoneum, sympathetic nerve, u
near bifurc

BEHIND – Both common iliac veins.

OUTER SIDE – Right common iliac vein, inferior vena cava,
m

Left Side:

IN FRONT – Same, plus rectum & superior hæmorrhoidal artery.

OUTER SIDE – Psoas.

Left Common Iliac Vein – Lies at first on inner side of its artery, and
passes beneath artery of right

Right Common Iliac Vein – Lies at first behind its artery, and then
outer

BRANCHES — Very small & not named, sometimes **Renal & Ilio-lumbar.**

EXTERNAL ILIAC ARTERY.

Downwards & outwards along inner border of psoas, extending from bifurcation of com
mon iliac opposite sacro-vertebral articulation (some Authors say opposite sacro-ili
synchondrosis) to beneath Poupart's ligament midway between anterior superi
spine of ilium & symphysis pubis, where it becomes femoral artery. Rather larger i
the adult than internal iliac; half the size in the fœtu

RELATIONS: —

In Front – Intestine, peritoneum, thin layer of fascia derived fro
the iliac; spermatic vessels & nerves, genital branch of genit
crural nerve, circumflex iliac vein, sometimes ureter near origi
Behind on Right Side – External iliac vein, which lies on inner si
at femoral arc
On Inner Side – External iliac vein, & vas deferens.
On Outer Side – Iliac fascia & psoas muscle.

Left External Iliac Vein lies altogether on inner side of its artery.
Right External Iliac Vein lies at first on inner side of its artery, and th
behind

BRANCHES: —

Epigastric – Somewhat the larger. From front of external iliac a few lines abo
Poupart's ligame
Descends slightly to reach level of the ligament.
Ascends obliquely upwards & inwards in subperitoneal areolar tissue, passi
behind inguinal canal & along lower & inner boundaries of internal abd
minal ring, and hooking round vas deferens in the male, round rou
ligament in the fema
Pierces sheath of rectus between its middle & lower thirds, and ascends behi
the muscle, dividing into muscular & cutaneous branches, which anast
mose with lower intercostals, lumbar, superior epigastric of intern
mammary, & superficial epigastric of femoral. – Gives off branche
Cremasteric – Small, descends upon spermatic cord and supplies cremaste
anastomoses with spermat
Pubic – Usually small; descends behind pubes on inner side of femoral ring, a
anastomoses with obturator. Sometimes greatly increased in si
so as to form the origin, or one of the origins, of the obturator arte
which artery is then said to arise from the epigastric (Vide obturat
artery). – The two epigastric veins unite into one trunk, which ope
into the external ili

Circumflex Iliac – Somewhat the smaller. From outer side of external iliac ne
Poupart's ligame
Upwards & outwards behind the ligament, and along anterior half of inner l
of crest of ilium, joining with glute
Pierces transversalis, runs backwards between it & the internal oblique, a
joins with ilio-lumbar. Gives off numerous muscular branches; one, rath
large, ascends from anterior superior spine of ilium, and joins with t
epigastric & lumbar. – The two circumflex iliac veins unite into one trun
which crosses the external iliac artery and opens into the corresponding

LUMBAR PLEXUS.

Formed by anterior divisions of four upper lumbar nerves, and situated in substance of p
in front of transverse processes of the lumbar verte
Narrow above, where it usually receives a small branch from last dorsal nerve; broad b
where it is joined to the sacral plexus by a branch from 4th lumbar nerve & by lu
sacral nerve or
Its arrangment is as follows: – (Vide Quain's diagram).

1st Lumbar Nerve – Gives off:
Ilio-hypogastric,
Ilio-inguinal,
Small part of Genito-crural,
Communicating branch to 2nd Lumbar.

2nd Lumbar Nerve – Completes
Genito-crural, – and gives off
Greater part of External Cutaneous, and
Communicating branch to 3rd Lumbar, from which communicating branch
Anterior Crural, Obturator, & Accessory Obturator nerves (when
latter exists) are partly der

3rd Lumbar Nerve – Completes
External Cutaneous, and gives off
Greater part of Anterior Crural, Obturator & Accessory Obturator Nerves (w
the latter exists), a
Communicating branch to 4th Lumbar.

4th Lumbar Nerve – Completes
Anterior Crural, Obturator, & Accessory Obturator Nerves, (when the l
exists), and gives
Large branch to 5th Lumbar, which large branch forms with the latter n
the *Lumbo-Sacral Nerve or*

LATERAL BRANCHES of the LUMBAR PLEXUS.

ILIO-HYPOGASTRIC — From 1st lumbar.

Emerges from *upper part of outer border of Psoas.*

Crosses quadratus lumborum.

Perforates transversalis, and divides between it & internal oblique into branches: –

ILIAC – Pierces internal & external oblique just above crest of ilium, and supplies skin gluteal region behind lateral cutaneous branch of twelfth dorsal nerv

HYPOGASTRIC – Forwards between internal oblique & transversalis, communicating wit ilio-ingninal. Pierces internal oblique & aponeurosis of external obliqu a little above the external abdominal ring, and supplies skin of hypoga tric regio

ILIO-INGUINAL — From 1st lumbar; smaller than foregoing.

Pierces psoas, and crosses quadratus lumborum *immediately below ilio-hypogastric.*

Pierces transversalis, and communicates with hypogastric branch of ilio-hypogastri between that muscle and the internal oblique, which it pierces a litt further o

Through inguinal canal in front of spermatic cord; and supplies skin of upper inner part of thigh and of scrotum & penis, or of labium pudend

Is sometimes small, and then ends by joining the ilio-hypogastric near crest ilium; in that case a branch of the ilio-hypogastric takes the place of t ilio-inguin

GENITO-CRURAL — From 2nd lumbar nerve, and by a few filaments from the 1st.

Descends obliquely *through substance, and afterwards on anterior surface of psoas,* a divides into branches;

GENITAL – Over external iliac artery, and through inguinal canal behind spermatic cor to cremaster muscle & scrotum; – in female behind round ligament to labiu

CRURAL – Beneath Pouparts ligament on inner side of psoas. Pierces fascia lata on out side of femoral artery, and supplies skin of upper and front part of thig communicates with middle cutaneou

EXTERNAL CUTANEOUS — From 2nd lumbar nerve, and, by a few filaments, from the 3r

Pierces psoas muscle towards its middle and crosses iliacus.

Passes beneath Poupart's ligament through notch below anterior superior spine ilium, and divides into branches:

ANTERIOR – Pierces fascia lata about four inches below Poupart's ligament, and suppli skin of anterior & outer aspects of thigh as low as kne

POSTERIOR – Supplies skin of outer & posterior aspect of thigh.

THE DIAPHRAGM.

Is fan-shaped; the expanded portion of the fan being horizontal, and the narrow portion or handle, tical. It presents for examination its points of origin & the fibres arising from them, its centr cordiform tendon, its openings, & its rela

POINTS OF ORIGIN & FIBRES ARISING FROM THEM:

Ensiform Cartilage. – Gives attachment to a narrow & sometimes tendinous slip, on eithe of which the costal cartilages & the costal fibres bound a narrow triangular area, over the e of which area the pleuræ & the peritoneum are separated only by a little areolar t

Cartilages & Osseous Portions of the 6 or 7 Lower Ribs – Give rise to the long a lateral fibres, which, at their point of origin, interdigitate with the transve

Ligamentum Arcuatum Internum – A thickened band of the fascia over the psoas, exte from side of body of 1st, & sometimes from that of 2nd lumbar vertebra, to tip of trans process of 1st & sometimes to that of 2nd. Gives rise to arched fibres similar but rather sh

Ligamentum Arcuatum Externum – A thickened band of the fascia over quadratus lumb (anterior lamella of posterior abdominal aponeurosis), extending from tip of transverse p of first lumbar vertebra, & sometimes from that of 2nd, to lower border & apex of las Gives rise to similar arched

Bodies of Second, Third & Fourth Lumbar Vertebræ by means of the

CRURA — Two thick fibro-muscular bundles, which arise by tendinous fibres as follows:

RIGHT CRUS – The thickest & longest, from front of bodies & intervertebral substances 2nd, & 3rd, or sometimes of 2nd, 3rd, & 4th lumbar v., & from ant. common ligt. of

LEFT CRUS – The shortest & narrowest, from left side of bodies & intervertebral substan 1st & 2nd or sometimes of 2nd & 3rd lumbar vertebræ, & from ant. common ligt. of

The tendons ascend for a short distance on either side of the aorta, and then be joined in front of that vessel by means of a tendinous arch formed by the blendi their innermost fibres. The crura then give rise, as well as the intervening arch t large fleshy bellies, the outer fasciculi of which bellies pass upwards & outwards t cordiform tendon, while the inner ones first decussate in front of the aorta (those right side being the largest & most anterior), then diverge to surround the œsoph and finally meet again in front of it before they end in the central tendon. (In very rare cases these fasciculi do not join in front of the œsophagus, a portion of anterior margin of the œsophageal opening is then tendinous).

CENTRAL or CORDIFORM TENDON — The common insertion of all the fibres. Has som the shape of a trefoil leaf; and presents anteriorly three leaflets; the right one is broad, & the largest; the left one, long, narrow, & the smallest; the middle one short, bro intermediate i

OPENINGS — Are:

Large Openings – Three:

AORTIC OPENING – For aorta, vena azygos major, thoracic duct & frequently the left cord of the pathetic. Lies in middle line, and is osteo-fibrous, being bounded behind by bodies of ver laterally by tendons of the crura, and in front by the fibrous arch which joins the

ŒSOPHAGEAL OPENING – For œsophagus & pneumogastric nerves. Lies higher up, & a little left. Is oval in form & entirely muscular, being formed by the inner decussating fasciculi fleshy portion of the crura; – in some very rare cases a portion of the anterior margin is fi & formed by the posterior border of cordiform t

OPENING FOR INFERIOR VENA CAVA – The highest; lies a little to the right between right & leaflets of cordiform tendon. Is quadrilateral & fibrous, being bounded by four bundles of t ous fibres which meet at right

Small Openings – Transmit;

Right cord of sympathetic, & sometimes the left;
Right & left great, lesser, & least splanchnic nerves, either separately or conjointly.
Vena azygos minor, & sometimes the major – These openings vary therefore in number.

RELATIONS —

Of Upper Surface:

LATERALLY – Pleuræ; lungs. Also at circumference of thorax for a considerable though variab tent, lower ribs & lower intercostal spaces, the lungs not descending under ordinary ci stances as low as the costal attachments of the diaphragm & the point of reflection of the The lateral portions of the diaphragm are the most movable; their degree of elevat depression varies much more than that of the central part in accordance with the respi movements, and with the degree of distension, or otherwise, of the stomach, intestines, & The right lateral portion of the diaphragm, on account of the pressure of the liver on tha rises by one or two ribs' breadths higher than the left, and reaches the level of

In Forced Expiration – 4th costal cartilage;
In State of Repose of Thorax – 5th costal cartilage;
In Forced Inspiration – Line from ensiform cartilage, to back of 10th rib.

CENTRALLY – Heart & base of pericardium, the fibrous layer of which latter sac blends more p larly with the anterior & left part of central leaflet of cordiform tendon, & with the fascia co the left anterior costal fibres. The central part of the diaphragm is flattened & less m and lies on a lower level than the lateral portions, except close to the sternum, in front, & vertebræ, behind, where, on the contrary, it rises a little

Of Under Surface – This is entirely covered by peritoneum except behind pancreas, kidneys & renal capsules, and at points of attachment of coronary & lateral ligaments of liver, gastro-p ligament, & suspensory ligament of spleen; it lies in mediate contact with liver, stomach &

PELVIS & MALE GENITO-URINARY ORGANS.

PERITONEUM.

Downwards in front of spine & Aorta;
Over upper part of rectum, forming *meso-rectum*;
Forwards:
In Male: – To bladder, forming *posterior false ligaments of bladder* &c
vesical pou
In Female: – To vagina & uterus, forming *posterior ligaments of uterus* &
vaginal pouch; and then over uterus & from uterus to blad
forming *anterior ligaments of uterus* & *utero-vesical pou*
Over bladder and from bladder to anterior wall of abdomen;
Up to umbilicus, covering urachus & obliterated hypogastric arteries.

THE PELVIC FASCIA.

Is continuous with fascia over psoas & iliacus and with fascia transversalis, and is sli
adherent to brim of pelvis, especially at sides.

It is thin posteriorly, where it covers pyriformis muscle & sacral plexus, and passes b
internal iliac vessels which perforate it.

In front it forms a single thick layer over obturator internus as low down as a white l
thickening, which linear thickening extends in a curved direction from spi
ischium to side of lower part of symphysis pubis, and both gives attachme
middle fibres of levator ani, and marks point of division of pelvic fascia into
vesical & obturator layers, or recto-vesical & obturator fasciæ.

Recto-Vesical Fascia -

Is continued over inner surface of levator ani to bladder, prostate or va
& rectum.

In front it forms anterior true ligaments of bladder, or pubo-prostatic ligam

Further back it ascends over side of prostate, inclosing this gland & the pro
plexus of veins, and is then continued on the bladder forming its latera
ligaments.

Posteriorly it sends a prolongation between the bladder & rectum, which pro
ation invests the vesiculæ seminales.

Obturator Fascia -

Descends on portion of obturator internus muscle which lies beneath levato
and becomes attached to pubic arch & sacro-sciatic ligaments.

It forms a canal for pudic vessels & nerve, and gives off a thin layer, the a
ischio-rectal fascia, to under surface of levator ani & to third part of rec

SIDE VIEW of the MALE PELVIS.

How to obtain it (the Perinæum having been previously dissected): –

Incline bladder & rectum to the right.
Divide on left side obliterated hypogastric, vesical & middle hæmorrhoidal arteries, (a
the uterine & vaginal in female), lateral true ligament of bladder & levator ani musc
Saw through pubes externally to left anterior true ligament of bladder.
Divide right common iliac artery & left common iliac vein, and saw through sacrum
coccyx just to the left of middle line.
Detach deep perinæal fascia & the contained compressor urethræ muscle from rami of pu
& ischium.
Introduce catheter into, and inflate, bladder; distend rectum with tow.

What it shows: –

Towards middle: –

Cut edge of the deep perinæal fascia, containing between its two layers: –
Cut edges of compressor urethræ & deep transverse muscles;
Membranous portion of urethra;
Pudic vessels & nerve with the vessels & nerve of the bulb;
Cowper's glands & their ducts.

Below and in front of the deep perinæal fascia: –

Bulb of urethra partly covered by prolongation of anterior or inferior layer of deep p
næal fascia, which latter passes down upon it and becomes lost on its surf

Above and behind the deep perinæal fascia: –

Cut edges of levator ani muscle & of recto-vesical layer of pelvic fascia, which latter is
further up to ascend upon bladder, prostate, & rect

The viscera of the pelvis and the vessels & nerves of the right side
now be examined convenient

THE RECTUM.

Commences opposite left sacro-iliac synchondrosis.
Passes downwards & to the right to middle, or to a little to the right of middle, of thi
piece of sacru
Curves forwards upon concavity of sacrum & coccyx, regaining middle line if latter h
been passe
Inclines downwards & backwards to anus.
Is smooth & cylindrical, not sacculated; about 8 inches long. Rather narrower above the
sigmoid flexure, but it increases as it descends, and is greatly dilated just abo
anus. – Divided into three part

UPPER PART — From sacro-iliac synchondrosis to middle, or to a little to the right
middle, of third piece of sacrum; about 4 inches lon
Almost completely surrounded by meso-rectum.
Separated by small intestine from bladder, in the male, & from uterus & vagina, in th
female; and connected inferiorly with latter organs by the folds of peritoneu
which form margins of recto-vesical & recto-vaginal pouches respectivel
Rests upon pyriformis muscle & sacral plexus of left side.
Has to its left side left ureter & branches of left internal iliac artery.

MIDDLE PART — From middle of third piece of sacrum to tip of coccyx; about 3 inch
lon
Covered by peritoneum in front & at sides above, in front only towards middle, n
at all belo
In relation below & in front with:
IN THE MALE – Triangular portion of base of bladder, vesiculæ seminales
vasa deferentia, and under surface of prostat
IN THE FEMALE – Middle part of posterior wall of vagina, to which it is close
adheren

LOWER PART — From tip of coccyx to anus; about an inch in length.
Invested by the internal & external sphincters & by the levatores ani.
Separated by a triangular space, the perinæum, from membranous portion of urethra
bulb, in the male, from vagina, in the femal

STRUCTURE — Presents:

Serous Coat – Covers upper & middle parts of rectum, the former almost compl
tely, the latter in front & at sides above, in front only towards middle, n
at all belo

Muscular Coat – Very thick; consists of fibres:
EXTERNAL LONGITUDINAL – Form a thick uniform layer all round intestine.
INTERNAL CIRCULAR – Are most numerous at lower end of rectum, where the
form internal sphinct

Cellular Coat – Forms a loose connection between the muscular & mucous coat

Mucous Membrane – Thick, very vascular, freely movable upon muscular coa
Present
LONGITUDINAL FOLDS – Most marked below; due to contraction of sphinct
and disappear on distentio
PERMANENT TRANSVERSE FOLDS, OR FOLDS OF HOUSTON – Three principal one
semilunar, sometimes half an inch in depth, situated at upper part
right side, near middle of rectum on left side, and at front pa
opposite base of bladde

Vessels & Nerves – ARTERIES. From superior, middle & inferior hœmorrhoida
they form a rich network beneath & within mucous membrane, the meshe
of which network are mainly longitudinal in lower part of rectum, an
connected opposite anus, by large transverse branches (Quain). –VEI
Also mainly longitudinal near anus; open partly into internal iliacs
partly into inferior mesenteric. – LYMPHATICS. Open into glands in hollo
of sacrum, or into lumbar glands. – NERVES. From sacral plexus, 4
sacral & inferior hœmorrhoidal nerves, and from inferior mesenteric
hypogastric plexuse

THE KIDNEY.

Is situated in lumbar region behind peritoneum, and extends from 11th rib to near cr
ilium, right kidney lying a little lower than left

Presents:

Ant. Surface – Convex, looking slightly outwards, covered at upper & outer part by periton
and in relation

ON RIGHT SIDE – Right lobe of liver, descending portion of duodenum, ascending c
ON LEFT SIDE – Tail of pancreas, lower end of spleen, descending colon.

Post. Surface – Flat; rests upon 11th & 12th ribs, crus of diaphragm, psoas magnus, and ant
lamella of aponeurosis of transversalis, which latter separates it from quad
lumb

Sup. Extremity – Thick, rounded, directed inwards, covered by suprarenal capsule. Co
ponds on left side to upper border, on right side to lower border, of 11t

Inf. Extremity – Smaller, flattened, directed outwards. Descends to near crest of ilium

Outer Border – Convex, directed backwards & slightly upwards.

Inner Border – Concave, directed forwards & slightly downwards. Presents the *hilum*, a
gitudinal fissure most marked behind, which leads into the *sinus*, and contains
before backwards renal vein, renal artery & ur

The kidneys are subject to frequent

VARIATIONS in:

FORM & SIZE – One or both being longer & narrower, or shorter & more
ded; or one being more or less enlarged & the other proportion
dimini

SITUATION – One or both being situated lower down than usual, occasio
in the p

NUMBER – There being but one kidney sometimes of a horse-shoe shape &
ted in front of the vertebræ, or there being a supernumerary ki

THE URETER.

The excretory duct of the kidney commences in the

Calices, – small tubes from 7 to 13 in number, which embrace each of them one
or more papillæ, and join to form

Infundibula, – larger tubes usually three in number, which join to form the

Pelvis – funnel shaped dilatation of upper part of ureter compressed from b
backwards, and situated at lower & back part of hi

The ureter passes:

Downwards & inwards upon psoas, beneath peritoneum & spermatic vessels, an
the right side, on right side of inferior vena c

Over common or external iliac artery, being covered by termination of ileum o
right side, by sigmoid flexure of colon, on the

Forwards & inwards, –

IN THE MALE – In posterior false ligament of bladder, and on outer side o
deferens & below obliterated hypogastric ar

IN THE FEMALE – In posterior ligament of uterus and over side of cervix
& upper part of vagi

to posterior angle of trigonum vesicæ, passing obliquely thr
walls of bladder for about ¾ of an

It is from 16 to 18 inches long, and of about the diameter of a crow-quill.

The calices, infundibula, pelvis & ureter are formed of fibrous, muscular & mucous coats.
muscular coat consists, in the greater part of the ureter, of two longitu
layers comprising an intermediate circular one; the epithelium of the mu
coat is spher

THE BLADDER.

When

Empty, – Is deeply situated behind pubes, in front of rectum, in the male, of uterus & vagina, female, and is compressed from before backwards & triangular with base downward

Moderately full, – Is rounded, and partly fills pelvis;

Distended, – Becomes egg-shaped, curves slightly forwards, and rises into abdominal cavity son times as high as umbilic

In Female bladder is normally smaller, though sometimes larger through dist tion, and is widest from side to side. In Children it is conical, and points up hig into abdom

Presents:

Ant. Surface – Destitute of peritoneum, and in relation with triangular ligam of urethra, pubes & pubo-prostatic ligaments, and with anterior wall of domen in children, and also in adults when bladder is distend

Post. Surface – Covered by peritoneum, and separated by convolutions of sn intestine from rectum in the male, and uterus in the fem

Lateral Surfaces – Crossed towards their middle by obliterated hypogast artery, below & behind by ureter, above & behind in male by vas defere which latter first crosses hypogastric artery externally, and then pas between bladder & ureter. – Covered by peritoneum above & behind hy gastric artery, and rest below & in front on pelvic fas

Apex – Connected to umbilicus by urachus & by obliterated hypogastric arter behind which it is covered by peritone

Base or Fundus – The enlarged part directed downwards & backwards. – relation w

In the Male – Second portion of rectum, upon which rests the part boun by the recto-vesical fold of the peritoneum, the vesiculæ seminale vasa deferentia, and the prostate gland. – Is covered behind by p toneum, the recto-vesical fold descending to about four inches from anus when the bladder is distended, and nearly reaching the prost when the bladder is emp

In the Female – Anterior wall of vagina & lower part of cervix uteri.

Neck – Directed downwards & forwards, and now known to be the lowest par the bladder both in the male & female, when in the erect posture; is s rounded in the male by the prostate gla

LIGAMENTS of the BLADDER

Are five true ligaments, and five false ones formed by peritoneum.

TRUE LIGAMENTS — Anterior & Lateral formed by pelvic fascia & Superior Urachus, a remnant of allant

ANT. OR PUBO-PROSTATIC LIGAMENTS — From back of pubes on eit side of symphysis to front of neck of bladder & upper surface of prost Contain a few muscular fibres passing to bladder, and are separated a narrow groove containing dorsal vein of pe

LATERAL LIGAMENTS — Broad & thin; formed by recto-vesical layer of p vic fascia as it passes from upper surface of levator ani to capsule of pr tate & side of blad

URACHUS, or SUP. LIGAMENT — Fibro-muscular cord extending from apex bladder, where it is wide & expanded, to umbilicus, where it is contrac and lost in umbilical cicatrix. Sometimes partly pervious, communicati with bladder, sometimes completely pervious forming umbilical urin fist

FALSE LIGAMENTS — Posterior, Lateral & Superior.

POST. FALSE LIGAMENTS — The margins of the recto-vesical pouch of peri neum in the male, of the utero-vesical pouch in the female, where th are much smaller. Contain the obliterated hypogastric arteries & uret

LATERAL FALSE LIGAMENTS — From sides of pelvis to sides of bladder.

SUP. FALSE LIGAMENT — Over urachus & obliterated hypogastric arteries umbilic

COVERINGS of the TESTICLE.

Are the:-

Scrotum - Consists of two layers:

INTEGUMENT - Thin & brownish; presents a few sebaceous follicles & thinly scat
crisp hairs, and is divided into two lateral halves by a median raphé, w
raphé is continued forwards on under surface of penis and backwards a
middle line of perinæum to anus. Is closely applied to the testes and is c
gated transversely when the dartos is contracted, that is to say, usually i
young & robust, and in all under the influence of cold, and is elongat
flaccid when the dartos is relaxed, that is to say, usually in the debilitat
aged, and in all under the influence of wa

DARTOS - Is a thick stratum of loose reddish tissue, a modification of the super
fascia of the surrounding regions, consisting of areolar tissue with num
superadded muscular fibres and without any fat; it sends inwards bet
the two testicles a septum, the *septum scroti*, which divides its cavity into t
It is contractile, but its contractility is slow in its action, and especially ex
by cold, not by electr

Intercolumnar or External Spermatic Fascia - Thin cellular layer derived
the margins of the external abdominal ring during the descent of the testis,
continuous above with the intercolumnar fibres, which bound that ring super

Cremasteric Fascia - Consists of the scattered c[illegible]dles of fibres of the cremaster & int
oblique muscles united by a little areolar ti

Fascia Propria - Relatively thick layer, the continuation of the infundibuliform proce
the fascia transversalis, which layer supports both the cremasteric fascia &
tunica vaginalis re

Tunica Vaginalis - Is derived from the peritoneum, of which it is at first a continu
but from which it is subsequently cut off by the closure of that part of the perit
pouch, which extends from the internal abdominal ring to a short distance fro
testicle. - Is divided

VISCERAL PORTION OR TUNICA VAGINALIS PROPRIA - Surrounds the testicle, and c
both the upper or outer surface of the epididymis and also the under surfa
its central part or body, penetrating, along its outer border, between it &
testicle, and thus forming the *digital*

PARIETAL PORTION, OR TUNICA VAGINALIS REFLEXA - Is reflected from the posterior
der of the testicle upon the inner surface of the fascia propria, exten
however, a short distance up the cord upon its anterior & inner asp

THE TESTICLE & EPIDIDYMIS.

THE TESTICLE

Is oval & compressed laterally, and so suspended by the spermatic cord as to present:

Upper Extremity – The largest, directed forwards & outwards. Presents a small pedunculated body, the hydatid of Morgagni, probably a remnant of Muller's duct.

Lower Extremity – The smaller, directed backwards & inwards.

Lateral Surfaces – Looking respectively forwards & inwards, and backwards & outwards.

Anterior Border – Convex, directed forwards, downwards & outwards. – All these parts are free, smooth, and entirely invested by the tunica vaginalis propria.

Posterior Border – Straight & flattened, directed backwards, upwards & inwards, covered by the epididymis & vas deferens, and only partly invested by the tunica vaginalis.

The left testicle lies a little lower than the right one, and is frequently a little larger.

THE EPIDIDYMIS

Lies on the posterior border and back part of the outer surface of the testicle, and has the vas deferens on its inner side. It presents:

Globus Major or Head – Its upper enlarged extremity, connected to the testicle by the efferent ducts of the latter.

Body – Free, surrounded by the tunica vaginalis, which dips in between it & the testicle along its outer border, and connects its inner or posterior border to the posterior border of the testicle.

Globus Minor or Tail – Its lower pointed extremity, attached to the testicle by dense fibrous tissue.

The tunica vaginalis covers the whole of the upper or outer surface of the epididymis, as well as the under surface of its body. – The vas aberrans of Haller communicates with the canal of the epididymis or with the commencement of the vas deferens.

STRUCTURE of the TESTICLE & EPIDIDYMIS.

STRUCTURE of the TESTICLE — Presents for examination: -

THREE IMMEDIATE COVERINGS: —

Tunica Vaginalis - Vide Coverings of the testicle.

Tunica Albuginea - Thick, dense, bluish-white, fibrous membrane, covere
nally by the tunica vaginalis propria except along the points of
ment of the epididymis & vas deferens, and reflected into the in
the testicle along its posterior or upper border in the shape of an
plete vertical septum, the mediastinum testis or Corpus Highmo
This latter body supports the vessels & nerves and the excretory
the testicle in their passage to or from the gland, and gives off n
trabeculæ, which radiate towards the whole extent of the inner su
the tunica albuginea, and inclose the numerous pyramidal spa
taining the lobules of the gland su

Tunica Vasculosa or Pia Mater Testis - Consists of a plexus of blood
held together by delicate areolar tissue, and formed by the subdi
the superficial set of brs. of the spermatic artery. Branches given of
plexus, penetrate into the substance of the gland, supported by the tra

PROPER SUBSTANCE or PARENCHYMA — Consists of numerous py
lobules contained in the pyramidal spaces bounded by the trabeculæ, a
senting a base directed towards the surface of the testicle and an apex
towards the mediastinum. Of these lobules the central ones are the
The degree to which the lobules are isolated by the trabeculæ is somewh
able, hence the different estimates of their number, 250 (Berres), 400 (

Each lobule consists of from *one to three or more tubuli seminiferi*, the
& the length of which tubuli has also been variously estimated,- 300, six
in length (Monro), 840, two feet & a quarter in length (Lauth). - The dia
the tubuli is from $\frac{1}{200}$ to $\frac{1}{150}$ of an inch. They consist from without inwa
delicate fibro-areolar coat, a basement membrane, and sometimes a
granular nucleated epithelium. The epithelium is absent, however, w
gland is particularly active; the tubuli are then filled with cells of differe
without any regular arangement.

The *tubuli seminiferi* commence towards the surface of the testicle, so
by free cœcal or blind extremities, but more commonly by anastomatic loops
are exceedingly convoluted in the peripheral part of the gland; their conv
are of two orders, viz., a fine & regular undulation giving a granular
ance to the whole of their mass, and a more complicated folding of the und
tube. Towards the apices of the lobules they become straighter, and they
into from twenty to thirty straight tubes the *vasa recta*, which are from $\frac{1}{1}$
of an inch in diameter.

The *vasa recta* enter the mediastinum, and passing upwards & bac
they form within that body a network of anastomosing tubules, the
or *rete vasculosum testis*.

The rete testis is continued superiorly into from twelve to fifteen or
vasa efferentia

The *vasa efferentia* perforate the tunica albuginea at the upper & ba
of the testicle. In their extra-testicular course, which is about 6 or
long, they are at first straight & relatively wide, but they soon become con
& slightly narrowed, and form a series of conical masses, the *coni vasculos*
latter constitute together the globus major of the epididymis. They a
with ciliated epithelium.

The excretory ducts of the testicle open finally into the commence
the canal of the epididymis at apparently narrow intervals, which i
however, are seen, when the canal of the epididymis is unravelled, to measu
two to three inches in

STRUCTURE of the EPIDIDYMIS — The epididymis consists of a single tub
twenty feet long, by which the tubuli seminiferi open into the vas defere
is at first very thin & exceedingly convoluted, and of a diameter of about
inch. It diminishes a little in size for a short distance, but it soon increas
siderably, the thickness of its walls increasing also, and its course becomi
tortuous. A little fine areolar tissue binds its convolutions together, thicke
being interposed between the larger masses of coils termed *lobes*, which lat
mostly transverse in direction. The epithelium of the canal of the epidid
ciliated (Becker, Kölliker). - The Vas aberrans of Haller (Vide spermatic
usually connected either with the canal of the epididymis or with the com
ment of the vas de

THE VAS DEFERENS, VESICULÆ SEMINALES, & EJACULATORY DUCTS.

VAS DEFERENS

Ascends on inner side of epididymis along lower three-fourths of posterior border of testicle, to which it is attached by firm areolar tissue.

Along back of spermatic cord to external abdominal ring;

Through external abdominal ring, inguinal canal & internal abdominal ring;

Downwards, backwards, inwards to base of bladder, passing on outer side of epigastric & obliterated hypogastric arteries and then on inner side of ureter;

Forwards & inwards between bladder & rectum, along inner side of vesicula seminalis becoming enlarged & sacculated;

Narrows to a point, and joins opposite base of prostate with duct of corresponding vesicula seminalis, to form the common seminal or ejaculatory duct.

Its canal is very small. Its walls are very thick & dense, and consist from without inwards of a cellular coat, of a muscular coat presenting two longitudinal layers & an intermediate circular layer of fibres, and of a mucous coat covered with columnar non-ciliated epithelium.

The vas aberrans of Haller communicates with the canal of the epididymis or with the commencement of the vas deferens.

VESICULÆ SEMINALES

Two lobulated membranous pouches about 2½ inches long obliquely disposed between base of bladder & second part of rectum, and presenting:

Post. Diverging Extremities – Enlarged, and reach as far back as termination of ureters.

Ant. Converging Extremities – Pointed; join at base of prostate with termination of the corresponding vas deferens to form the common seminal or ejaculatory duct.

Upper Surface – In contact with base of bladder.

Under Surface – Rests upon second part of rectum, from which it is separated by a process of the recto-vesical layer of the pelvic fascia.

They have the enlarged & sacculated vasa deferentia to their inner side, and bound laterally a triangular portion of the base of the bladder which corresponds to trigonum vesicæ.

Each vesicula seminalis consists of a tube from four to six inches long, and of about the diameter of a crow quill. This tube is irregularly coiled upon itself, and gives off numerous cœcal diverticula, which, as well as the coils of the tube, are bound together by firm areolar tissue. Its walls are thin, and consist of fibrous, muscular & mucous coats, the epithelium of the latter being squamous.

EJACULATORY DUCTS

Two small canals about ¾ of an inch in length formed by the junction opposite the base of the prostate of the vas deferens with the duct of the vesicula seminalis.

They pass forwards & inwards through the substance of the prostate along the side of the verumontanum, and terminate by a slit-like opening upon or within the margins of the vesicula prostatica or sinus pocularis.

Their walls are thin, and consist of a delicate fibrous coat & of muscular & mucous coats.

THE SPERMATIC CORD.

Consists of the portion of the vas deferens which extends from the testicle to the inter
dominal ring, and of the accompanying arteries, veins, lymphatics, & nerves and c
the vas aberrans & the organ of Giraldes. These structures are bound toge
delicate areolar tissue, and are invested from within outwa
Tunica vaginalis, below;
Fascia propria, along the whole
Cramasteric fascia, along nearly the whole of the course of the cord;
Intercolumnar fascia, dartos & skin of the scrotum, below the external ab

Vas deferens – Lies at the back.

Arteries – Are the *spermatic*, the *artery of the vas deferens* from the superior vesical,
cremasteric branch of the epi

Veins – Are the spermatic veins, which pass up in front of the vas deferens, form
pampiniform plexus, and then unite in a single trunk, which accompanies the
nal portion of the spermatic artery and terminates in the left renal vein, on
side, in the inferior vena cava, on th

Lymphatics – Terminate in the lumbar glands.

Nerves – Are the *ilio-inguinal*, the *genital branch of the genito-crural*, frequently a br
the ilio-hypogastric, and the *spermatic plexus of the sympathetic*, which latter is
from the renal, aortic & hypogastric p

Vas Aberrans (HALLER) – A narrow tortuous tube from 1½ to 14 inches long, co
with the commencement of the vas deferens or with the lower part of the
the epididymis, and passing upwards for 1 or 2 inches among the other ve
the spermatic cord. It ends in a blind extremity, and is sometimes unco
with the seminal ducts. It was probably connected in the fœtus with the

Organ of Giraldes – A collection of minute convoluted tubules, probably a rem
the Wolffian body, found in the lower & front part of the cord close to the
the epid

THE PROSTATE GLAND.

Is a pale firm glandular structure of about the size & shape of a horse-chesnut, situated beneat the trigonum vesicæ and around the neck of the bladder & commencement of the urethr below and behind the symphysis pubis & the pubo-prostatic ligaments or anterior true lig ments of the bladder; above & in front of the second part of the rectum and the point decussation of those anterior or inner fibres of the levator ani which form the levat prostatæ; between the two lateral halves of the posterior or ascending layer of the dee perinæal fascia or triangular ligament, and between the two lateral halves of the ascendi portion of the recto-vesical layer of the pelvic fascia.

It measures normally from 1¼ to 1½ inches in its antero-posterior diameter, 1⅜ inches in i greatest transverse diameter (Sir H. Thompson), and about ¾ of an inch in depth; the measurements undergo, however, great variations in old persons, who are frequently th subjects of enlarged prostate.

It consists of two lateral lobes separated behind by a deep notch, and of a third or middle lob which is normally but a small rounded or triangular mass fitted in between the two later lobes in the under part of the organ, and lying between the ejaculatory ducts immediatel beneath the neck of the bladder. The degree of development of this middle lobe, however, very variable, it being often much enlarged in advanced life, and then pr jecting into the neck of the bladder so as to impede the passage of urine.

It presents for examination:

BASE — Directed backwards & upwards towards the trigonum vesicæ & the neck of th bladder, and notched posteriorly.

APEX — Passes downwards & forwards between the posterior or ascending layers of th deep perinæal fascia or triangular ligament.

UPPER SURFACE — Covered by and connected to the pubo-prostatic ligaments o ant. true ligaments of the bladder and the front part of the recto-vesical layer of th pelvic fascia. Is situated about ¾ of an inch below & behind the symphysis pubis, an presents a slight longitudinal furrow.

UNDER SURFACE — Rests upon the lower part of the second portion of the rectu (just opposite the bend between the second & third portions), a process of the recto vesical layer of the pelvic fascia being interposed between the two organs. Present a slight depression, or sometimes two converging grooves which correspond to th ejaculatory ducts and which demarcate the central lobe.

LATERAL SURFACES — Covered by the layers of fascia above mentioned, by thos anterior or inner fibres of the levatores ani which go to form the levator prostatæ and by the reflections of the peritoneum from the bladder to the sides of the pelvi which reflections form the lateral false ligaments of the bladder.

It is perforated by the urethra, which usually lies nearer its upper than its lower surface, an also by the ejaculatory ducts which pass forwards & inwards through the lower part of th gland along the side of the verumontanum, and terminate by a slit-like opening upon o within the margins of the vesicula prostatica or sinus pocularis.

STRUCTURE — Structurally the prostate presents:

Fibrous Capsule — Distinct from the fibrous investment derived from the tw halves of the posterior or ascending layer of the deep perinæal fascia & from the recto-vesical layer of the pelvic fascia, and separated from these by prosta tic plexus of veins. It sends off fibrous prolongations into the interior of the gland

Glandular Subtance — Consists of follicular pouches which are groupe around, and open into, numerous elongated canals, by the junction of which from twelve to twenty excretory ducts are formed; these open into the prostati sinus on the floor of the prostatic portion of the urethra.

Muscular Fibres — Are abundant in the fibrous capsule. The urethra is surroun ded, as it passes through the prostate, by a thick layer of circular fibres con tinuous behind with the fibres of the sphincter vesicæ, and in front with thos of the membranous portion of the urethra.

Vessels & Nerves — ARTERIES are derived from the internal pudic, vesical & middl hæmorrhoidal. VEINS form an important plexus around sides & base of prostate they receive in front the dorsal vein of the penis, and open behind into internal iliac vein. LYMPHATICS ramify on the outer surface of the capsule. NERVES are derived from hypogastric plexus.

THE MALE URETHRA.

Is about 8½ inches long, and extends from neck of bladder to end of penis.
It presents beneath the pubes a fixed curve concave superiorly, and in front of the pu
the flaccid state of the penis, a second flexible curve concave infe
It is divided into: -

PROSTATIC PORTION — The widest & most dilatable part, spindle-shaped, 1¼
long; passes through the prostate from base to apex, lying nearer its upper th
lower surface. Its transverse section is of a horse-shoe shape concave infe
On its floor are the following pe

URETHRAL CREST, VERUMONTANUM OR CAPUT GALLINAGINIS – Longitudinal elevation
lines in length and 1½ lines high at its central & highest part, consisting, a
ing to Kobelt, of muscular fibres & erectile tissue. On either side of the

PROSTATIC SINUS – A longitudinal groove into which open the ducts of the lateral
the prostate. On the front part of the crest

UTRICLE, SINUS POCULARIS OR VESICULA PROSTATICA – An expanding cul-de-sac,
passes backwards into the substance of the middle lobe of the prostate for
a quarter of an inch, and upon or within the margins of which are the e
openings of the ejaculatory

MEMBRANOUS PORTION —The shortest, and, excepting the meatus, the narrowe
of the canal. It extends from apex of prostate to bulb of corpus spongiosum,
situated between the two layers of the deep perinæal fascia, which layers ar
longed around it, the one downwards & forwards, the other upwards & back
Its upper surface is concave superiorly, ¾ of an inch long, and situated about a
below & behind the pubic arch, from which arch it is separated by the anterior
of the compressor urethræ muscle & by the dorsal vessels & nerves of the penis
under surface is convex inferiorly, only ½ inch long (in consequence of the bul
jecting backwards beneath the urethra), and separated from the rectum by a tr
lar space, broad below, narrow above, the peri

SPONGY PORTION — Commences within the bulb below & behind the symphysis
ascends a short distance in front of the symphysis within the corpus spong
curves downwards with the latter in the flaccid state of the penis, and ends at the
urinarius. It is about six inches long. In the greatest part of its course it is u
in size, and intermediate between the prostatic & membranous portions; it is d
however, within the bulb & within the glans penis (in which latter situation th
tation forms the fossa navicularis), and is greatly constricted at the meatus
transverse section is elongated from side to side except within the glans penis,
it is elongated vertically. On its walls, and more particularly on its floor, are the
ings of numerous mucous glands, the glands of Littre, which openings are direct
wards, and are sometimes large enough to intercept the passage of small cath
this is especially the case with one of them, which is situated on the upper wall
fossa navicularis, and which constitutes the lacuna magna. On the floor of i
terior dilated portion comprised within the bulb, and sometimes termed the b
portion, are the openings of the ducts of Cowper's g

STRUCTURE — Three coats: -

Mucous Coat - Thin, pale in the prostatic portion, rosy in the membranous &
portions, in which it is thrown into longitudinal folds (except when the c
distended with urine). Covered with columnar epithelium except in the
navicularis, where the epithelium is squamous. Presents the glands of
above described, which glands are most abundant in the spongy portio
presents also, near the meatus, a few p

Muscular Coat - Consists of external longitudinal & internal circular unstriped
cular fibres, both most abundant in the prostatic p

Erectile Coat - Thick in the spongy portion, where it forms the corpus spon
(Vide Structure of the Penis). From this a thin layer of erectile tissue
longed upwards round the membranous & prostatic portions as far as th
of the bladder, forming in the prostatic portion, according to Kobelt, the
montanum or caput gallin

STRUCTURE of the PENIS.

CORPORA CAVERNOSA — Arise from the anterior & inner part of the two isch tuberosities, and from the ascending rami of the ischia & descending rami of the pub by two pointed prolongations, the *crura penis*. These pass forwards & inwards, presen slight enlargement, the *bulb of the corpus cavernosum*, and unite to form the body of penis. – The body of the penis presents on its upper surface a narrow median groove the dorsal vessels & nerves of the organ, and, on its under surface a broader groo which receives the corpus spongiosum. It ends anteriorly in a rounded extremity ov lapped by the base of the gla

CORPUS SPONGIOSUM — Commences between the two converging crura of corpora cavernosa by an expanded portion, the *bulb of the urethra*. This latter is penetra superiorly by the membranous portion of the urethra, is marked inferiorly by a part division into two lobes, and is surrounded by the accelerator urinæ muscle & by a p longation of the anterior or descending layer of the deep perinæal fascia. – It passes f wards, as an erectile tube, round the spongy portion of the urethra, and terminates the *glans penis*, a conical enlargement, which overlaps the anterior rounded extremity the two corpora caverno

STRUCTURE of the CORPORA CAVERNOSA & SPONGIOSUM

They consist

Fibrous Investment – Thick, dense, firm, especially over the corpora caverno highly elastic, but incapable of more than a certain degree of distentio formed of white & yellow elastic fibrous tissues and of unstriped muscu fibres disposed longitudinally in the superficial strata, circularly in deeper on

It forms but an incomplete septum between the two corpora caverno in their points of contact: – The septum is thick & imperforate behind, it only consists in front of a few vertical bands arranged somewhat like teeth of a comb, and forming the *septum pectinifor*

It gives off numerous trabeculæ from its inner surface. – In the corpo cavernosa the trabeculæ are strongest towards the periphery, and the co partments they bound are transversely or circularly disposed & larg towards the centre. In the corpus spongiosum the trabeculæ are more de cate, and the compartments are longitudinal & more uniform, except the glans penis where their arrangement is somewhat compl

Erectile Tissue – Consists of afferent arteries, a venous plexus, & efferent vei

AFFERENT ARTERIES – Are the arteries of the corpora cavernosa & the arter of the bulb, and twigs from the internal pudic & the dorsal arteries the penis. Some of the branches of these arteries terminate in cap lary plexuses as in other parts of the body. Others, the *helic arteries*, which are said to be especially numerous towards the root the penis and to be wanting in the glans, become convoluted, a forming tendril-like twigs, project singly or in tufts into the veno spaces, and end in dilated extremities which are either open or clos (Müller). This is denied however by Valentin, who describes t smallest branches of the arteries as ending in wide funnel-shap orifices, which open directly into the venous spac

VENOUS PLEXUS – Is very intricate. So numerous & large are the communic tions between the veins that the blood appears to be effused into system of extra-vascular structur

EFFERENT VEINS – Some emerge from the corona glandis and from the upp & under surfaces of the corpora cavernosa, and join the dorsal vein the penis; most pass out at the root of the penis, and join the prost tic plexus & the pudic vei

The proper nerves of the cavernous structures are deriv mainly from the pelvic & prostatic plexuses of the sympathetic, b partly also from the pudic nerve.

INTERNAL ILIAC ARTERY.

Short thick trunk which extends from bifurcation of common iliac artery opposite
vertebral articulation (some Authors say opposite sacro-iliac synchondros
upper border of great sacro-sciatic foramen, near which it divides into an
& posterior divisions.

Usually 1½ inches long, but its length may vary from ½ an inch to 3 inches.

Rather smaller in adult than the external iliac. Twice as large in fœtus: - Und
name of hypogastric artery, it then continues the common iliac along s
bladder, and ascends to umbilicus where it becomes one of the umbilical ar

RELATIONS:

In Front - Peritoneum, ureter.
Behind - Pyriformis, internal iliac vein, lumbo-sacral cord.
On Outer Side near Origin - Psoas & external iliac vein.

BRANCHES — Are given off as follows, from: -

ANT. DIVISION — Sup. Middle & Inf. Vesical, Middle Hæ
rhoidal; and in female, **Uterine & Vagi**
Obturator, Sciatic, Pudic.

POST. DIVISION — Ilio-Lumbar, Lateral Sacral, Gluteal.

BRANCHES of the INTERNAL ILIAC ARTERY—1st T.

BRANCHES FROM ANTERIOR DIVISION.

VISCERAL BRANCHES:

Vesical - Two or three; but other twigs pass to bladder from middle hæmorrhoida uterine, vaginal, & obturato

SUPERIOR VESICAL - Is that part of hypogastric artery which extends to side bladder, and which remains pervious after birth. Gives off *artery of v deferens*, and th

MIDDLE VESICAL, - Which is often wanting.

INFERIOR VESICAL - Usually arises in common with middle hæmorrhoidal. To bas of bladder, prostate, & vesiculæ seminale

Middle Hæmorrhoidal - Joins with superior hæmorrhoidal branch of inferi mesenteric, and with inferior hæmorrhoidal branch of internal pudi

Uterine - Downwards to neck of uterus, and then upwards in a tortuous course alon side of body between folds of broad ligament; communicates with ovaria

Vaginal - Descends upon vagina to neck of bladder & rectum.

NON-VISCERAL BRANCHES:

Obturator - Usually arises (2 cases out of 3) from anterior division or sometime from posterior division of internal iliac. In one case in 3½ it arises fro the epigastric, that is to say that its anastomotic branch with that artery enormously increased in size while its proper root is proportionately dimin ished. Sometimes both roots are nearly equally developed (1 case in 72) Occasionally the artery arises from termination of external iliac.

In cases of abnormal origin from epigastric the obturator artery usuall arises from near the root of the latter, and then descends into the pelvis clos to the external iliac vein and on the outer side of the femoral ring. Some times, however, it arises from the epigastric higher up, that is to say at distance from the root of the latter; it then passes inwards above the femora ring and descends into the pelvis on the inner side of that ring behin Gimberat's ligament. It is in this latter case only that the obturator artery exposed to be wounded in the operation for strangulated femoral hernia.

When it arises from the internal iliac it passes forwards along outer wall of pelvi below obturator nerve, giving off small iliac & vesical branches and a pubi branch which communicates on back of pubes with its fellow and with th epigastric.

Through upper part of obturator foramen, and divides into:

INTERNAL BR. - Round inner margin of obturator foramen; supplie obturator & adductor muscles, pectineus & gracilis and anasto moses with internal circumflex

EXTERNAL BR. - Round outer margin of obturator foramen to inter val between gemellus inferior & quadratus femoris, sends a articular branch to hip-joint through cotyloid notch, and anasto moses with external circumflex & sciatic arteries; supplies obtu rator externus & the lower external rotator muscles

Sciatic - The largest of the two terminal branches of anterior division of internal ilia artery, and the largest branch of the artery after glutea

Downwards in front of pyriformis & sacral plexus, lying a little behind & to oute side of internal pudic

Through great sacro-sciatic foramen below pyriformis and between great sciati nerve & pudic vessels & nerve

With small sciatic nerve over gemelli, obturator internus & quadratus femori and in front of gluteus maximus

Gives off branches:

MUSCULAR, ARTICULAR to hip-joint;

COCCYGEAL, INFERIOR GLUTEAL;

COMES NERVI ISCHIADICI - Long, slender; with, and subsequentl within sheath of, great sciatic nerve to lower part of thigh

Pudic - Vide next Tablet.

BRANCHES of the INTERNAL ILIAC ARTERY—2nd T

PUDIC ARTERY.

The smaller of the two terminal branches of anterior division of internal iliac artery.
Descends in front of pyriformis & sacral plexus, lying to the inner side & a little in fr
sciatic a
With pudic nerve through lower part of great sacro-sciatic foramen below pyriformis on
side of sciatic nerves & sciatic a
Winds round spine of ischium and re-enters pelvis through lesser sacro-sciatic foramen.
Forwards along outer wall of ischio-rectal fossa below pudic nerve, being covered by obt
fascia, and lying at first 1½ inches above lower extremity of tuber ischii, but appros
surface as it prog
Pierces deep layer of deep perinæal fascia, and ascends along pubic arch between th
layers of that fascia to near symphysis
Pierces superficial layer of deep perinæal fascia, and divides into artery of corpus caver
and dorsal artery of

BRANCHES:

Inferior Hæmorrhoidal - Two or three, small. - Arise in ischio-rectal
which they cross to lower part of rectum &

Superficial Perinæal - Arises near transversus perinæi muscle, which it c
superfi
Between accelerator urinæ & erector penis to skin of scrotum & c
or of la

Transverse Perinæal - Small, arises frequently from superficial perinæal.
Inwards below transversus perinæi to structures between bulb and

Artery of the Bulb - Large and surgically important.
Inwards to bulb & Cowper's glands between the two layers of deep pe

May be small or even absent, or may be double. May arise earlie
cross perinæum further back than usual, and would then be
liable to be divided in lateral lithotomy. May arise from an acc
pudic, and then lie more forward and be altogether out of d

Artery of the Corpus Cavernosum - Pierces crus penis, and runs for
in corpus cavernosum by side of septum pectini

Dorsal Artery of the Penis - Between crus and symphysis. Through susp
ligament and forwards beneath skin on dorsum of penis to glans & pr

ACCESSORY PUDIC ARTERY — Exceptional branch of internal iliac,
exists when pudic artery, being smaller than usual, fails to give off i
terminal branches & sometimes even the artery of the
Arises from near origin of pudic, passes forwards along base of bladder & upper
of prostate, pierces triangular ligament, and takes the place of termina
tion of normal

BRANCHES of the INTERNAL ILIAC ARTERY—3rd T.

BRANCHES FROM POSTERIOR DIVISION.

Ilio-Lumbar – Arises from upper part of posterior division.
Ascends beneath psoas to upper part of iliac fossa, where it divides into:

LUMBAR BRANCH – To psoas & quadratus lumborum, communicating with la
lumbar artery, and sending a small spinal branch through interve
tebral foramen between last lumbar vertebra & sacrum
ILIAC BRANCH – To iliacus & ilium, and along crest anastomosing with circum
flex ilia

Lateral Sacral – Usually two, superior & inferior.
Downwards and inwards in front of pyriformis & sacral plexus, and along inner si
of anterior sacral foramina, anastomosing with middle sacral ar
giving

DORSAL BRANCHES – Through anterior sacral foramina to contents of spin
canal, and then through posterior sacral foramina to skin & muscl
on back of sacrum

Gluteal – The largest branch of internal iliac, and the continuation of its posterior divisio
Through great sacro-sciatic foramen above pyriformis, and then between latter mu
cle & gluteus medius, and divides int

SUPERFICIAL BRANCH – Gives off numerous branches to gluteus maximus & i
tegument over sacrum

DEEP BRANCH – Forwards between glutei medius & minimus, and divides int
Superior Division – Along upper border of gluteus minimus towards a
terior superior spine of ilium, and joins with circumflex ilia
Inferior Division – Crosses gluteus minimus towards great trochanter, a
joins with ascending branches of external circumfle

SACRAL PLEXUS.

Formed by lumbo-sacral cord & anterior divisions of the three first sacral nerves, and p
that of the f
Triangular in shape, – its constituent nerve-fibres converging to form one broad flat
which leaves pelvis through lower part of great sacro-sciatic foramen below pyrif
and immediately divides into Small sciatic, Great sciatic & P
Rests upon pyriformis, and is covered by the pelvic fascia & by the two terminal bra
(sciatic & pudic) of anterior division of internal iliac a

BRANCHES :

Superior Gluteal – From back of lumbo-sacral cord.
With gluteal vessels through upper part of great sacro-sciatic foramen
pyriformis, and divides
SUPERIOR BRANCH – Along middle curved line on dorsum ilii with superior di
of deep branch of gluteal artery. Supplies glutei medius & min
INFERIOR BRANCH – Directly forwards between glutei medius & minimus, which
supplies, and terminates in tensor vaginæ fe

Muscular – To pyriformis, obturator internus, gemelli & quadratus femoris.
nerve to obturator internus passes behind spine of ischium and th
lesser sacro-sciatic foramen to inner surface of the muscle.
gemellus inferior and the quadratus femoris are supplied by a co
branch, which runs between capsule of hip-joint and the obturator int
& gemelli, and gives off an articular filament to the

Small Sciatic – From lower & back part of sacral plexus.
With sciatic vessels through lower part of great sacro-sciatic foramen
pyrif
Descends beneath gluteus maximus on inner side of great sciatic nerve.
Along back of thigh beneath fascia lata to lower part of popliteal space.
Perforates deep fascia, and accompanies external saphenous vein to skin o
of leg; communicates with external saphenous nerve. Gives off bran
INFERIOR GLUTEAL – Several, large; to under surface of gluteus maximus.
INFERIOR PUDENDAL – Forwards below tuber ischii to skin of perinæum and up
inner part of thigh, and to scrotum or la
CUTANEOUS – *Descending*. To skin of inner & outer sides of back of thigh, pop
space and back
Ascending. Wind round lower border of gluteus maximus to integ
over its su

Great Sciatic – Vide

Pudic – Vide

HEAD & NECK.

II.

POSTERIOR TRIANGLE OF THE NECK.

POSTERIOR TRIANGLE of the NECK.

Is bounded by sterno-mastoid, trapezius & clavicle.
Its floor is formed from above downwards by splenius capitis, levator anguli sca
posterior & middle scaleni, and superior digitation of serratus magn
a part of the complexus is sometimes seen above the spl
It is divided by posterior belly of omo-hyoid into:

Sup. or Occipital Portion – The largest, contains:
Superficial cervical plexus & spinal accessory nerve,
Transversalis colli artery & vein,
Fat & lymphatic glands.

Inf. or Clavicular Portion – The smallest. Its size varies greatly with the ext
clavicular attachments of sterno-mastoid & trapezius, situation of
hyoid, and elevated or depressed position of shoulder. Cont
Third part of subclavian artery,
Brachial plexus,
Transversalis humeri & transversalis colli vessels,
External jugular vein,
Fat & lymphatic glands.

MUSCLES.

Platysma Myoides – Clavicle, acromion, fascia over pectoralis major, deltoid, trapezius.

Innermost fibres decussate below chin & in front of symphysis; othe are inserted into lower jaw below external oblique line; others blend wit depressores labii inferioris & anguli oris and the other muscles of the mouth forming risorius. – S. by superficial cervical plexus and facial nerve.

Sterno-Cleido-Mastoid or Sterno-Mastoid.

STERNAL PORTION – Upper & outer part of front of first piece of sternum.

CLAVICULAR PORTION – Anterior surface & upper border of inner third of clavicle.

Anterior border & outer surface of mastoid process and outer two-thir of superior curved line of occipital bone. – S. by deep external branches cervical plexus & by spinal accessory nerve.

Trapezius – External occipital protuberance & inner third of superior curved line occipital bone; ligamentum nuchæ & spinous processes of the last cervical & of the dorsal vertebræ; supraspinous ligament.

Posterior border of outer third of clavicle, inner border of acromio whole length of upper lip of posterior border of spine of scapula, a tubercle at outer part of smooth surface at its inner extremity. – S. by spin accessory nerve & deep branches of cervical plexus.

Levator Anguli Scapulæ – Posterior tubercles of transverse processes of the 3, 4, or upper cervical vertebræ between splenius and scalenus medius.

Posterior border of scapula between spine and superior angle. – S. by one the deep branches of the cervical plexus and by one of the supra-clavicul branches of the brachial plexus.

Splenius – Lower half of ligamentum nuchæ and spinous processes of 7th cervical & upper dorsal vertebræ.

SPLENIUS CAPITIS – Mastoid process and outer part of rough surface between su erior & inferior curved lines of occipital bone.

SPLENIUS COLLI – Posterior tubercles of transverse processes of the 2, 3, or 4 upper c vical vertebræ – S. by external branches of posterior divisions of cervical nerves.

Scalenus Anticus – Tubercule on inner border and upper surface of 1st rib.

Anterior tubercules of transverse processes of 3rd, 4th, 5th, and 6th cervi vertebræ. – S. by one of the supra-clavicular branches of brachial plexus.

Scalenus Medius – Upper surface of first rib behind groove for subclavian artery.

Posterior tubercles of transverse processes of six lower cervical verteb – S. by one of the supra-clavicular branches of brachial plexus.

Scalenus Posticus – Back of outer surface of 2nd rib.

Posterior tubercules of transverse processes of two or three lower cervi vertebræ. – S. by one of the supra-clavicular branches of brachial plexus.

CERVICAL PLEXUS.

Formed by anterior branches of four upper cervical nerves & loops connecting them, and lies b
sterno-mastoid, in front of levator anguli scapulæ & scalenus medius & the four upper ver
Communicates through loop between 4th & 5th nerves with brachial plexus, and, through it
communicating branches, with pneumogastric, spinal accessory, hypoglossal & superior c
ganglion of the sympathetic. – Its superficial branches communicate with facial & great occ
Its branches are superficial & deep.

SUPERFICIAL BRANCHES — Wind round posterior border of sterno-mastoid one
the other in the following order, which is also the order in which they

Small Occipital – From 2nd cervical; variable in size & sometimes double.
Ascends behind sterno-mastoid to attollens aurem & posterior belly of oc
frontalis, and perforates deep fascia to integument of back of side of h
upper part of back of pinna; its auricular branches being sometimes su
by great occipital. Joins with great occipital, great auricular, & po
auricular branch of facial. – The second small occipital, or smallest occ
when it exists, arises from 3rd nerve, and sends twigs to back o

Great Auricular – From 2nd & 3rd cervical nerves.
Ascends upon sterno-mastoid & beneath platysma to near lobule of ear, wh
divides into bra
AURICULAR – Several, large; to integument of back of pinna, joining wit
terior auricular branches of facial & pneumogastric. Some twigs
outer surface of lobule, and one reaches outer surface of pinna th
a fissure between antihelix & c
MASTOID – To integument behind ear, joining with post. auricular branch of
FACIAL – To integument of face, and to parotid gland joining with facial.

Superficial Cervical – The largest; from 2nd & 3rd.
Crosses sterno-mastoid beneath platysma & external jugular vein, and divides int
ASCENDING – Gives off an ascending twig to external jugular vein, joins
cervico-facial branch of facial, and, supplying platysma, pierces
integument of upper & front part of
DESCENDING – Pierces platysma to integument of lower & front part of neck

Superficial Descending – Several large branches from 3rd & 4th.
Descend between sterno-mastoid & trapezius, and divide into branches:
STERNAL – Cross origin of sterno-mastoid to integument of front of ch
far as middl
CLAVICULAR – Cross clavicle (sometimes one of them perforates the bo
integument over pectoralis major & deltoid, communicating with
neous branches of the superior intercostal n
ACROMIAL – Over acromion & clavicular origin of trapezius to integume
outer & back part of sho

SPINAL ACCESSORY NERVE.

Consists of two portions, the portion accessory to the pneumogastric & the spinal portion

PORTION ACCESSORY to the PNEUMOGASTRIC — The smaller.

Arises from *lateral tract of medulla oblongata below pneumogastric.* — Deep origin fro
grey nucleus on lower part of floor of 4th ventricl
Joins ganglion of root of pneumogastric in jugular foramen by two or three filamen
and is entirely added to the pneumogastric below the ga
glion of the trun
Assists in forming *pharyngeal, superior & inferior laryngeal brs.* of pneumogastric.

SPINAL PORTION — The larger.

Arises from *lateral column of cord as low as 5th or 6th cervical n.* — Deep origin fro
anterior horn of grey matt
Ascends between ligamentum denticulatum & posterior roots of the spinal ns., a
enters skull through foramen magnu
Passes out through jugular foramen in same sheath as, and on outer side of, pneum
gastric n. and behind glosso-pharyngeal, joining with acc
sory portio
Backwards behind hypoglossal & pneumogastric, beneath and then behind intern
jugular vein and digastric & stylo-hyoid muscles to upp
part of sterno-masto
Pierces deep fibres of sterno-mastoid, giving branches to it and joining in its su
'stance with 3rd cervical ner
Crosses posterior triangle of the neck, joining with 2nd, 3rd, 4th & 5th cervical n
and is distributed to under surface of trapezi

SUBCLAVIAN ARTERY.

From innominate artery behind upper border of sterno-clavicular articulation (right
from end of transverse portion of arch of Aorta (left side), to outer border of firs
Divided into three pa

FIRST PART — From origin to inner border of scalenus anticus.

SECOND PART — Lies behind scalenus anticus at a somewhat variable level abov
icle. Short; forms higest part of arch described by the artery. – RELA
In Front – Scalenus anticus, subclavian vein, phrenic nerve.
Behind – Scalenus medius.
Above – Brachial plexus.
Below – Pleura.

SUBCLAVIAN VEIN lies below & in front of artery, from which it is separat
scalenus a

BRANCHES — **Superior Intercostal** on right side; generally no bran
lef

THIRD PART — From outer border of scalenus anticus to outer border of first rib. C
lower & inner part of posterior triangle of neck, lying in the small
bounded by omo-hyoid, clavicle & scalenus ant. – RELA
In front – Skin, superficial fascia, platysma, descending branches of supe
cervical plexus, deep fascia, transversalis colli
Clavicle, subclavius & its nerve, transversalis humeri vessels,
nal jugular vein with the plexus frequently formed b
suprascapular & transversalis
Behind – Scalenus medius.
Above – Brachial plexus, omo-hyoid.
Below – Outer surface of first rib.

SUBCLAVIAN VEIN lies below, in front, & to inner side of artery.

BRANCH — Frequently the **Posterior Scapular,** which is otherwise de
from the transversalis

THYROID AXIS.

Short thick trunk from front of first part of subclavian close to inner border of scalenus anticus. Divides almost immediately into :-

Inferior Thyroid -

Suprascapular or Transversalis Humeri

Crosses lower part of scalenus anticus under cover of sterno-mastoid.
Outwards behind clavicle, beneath omo-hyoid.
Beneath trapezius, and over transverse ligament of scapula to supraspinous fossa, where it ramifies between the muscle & the bone.
Crosses neck of scapula to infraspinous fossa. - Anastomoses with the other scapular arteries, supplies shoulder-joint & subscapularis, and gives off a small supra-acromial twig.

Transversalis Colli

Crosses upper part of subclavian triangle in front of scaleni & brachial plexus, passing sometimes between the trunks of the plexus, and divides beneath trapezius into:

Superficial Cervical - Ascends beneath trapezius to muscles & glands of back of neck, and anastomoses with superficial branch of arteria princeps cervicis.

Posterior Scapular - Beneath levator anguli scapulæ to superior angle of scapula, and then along posterior border of the bone beneath rhomboidei as far as its inferior angle, anastomosing with the other scapular arteries & the intercostals. Frequently arises from 3rd part of subclavian.

BRACHIAL PLEXUS.

Formed as follows by anterior divisions of 5th, 6th, 7th, & 8th cervical and 1st dor
Fifth & Sixth Cervical unite between anterior & middle scaleni, and f
OUTER PRIMA
Eighth & First Dorsal unite behind scalenus anticus, and form the
Seventh forms alone the MIDDLE PRIMARY CORD. [PRIMA
All three primary cords divide into *anterior & posterior divisions.*
Anterior divisions of *outer & middle* primary cords form the OUTER COR
Anterior division of *inner* primary cord forms the INNER CORD.
Posterior divisions of *all three* primary cords form the POSTERIOR CORD.
Broad between anterior & middle scaleni, where anterior divisions of the ne
above 2nd part of subclavian artery; contracted opposite clavicle, where i
outer cords lie at fore part of plexus on outer side of 3rd part of subclavian
& of 1st part of axillary; again expanded in axilla, where the three cords
inner, outer & posterior aspects of 2nd part of axillary, and where they br
into the large nerves of upp
Communicates with the cervical plexus through loop between 4th & 5th nerves &
branch from 5th nerve to phrenic, and with middle & inferior ganglia of symp

BRANCHES — Are

ABOVE THE CLAVICLE:

Post. or Long Thoracic, or Ext. Respiratory of Sir C. Bell
5th & 6th nerves, the two roots uniting in substance
lenus
Deeply along side of chest behind axillary vessels & cords of
plexus as far as lowest digitation of serratus

Suprascapular – From back of trunk formed by union of 5th & 6th.
Backwards & outwards beneath trapezius & through supras
foramen to supraspinous fossa, where lies between supr
tus & t
Round spine of scapula to infraspinous fossa. – Supplies supra-
spinati (two twigs to each), shoulder-joint &

Muscular – To rhomboidei & frequently to levator anguli scapulæ (fr
nerve), subclavius (from 5th & 6th, anastomoses fre
with phrenic), scaleni & longus colli (variably from 6

Communicating – From 5th cervical to phrenic on anterior scalenus

BELOW THE CLAVICLE — The branches are given off from the thre
as follow
Outer Cord – External anterior thoracic, outer head of media
culo-cutaneous or external cut
Inner Cord – Internal anterior thoracic, inner head of mediar
internal cutaneous, lesser internal cutaneous or n. of W
Posterior Cord – The three subscapular nerves, musculo-s
cir

HEAD & NECK.

II.

ANTERIOR TRIANGLE OF THE NECK.

ANTERIOR TRIANGLE of the NECK.

Is bounded by sterno-mastoid, middle line of neck, lower border of jaw & line
angle of jaw to mastoid pr
It is divided by anterior belly of omo-hyoid, and by stylo-hyoid & posterior be
digastric

Inf. Carotid Triangle – Bounded by sterno-mastoid, anterior belly of omo-hyo
middle line of neck; contains beneath sterno-hyoid & -thy
Common carotid artery, internal jugular vein, pneumogastric & sympathetic;
Inferior thyroid artery, recurrent laryngeal nerve;
Trachea, thyroid gland, lower part of larynx.

Sup. Carotid Triangle – Bounded by sterno-mastoid, anterior belly of omo-
stylo-hyoid & posterior belly of digastric; cont
Termination of common carotid artery, internal & external carotid arteries, &
branches of the
Superior thyroid, lingual, facial, & internal jugular veins;
Pneumogastric, superior laryngeal, & sympathetic nerves:
Hypoglossal & descendens noni nerves.
Upper part of larynx, lower part of pharynx.

Submaxillary Triangle – Bounded by median line, jaw-bone & line from ang
jaw to mastoid process, and by stylo-hyoid & posterior belly of diga
cont
Submaxillary gland, facial artery & vein;
Submental artery, mylo-hyoid artery & nerve;
Lower part of parotid gland, facial nerve, external carotid artery with its po
auricular, temporal & internal maxillary bra
Internal carotid, internal jugular vein, pneumogastric, sympathetic all separated
external carotid by stylo-glossus & -pharyngeus & glosso-pharynge

MUSCLES.

INFRA-HYOID REGION.

Sterno-Hyoid or Sterno-Cleido-Hyoid – Variously from posterior sterno-clavicu ligament, and from upper & back part of first piece of sternum or back inner extremity of clavicle, or from both; sometimes from clavicle only; oc sionally from cartilage of first rib.
Lower border of body of hyoid bone internally to omo-hyoid. – S. b branch from loop between descendens & communicans noni nerves.

Sterno-Thyroid – Back of first piece of sternum below & internally to sterno-hyoid.
Oblique line on ala of thyroid cartilage. – S. by a branch from sa source.

Omo-Hyoid – Upper border of scapula on inner side of suprascapular notch and so times from transverse ligament.
Lower border of body of hyoid bone externally to sterno-hyoid. – S. b branch from loop between descendens & communicans noni nerves.

Thyro-Hyoid – Oblique line on ala of thyroid cartilage.
Lower border of body & greater cornu of hyoid bone. – S. by hypoglossal

SUPRA-HYOID REGION.

Digastric – Digastric groove on inner side of mastoid process. – Perforates stylo-hy and is held in connection with body & great cornu of hyoid bone by an ap eurotic loop lined with synovial membrane, from which loop it is reflec upwards & forwards to
Rough depression on inner lip of lower border of jaw bone close to sy physis. – S., posterior belly by facial nerve, anterior belly by mylo-hy branch of inferior dental nerve.

Stylo-Hyoid – Middle of outer surface of styloid process.
Body of hyoid bone at its junction with great cornu. – S. by facial ner

Mylo-Hyoid – Whole length of mylo-hyoid ridge.
Body of hyoid bone & median raphé from hyoid bone to symphysis. – mylo-hyoid branch of inferior dental nerve.

Genio-Hyoid – Inferior genial tubercle.
Anterior surface of body of hyoid bone. – S. by hypoglossal nerve.

MUSCLES of the FACE—3rd Tablet.

MUSCLES of the MOUTH.

Orbicularis Oris – Consists of three portions:

LABIAL OR MARGINAL PORTION – Continued uninterruptedly from one lip to the round the commissures of the mouth.

FACIAL PORTION – Central fibres decussate with, the others are directly conti with, fibres of buccinator.

ACCESSORY PORTION – Consists for the upper lip of four fasciculi, the musculi sorii orbicularis superiores, arising from superior maxilla opposite incisor & from septum of the nose; and for lower lip, of two fasciculi, the musculi sorii orbicularis inferiores, from inferior maxilla near the canine teeth.

Inserted into this muscle and into the integument covering it fro middle of the upper lip to the middle of the lower lip, are the following mu (the last excepted), which all blend more or less with each other :–

Levator Labii Superioris Alæque Nasi – Upper part of nasal process of sup maxilla.

Levator Proprius Labii Superioris – Superior maxillary & malar bones clo margin of orbit.

Levator Anguli Oris or Musculus Caninus – Canine fossa just below orbital foramen.

Zygomaticus Minor – Lower and front part of malar bone.

Zygomaticus Major – Malar bone near zygomatic suture.

Buccinator – Outer surface of alveolar processes of superior & inferior maxillæ co ponding to the molar teeth, and from pterygo-maxillary ligament (which is a fibrous band extending from apex of internal pterygoid plate to post extremity of mylo-hyoid ridge of lower jaw, and which gives attachment po iorly to superior constrictor of pharynx).

Its fibres are continuous with those of facial portion of orbicularis ori middle ones decussating, the superior & inferior ones passing directly into co ponding lip.

Risorius – Fascia over parotid gland & masseter. – Is often described as the upper of platysma myoides.

Depressor Anguli Oris or Triangularis Oris – External oblique line of lowe externally to mental foramen.

Depressor Labii Inferioris or Quadratus Menti – External oblique line of jaw between symphysis & mental foramen.

Levator Labii Inferioris or Levator Menti – Incisor fossa of lower jaw. Integument of chin close to median line.

ANTERIOR BRANCHES of the EXTERNAL CAROTID.

SUP. THYROID — Arises from front of external carotid close to its origin beneath thin anterior margin of sterno-mastoid, and is quite superficial when this muscle is dissected from its sheath, for the latter then retracts and exposes the carotid vessels & their branches.

Tortuous course upwards & forwards, and then downwards & forwards beneath omo- & sterno-hyoid & -thyroid to anterior surface of thyroid body. Gives off brs:

Hyoid - Small; along lower border of hyoid bone beneath thyro-hyoid, and joins with its fellow.

Sterno-Mastoid or Superficial Descending - Descends to middle of sterno-mastoid, crossing carotid vessels.

Sup. Laryngeal - With superior laryngeal nerve to interior of larynx through outer part of thyro-hyoid membrane.

Crico-Thyroid - Small; crosses crico-thyroid membrane and joins with its fellow.

LINGUAL — Arises a little below hyoid bone beneath thin anterior margin of sterno-mastoid.

Upwards & forwards upon middle constrictor to great cornu of hyoid bone.
Horizontally forwards above great cornu beneath hyo-glossus, digastric & stylo-hyoid.
Upwards on genio--hyo-glossus.
Forwards with gustatory nerve on under surface of lingualis inferior, and then beneath mucous membrane to tip of tongue under name of ranine. - Gives off brs:

Hyoid - Small; along upper border of hyoid bone and joins with its fellow.

Dorsalis Linguæ - Ascends on genio--hyo-glossus to dorsum of tongue, epiglottis, soft palate & tonsil.

Sublingual - Forwards between mylo-hyoid & mucous membrane to sublingual gland.

Ranine - The terminal branch; joins with its fellow at tip of tongue.

FACIAL — Arises above preceding beneath thin anterior margin of sterno-mastoid.

Forwards & upwards beneath posterior belly of digastric & stylo-hyoid & submaxillary gld.
Crosses jaw bone in front of masseter.
Forwards and upwards to angle of mouth upon buccinator & beneath platysma.
Upwards beneath zygomatici and upon levator anguli oris and the levators of the lip & ala of the nose to inner canthus, where becomes angular artery and joins with ophthalmic.

Is very tortuous in its course. Facial vein lies behind it, and is less tortuous. Gives off branches

Inferior or Ascending Palatine - Dips beneath ramus of jaw. Ascends between stylo-glossus & -pharyngeus and then upon superior constrictor in front of ascending pharyngeal, and supplies tonsil & soft palate.

Tonsillar - Ascends upon and perforates sup. constrictor to tonsil & root of tongue.

Submaxillary - Three or four, to submaxillary gland & surrounding muscles.

Submental - Forwards on under surface of mylo-hyoid, and between it and digastric to symphysis, where ascends upon chin.

Inf. Labial - Forwards beneath depressor anguli oris, below following artery to tissues of lower lip.

Inf. Coronary - Forwards beneath depressor anguli oris, and tortuous course through substance of orbicularis and between it & mucous membrane anastomosing with its fellow.

Sup. Coronary - Larger and more tortuous; similar course along free edge of upper lip, giving twigs to ala and artery of septum to septum of nose.

Lateralis Nasi - To ala and dorsum of nose.

Angular - To inner canthus, supplying lachrymal sac and anastomosing with nasal branch of ophthalmic.

All these branches anastomose freely with each other, with those of the opposite side, and with the mental, transverse facial, infra-orbital, ophthalmic, sublingual, posterior superior or descending palatine and ascending pharyngeal arteries.

GLOSSO-PHARYNGEAL NERVE.

The smallest of the three divisions of the 8th pair. *Arises from lateral tract of medulla obl*
above pneumogastric. — Its deep origin is from a grey nucleus on floor of 4th vent
Through anterior & inner part of jugular foramen in front of pneumogastric & spinal acce
and in a separate sheath, grooving lower border of petrous portion of temporal bon
presenting two ga
Sup. or Jugular G. or G. of the Root — Small, and involves only the outer fib
Inf. of Petrous G. or G. of Andersch — Larger, and involves whole of fibres.
Gives off from petrous ganglion:
Tympanic branch or *Jacobson's nerve*, described below;
Anastomotic br. to *ganglion of the root & to auricular br. of the pneumogastri*
and from a little below the ganglion:
Anastomotic br. to *facial nerve.* — This branch pierces post. belly of digas
Downwards & forwards in front of pneumogastric & between int. carotid & int. jugular vei
Beneath styloid process & muscles connected with it to lower border of stylo-pharyngeus.
Curves inwards upon stylo-pharyngeus & middle constrictor.
Beneath hyo-glossus to mucous membrane of fauces & base of tongue.

BRANCHES:

Tympanic Br. or Jacobson's N. — Arises from petrous ganglion.
Ascends through small canal in petrous bone to tympanum, where divides
Brs. of Communication — To *carotid plexus and great & small p*
branches of
Brs. of Distribution — To *fenestra rotunda, fenestra ovalis & mucous*
brane of Eustachia
Carotid Brs. — Descend on internal carotid artery, and join pharyngeal b
pneumogastric, sup. laryngeal & sympat
Pharyngeal Brs. — Three or four; form pharyngeal plexus by joining op
middle constrictor with pharyngeal brs. of pneumogastric, sup. laryng
sympat
Muscular Brs. — To stylo-pharyngeus & constrictors of pharynx.
Tonsillar Brs. — To tonsil, forming tonsillar plexus, branches of which are
buted to soft palate & f
Lingual Brs. — To mucous membrane of base & side of tongue.

THE TONGUE—1st Tablet.

Presents for examination:

BASE – Connected to:

Soft palate – By anterior pillars of fauces;
Pharynx – By superior constrictors of pharynx & mucous membrane;
Epiglottis – By three folds of mucous membrane, the glosso-epiglottic ligaments;
Hyoid bone – By hyo-glossi & genio-hyo-glossi muscles.

APEX – Free.

UPPER SURFACE OR DORSUM — Rough in its anterior two-thirds, where it presents the *papillæ minimæ* or *conicæ et filiformes*, and the papillæ *mediæ* or *fungiformes*; smooth in its posterior third, or behind the papillæ *maximæ* or *circumvallatæ*, where it presents the projecting orifices of nnmerous mucous glands.

UNDER SURFACE — Connected to hyoid bone & lower jaw by hyo-glossi & genio-hyo-glossi muscles, and from sides of which the mucous membrane is reflected over floor of mouth to inner surface of gums, forming in front a prominent fold, the frænum linguæ.

STRUCTURE of the TONGUE

Presents for examination:

Osteo-fibrous Support – Consists of:

HYOID BONE;
MEDIAN FIBROUS SEPTUM – Thickest behind, where it is attached to epiglottis.
HYO-GLOSSAL MEMBRANE – Connects under surface of tongue to hyoid bone.
To these may be added the
THICK MUCOUS MEMBRANE ON THE DORSUM OF THE ORGAN.

Muscular fibres – Vide next Tablet.

Mucous Membrane – Vide next Tablet but one.

Vessels & Nerves.

ARTERIES – *Lingual*, inferior or ascending palatine branches of *facial*, *ascending pharyngeal*.
VEINS – Partly correspond to arteries, partly open into pterygoid plexus.
LYMPHATICS – To submaxillary glands.
NERVES – Are the:

Gustatory to mucous membrane of anterior two-thirds.
Glosso-pharyngeal to mucous membrane of posterior third & sides;
Hypoglossal to the muscles.

Internal branch of the superior laryngeal sends a few twigs to mucous membrane of base. — A few small ganglia are found (Kölliker, Remak) upon the glosso-pharyngeal and, in the sheep & calf, upon the gustatory.

THE TONGUE—2nd Tablet.

MUSCULAR FIBRES.

Form extrinsic & intrinsic muscles.

EXTRINSIC MUSCLES

Are the:

Stylo-glossus – Anterior & outer aspect of styloid process near its apex & maxillary lig
Side of base of tongue externally to hyo-glossus, dividing into:
LONGITUDINAL PORTION – Forwards along side of tongue, and blend lingualis inferior in front of hyo-g
TRANSVERSE PORTION – Decussates with hyo-glossus & with its fellow.

Hyo-glossus – Side of body, lesser cornu & whole length of great cornu of bone (basio-glossus, chondro-glossus, cerato-glo
Side of under surface of tongue between stylo-glossus & lin in

Genio-hyo-glossus – By a short tendon from superior genial tuber inner surface of body of jaw-bone close to symp
Whole length of under surface of tongue internally to lingua ferior, side of pharynx, body of hyoid

Palato-glossus or **Constrictor Isthmi Faucium** – Anterior surf soft palate close to
Side of base of tongue, blending with stylo-glossus.

INTRINSIC MUSCLES

Are the:

Lingualis transversus – Median septum.
Sides, and sides of dorsum. – Forms the chief bulk of the tongue

Lingualis Superior – Stratum of longitudinal or slightly oblique fibres th in front, and covering dorsum of tongue beneath the m membrane to which the individual fibres are att

Lingualis Inferior – Longitudinal band of fibres along whole length of surface of tongue between hyo-glossus & genio-hyo-glos
Blends with stylo-glossus in front of hyo-glossus.

Lingualis Perpendicularis – Set of vertical or slightly oblique fibres central part of dorsum to sides of under surface, forming c concave upwards & outw

The outer parts, or cortex, of the tongue are firm, and consist mai longitudinal fibres; the central part, or nucleus, is softer, consists mainly of transverse & vertical fibres intermingled adipose t

THE TONGUE—3rd Tablet.

MUCOUS MEMBRANE.

Thick & rough on anterior two-thirds of dorsum, sides, & tip; thin & smooth on posterior third of dorsum & on under surface.

Consists of a cutis or corium dense & very similar to that of the skin, and of a thick layer of squamous epithelium; and presents:

PAPILLÆ — Highly sensitive vascular projections divisible into simple and compound. The former are similar to the papillæ of the skin, and cover whole of tongue; the latter, which are themselves studded with simple papillæ, are found on rough surface only, and are divided according to their size & shape into:

Papillæ Maximæ or Circumvallatæ – From 7 to 12; situated at junction of middle & posterior thirds of dorsum, where they are arranged in two rows oblique backwards & inwards, which rows meet at foramen cœcum and form together an inverted V. They consist of a central conical projection, the base of which is free while its apex is attached, which projection is contained in a cup-shaped depression bounded itself by a prominent circular rim. – The foramen cœcum is the central depression, usually large, which lodges the central papilla, itself frequently small.

Papillæ Mediæ or Fungiformes – Club-shaped, and present narrow attached & rounded free extremities. Sparingly scattered over anterior two-thirds of dorsum, collected in greater numbers over sides & tip.

Papillæ Minimæ, or Conicæ et Filiformes – Tapering or cylindrical, closely packed over whole of rough surface, and arranged in rows which are vertical on borders & tip, and which are, on dorsum, parallel, posteriorly, to the rows of circumvallate papillæ, but, anteriorly, more directly transverse. – The simple or secondary papillæ borne by the filiform papillæ contain a few elastic fibres, and their epithelial sheaths are prolonged beyond them sometimes to the extent of forming a pencil of almost hair-like fibres.

In the fungiform & circumvallate, and probably also in the filiform papillæ, the nerves form plexuses, from which small brush-like filaments are given off to the secondary papillæ. These filaments are believed to terminate in the deep extremities of spindle-shaped nucleated bodies similar to the olfactory cells of Schultze (Billroth, Key).

GLANDS — Are:

Follicular – Aggregated on posterior third of dorsum behind papillæ circumvallatæ, and very similar to the follicular recesses of the tonsils.

Racemose – Lie beneath & in front of foregoing, and over sides & under surface of tongue. On under surface near tip they are collected into two small oblong masses first described by Blandin & Nuhn.

THE TASTE-BUDS.

Are flask-like bodies discovered by Loven & Schwalbe in the thick epithelial layer surrounds the sides of the circumvallate papillæ of the base of the tongue, and which also been found of late on some of the fungiform papillæ and on the epiglottis. The pyriform in shape. Their bases rest upon the chorium. Their apices project betwee superficial epithelial cells, and present a minute opening, from which a bundle of threa processes are seen to emerge.

They consist of modified epithelial cells, disposed perpendicularly to the surface, cells may be divided into superficial & deep. The *superficial cells* are flattened, or ribbo tapering at each end, and joined together at their sides, so as to enclose the deeper cells, the flower-bud, the external scales surround the internal folioles. The *deeper cells* are sp shaped, enlarged in their middle, where they present a prominent nucleus, and tapering at end. Their deeper end, which is sometimes branched, passes down into the chorium, an said, becomes connected with a nerve-fibril. Their more superficial end is prolonged into the thread-like processes, which are seen to project from the opening of the taste-bud surrounding epithelial cells are flattened around the taste-buds, so as to enclose them in or nest.

The taste-buds are now believed not to be connected with the sense of taste, sinc are found on the epiglottis, which is not endowed with taste.

HEAD & NECK.

VI

THE ORBIT.

THE ORBIT.

Quadrilateral pyramidal fossa looking forwards & outwards and formed by seven b
the frontal, ethmoid, sphenoid (which enter into formation of both orbits),
rior maxillary, malar, lachrymal & p
Communicates with cranium, and with nasal, temporal, zygomatic & spheno-maxi
fossæ through optic foramen, nasal duct & spheno-maxillary fi
Presents:

ROOF — Formed by orbital plate of frontal & lesser wing of sphenoid. Is concave, and
sents the suture between the foregoing bones, and in fron
Lachrymal fossa for lacrymal gland, and a
Depression (fovea trochlearis) for pulley of superior oblique.

FLOOR — Formed by upper or orbital surface of superior maxillary and orbital proces
malar & palate bones. Presents the sutures between foregoing bones
Infra-orbital groove for infra-orbital vessels & nerve, which becomes converted in fron
Infra-orbital canal ; and also at its anterior & inner part a
Depression for inferior oblique muscle.

INNER WALL — Formed from before backwards by nasal process of superior maxi
lachrymal, os planum of ethmoid, body of sphenoid. Is antero-post
in direction and parallel to its fellow, and presents the sutures bet
foregoing bones an
Lachrymal groove for lachrymal sac,
Crest of lachrymal bone for tensor tarsi muscle.

OUTER WALL — Formed in front by orbital process of malar bone, and behind by
rior or orbital surface of great wing of sphenoid. Is very oblique forw
& outwards being nearly at right angles with its fellow, and present
suture between foregoing bones, an
Orifices of one or two malar canals,
Small spine for lower head of external rectus.

ANGLES:

SUP. EXTERNAL – Presents:
Articulation of frontal with malar bone & orbital plate of sphenoid,
Sphenoidal fissure or *foramen lacerum anterius* for 3rd, 4th & 6th nerves and ophth
nerve &

SUP. INTERNAL – Presents
Suture connecting frontal with lachrymal & os planum, in which suture are th
Anterior ethmoidal canal for nasal nerve & anterior ethmoidal vessels, an
Posterior ethmoidal canal for posterior ethmoidal vessels.

INF. EXTERNAL – Presents
Spheno-maxillary fissure for infra-orbital vessels & nerve and ascending branch
Meckel's gan

INF. INTERNAL – Presents
Articulation of superior maxillary & palate bones with lachrymal & os planum

CIRCUMFERENCE OR BASE — Quadrilateral, looks forwards & outward
bounded by supra-orbital arch and external & internal angular pro
of frontal, anterior border of orbital surface & nasal process of su
maxillary, and anterior border of malar bone. Presents
Supra-orbital notch or foramen for supra-orbital vessels & nerve; and assists in fo
Nasal groove for lachrymal sac.

APEX — Corresponds to optic foramen for optic nerve & ophthalmic artery.

FOURTH NERVE, TROCHLEARIS or PATHETICUS.

Arises from upper part of *valve of Vieussens* immediately behind the testis. — Deep orig
is from two grey nuclei situated on floor of aqueduct of Sylvius & on upp
part of floor of 4th ventric
Crosses processus e cerebello ad testes and winds round under surface of crus cereb
immediately in front of pons Varol
Pierces dura mater in free border of tentorium cerebelli near posterior clinoid process.
Through outer wall of cavernous sinus below 3rd nerve and above ophthalmic branch
the 5th, receiving filaments from ophthalmic branch & from carotid plexu
Through highest and broadest part of sphenoidal fissure.
Inwards above levator palpebræ superioris to orbital surface of superior oblique.

FIFTH NERVE.

Arises by two roots, anterior small or motor, posterior large or sensory, from *side of pons* V
nearer to upper than to lower border. Its deep origin is said to be from lateral tract of me
behind olivary body, from grey nucleus on floor of 4th ventricle between restiform b
fasciculi teretes, from tubercle of Rolando; its motor root appears to arise from pyra

Through opening in dura mater near apex of petrous portion of temporal bone. Sensory
to Gasserian ganglion; motor root to inferior maxillary nerve outside cranium.

Gasserian ganglion – Crescentic. Situated in a depression near apex
trous portion of temporal bone, and receives filaments from carotid
Gives off anteriorly ophthalmic, superior & inferior maxillary nerves,
laterally, small branches to tentorium cerebelli & dura mater of m
fossa, and one to 6th nerve in cavernous

OPHTHALMIC NERVE — The smallest of the three divisions of the 5th pair.

Through outer wall of cavernous sinus below 3rd & 4th nerves, being joined by fila
from cavernous plexus and frequently from 4th nerve, and giving off recurrent bra
to tento

Divides near sphenoidal fissure into lachrymal, frontal, nasal.

LACHRYMAL N. — The smallest.

Through outer & narrowest part of sphenoidal fissure, and along upper border of
nal rectus to lachrymal gland, conjunctiva & skin of upper eyelid. — Joins
orbital branch of superior maxillary

FRONTAL N. — The largest.

Through highest & broadest part of sphenoidal fissure;
Along middle line of orbit between levator palpebræ superioris & periosteum, and
des

SUPRAORBITAL BR. — The largest. Through supraorbital foramen or
and ascends to corrugator supercilii, occipito-frontalis & orbicularis
pebrarum, and to periosteum & integument, the cutaneous branches
in number, lying at first beneath the mu

SUPRATROCHLEAR BR. — The smallest. Above pulley of superior ob
and same destribution. Joins with infratrochlear branch of

THIRD NERVE or MOTOR OCULI.

Arises from inner border of crus cerebri immediately in front of pons Varolii. — Deep orig
is from locus niger, tubercula quadrigemina, valve of Vieussens & grey nucle
on floor of aqueduct of Sylviu
Pierces dura mater on outer side of and a little behind, anterior clinoid process.
Through outer wall of cavernous sinus above 4th nerve & ophthalmic branch of 5th, bei
joined by filaments from cavernous plexu
Divides into superior & inferior branches, which pass through sphenoidal fissure betwe
the two heads of external rectu

Superior Br. – The smallest. Inwards above optic nerve to *levator palpeb*
superioris & superior rect

Inferior Br. – The largest. To *internal & inferior recti and inferior oblique.*

Short or Motor root of Lenticular Ganglion is derived from nerve
inferior obliqu

MUSCLES.

ORIGINS.

Internal & Inferior Recti & Lower Head of External Rectus – Incom
fibrous ring termed the ligament of Zinn, which surrounds optic foramen, e
at its upper & outer pa t. – Lower head of external rectus also arises fr
small spine on orbital surface of greater wing of sphenoid.

Superior Rectus & Upper Head of External Rectus – Upper margin & u
part of outer margin of optic foramen.

Levator Palpebræ Superioris – Under surface of lesser wing of sphenoid in
of optic foramen & externally to superior oblique.

Superior Oblique – Under surface of lesser wing of sphenoid in front of optic for
& internally to levator palpebræ superioris.

Inferior Oblique – Depression on orbital plate of superior maxilla close to lachr
groove.

INSERTIONS.

The Four Recti – Fore part of sclerotic about four lines from cornea.

Superior & Inferior Oblique – Upper & outer part of sclerotic between super
external recti and midway beteen cornea & optic nerve.

Levator Palpebræ Superioris – Upper border of superior tarsal cartilage.

NERVE-SUPPLY — Levator palpebræ superioris & superior rectus, *upper divis*
3rd nerve; – internal & inferior recti and inferior oblique, *lower di*
of 3rd nerve: – superior oblique, *4th nerve;* – external rectus, *6th ner*

NASAL NERVE.

Between the two heads of external rectus, and forwards & inwards across optic nerve
Through anterior ethmoidal foramen, and through groove on cribriform plate & slit b
crista galli to nose, where divides into
INTERNAL BR. — To mucous membrane of fore part of septum;
EXTERNAL BR. — In groove on inner surface of nasal bone, between that bon
& lateral cartilage, and downwards to tip of nose beneath conpresso
nasi supplying mucous membrane & integumen
Gives off:
GANGLIONIC BR. — Long & slender; to posterior superior angle of ciliar
ganglion, forming its long or sensory roo
LONG CILIARY NS. — Two or three; join ciliary nerves from ciliary gang
lion. (Vide Ciliary Ganglion
INFRATROCHLEAR BR. — Beneath pulley of superior oblique, where join
with supratrochlear branch of frontal, to orbicularis, lachrymal sac, carun
cula, conjunctiva & skin of eyelid

CILIARY, OPHTHALMIC or LENTICULAR GANGLIO

Reddish grey quadrangular body of the size of a pin's head situated at back of orb
outer side of optic nerve. — Pres

THREE ROOTS:

Sensory, or Long & Slender Root — From *nasal branch of ophthalmic* to
erior superior angle of ganglion; is accompanied by the sympat
root, which is sometimes blended wi

Motor, or Short & Thick Root — From *branch of 3rd nerve to inferior o*
to posterior inferior angle; is occasionally divided into two

Sympathetic Root — Long & slender filament from *cavernous plexus;* ac
panies sensory root, with which it is sometimes ble

BRS. OF DISTRIBUTION:

Ciliary Ns. — Ten or twelve from anterior angles of ganglion, forming a
superior & a large inferior bu
Forwards above & below optic nerve with ciliary branches of nasal;
Through back part of sclerotic, and in grooves on its inner surface to ci
muscle, cornea &

OPHTHALMIC ARTERY.

Arises from internal carotid as that vessel emerges from cavernous sinus between optic nerve
anterior clinoid proces

Through optic foramen below & on outer side of optic nerve.

Over optic nerve, and forwards beneath superior oblique to superior internal angle of orbi
where divides into frontal & nasa

BRANCHES — May be divided into:

ORBITAL GROUP:

Lachrymal – With lachrymal nerve & above external rectus to lachrymal glan
& upper eyelid. Gives off small malar & temporal branches, which per
forate temporal bone to temporal fossa & cheek

Supraorbital – With frontal nerve & above the muscles to supraorbital foramen
where divides into superficial & deep branches to integument & muscle
of forehead & pericranium

Ethmoidal – Anterior & posterior. Through anterior & posterior ethmoida
foramina (former with nasal nerve), giving branches to ethmoidal cells
dura mater, and then through foramina in cribriform plate of ethmoid t
septum & outer wall of nose

Palpebral – Superior & inferior. Encircle eyelids near free margin & beneath
orbicularis, and anastomose with infraorbital & with orbital branch
temporal

Frontal – From orbit at its superior internal angle to skin & muscles of forehea
& pericranium, joining with supraorbita

Nasal – Above tendo oculi, and divides into dorsalis nasi to dorsum of nose an
anastomotic branch to angular branch of facial

OCULAR GROUP:

Muscular – Very variable, usually divided into:

SUPERIOR – Smaller, to levator palpebræ superioris, superior rectus & supe
rior oblique

INFERIOR – Larger, to inferior oblique & the other recti, and gives off most
the anterior ciliary arteries

Ciliary – May be divided into:

SHORT POSTERIOR – Surround optic nerve, and through sclerotic a line
two from the nerve to ciliary processes & choroi

LONG – Two. Through back part of sclerotic, and between sclerotic & choroi
on either side of eyeball to ciliary body, where bifurcate and form
great arterial circle of iris, from which small twigs converge to fre
margin of iris forming lesser arterial circle

ANTERIOR – Chiefly from muscular. Through sclerotic a line or two fro
margin of cornea to great arterial circle of iri

Centralis Retinæ – Pierces optic nerve, and forwards in its substance t
retina. In fœtus a small branch passes forwards through vitreou
body to posterior part of capsule of len

SECOND or OPTIC NERVE.

Presents for examination the optic tract, the optic commissure & the optic nerve proper.

OPTIC TRACT

Begins in the *anterior & posterior quadrigeminal bodies* by two distinct bundles of fibres,
pass between the *corpora geniculata internum et externum*, become respectively conn
with and receive fibres from the latter, unite, and receive additional fibres fro
optic thalamus.

Winds obliquely forwards across under surface of crus cerebri, being flattened in shap
slightly attached to the crus by its anterior margin.

Leaves the crus as a round bundle and becomes connected with the *lamina cinere*
tuber cinereum, from both of which it is said to receive additional fibres.

Joins its fellow to form optic commissure.

OPTIC COMMISSURE or CHIASMA

Is formed as follows:

A few of the outer fibres of each optic tract pass into the optic nerve of the

The mass of the fibres decussate, and pass into the optic nerve of the opposite

A few of the innermost fibres, termed the inter-cerebral fibres, pass back to the
brum, forming the posterior fibres of the commissure and the inne
fibres of the optic tract of the opposite side.

A few similar fibres, termed the inter-retinal fibres, pass along the anterior b
of the commissure from one optic nerve to the other.

OPTIC NERVE

Through optic foramen, being surrounded by a tubular process of the dura mater, w
as the nerve enters the orbit, subdivides, and both continues the sheath of the
nerve, and forms the periosteum of the orbit.

Pierces sclerotic and choroid about one tenth of an inch to the inner side of the axis
eye, and expands into the retina. – The arteria centralis retinæ pierces the optic
and runs forwards in its substance to the retina.

SIXTH NERVE or ABDUCENS.

Arises by several filaments from *constricted part of corpus pyramidale* close to pons Varoli
or from *lower border of pons itself.* — Deep origin is from a grey nucleus on floo
of 4th ventricle
Pierces dura mater on basilar groove immediately below posterior clinoid process.
Forwards on floor of cavernous sinus on outer side of internal carotid artery, receiving
filaments from carotid plexus, Meckel's ganglion & ophthalmic nerve
Through sphenoidal fissure beneath the other nerves & above ophthalmic vein, receiving
filaments from sympathetic
Between the two heads of external rectus to ocular surface of that muscle.

RELATIONS of the NERVES of the ORBIT.

CAVERNOUS SINUS

Third & Fourth Ns. & Ophthalmic br. of Fifth — Pass through
wall of cavernous sinus in their numerical order both from above down
and from within out

Sixth N. — Lies on floor of cavernous sinus on outer side of internal carotid
on inner side of ophthalmic

SPHENOIDAL FISSURE:

Fourth N., Frontal & Lachrymal Divisions of Ophthalmic N. —
orbit above external

The other Ns. — Pass between the two heads of external rectus in following
from above downwards: *Superior division of 3rd N., Nasal branch of O*
mic, Lower division of 3rd N., Sixth

ORBIT:

Fourth N., Frontal & Lachrymal Divisions of Ophthalmic N.
above the muscles immediately beneath perio

The other Ns. — Are found in the following order from above downwards
erior division of 3rd N., Nasal branch of Ophthalmic crossing optic N., *O*
having lenticular ganglion on its outer side, *Inferior division of the 3*
Sixth

HEAD & NECK.

VII.

PHARYNX & SOFT PALATE.

BACK OF NECK.

THE PHARYNX.

Is a musculo-membranous bag extending from base of skull to lower border of cricoid
tilage in front & 5th cervical vertebra behind; about 4½ inches long; broadest
side to side, its greatest breadth being comprised between cornua of hyoid

It is bounded above by petrous portion of temporal bone and by under surface of bo
sphenoid; – not, as has hitherto been stated, by basilar process of occipital, the
capitis antici muscles passing forwards between roof of pharynx & whole leng
that process (Thomson & Clel

It is continuous below with œsophagus.

It is connected behind by loose areolar tissue to the cervical vertebræ & the longi c
recti capitis antici mu

In front it is attached from above downwards to:

Internal pterygoid plate;
Pterygo-maxillary ligament;
Lower jaw;
Base of tongue;
Cornua of hyoid bone & stylo-hyoid ligament;
Thyroid & cricoid cartilages.

Laterally it is in relation with styloid process, styloid & pterygoid muscles, internal ca
artery, internal jugular vein, glosso-pharyngeal, pneumogastric, spinal acces
hypoglossal & sympathetic nerves; and also, below, with lateral lobes of thyroid gl
common carotid artery & sterno-hyoid, and, in front, with hyo-glossus muscle
lingual artery & n

It presents seven openings: – nares, Eustachian tubes, mouth, larynx, œsophagus.

STRUCTURE of the PHARYNX.

Presents three coats, which, from without inwards, are muscular, fibrous, mucous; an
vessels & nerve

MUSCULAR COAT — Is formed by:

Inferior Constrictor – Side of cricoid cartilage; oblique line on outer surface of al
of thyroid cartilage & surface behind it, and inferior cornu.

Raphé on posterior median line of pharynx; its inferior fibres being hori
zontal & continuous with those of œsophagus, and its superior fibres passin
obliquely upwards and overlapping those of the middle constrictor. – S. b
pharyngeal plexus and external & recurrent laryngeal nerves.

Middle Constrictor – Whole extent of upper surface of great cornu of hyoid bon
lesser cornu, stylo-hyoid ligament.

Raphé on posterior median line of pharynx; its inferior fibres descendin
beneath inferior constrictor, its middle fibres being horizontal, and its sup
erior fibres overlapping superior constrictor & stylo-pharyngens. – S. by pharyn
geal plexus.

Superior Constrictor – Lower third of free margin of internal pterygoid plate, i
hamular process, & contiguous part of palate bone; pterygo-maxillary ligament
alveolar process of inferior maxilla above mylo-hyoid ridge; side of tongue.

Raphé on posterior median line of pharynx; its superior fibres ascendin
by means of strong fibrous band below mentioned, to pharyngeal spine o
basilar process, its lower fibres being horizontal. – S. by pharyngeal plexus.

Stylo-pharyngeus – Inner side of base of styloid process.

With palato-pharyngeus into posterior border of thyroid cartilage & sid
of pharynx. – S. by pharyngeal plexus & glosso-pharyngeal nerve.

Palato-pharyngeus – Posterior surface of soft palate by two heads separated b
levator palati.

With stylo-pharyngeus into posterior border of thyroid cartilage & sid
of pharynx. – S. by pharyngeal plexus.

Salpingo-pharyngeus (SANTORINI) – Small fasciculus from outer surface of cartil
ginous portion of Eustachian tube to stylo-pharyngeus, with which it blen
inferiorly. Is often wanting.

Other accessory muscles, the petro-, spheno-, & occipito-pharyngei, a
also described; but they are rarely met with.

RELATIONS – The constrictors overlap each other from below upwards. The styl
pharyngeus passes between superior & middle constrictors; the superi
laryngeal nerve between the middle & inferior constrictors; the recurre
laryngeal nerve beneath the inferior. – (Vide also relations of pharynx
foregoing Tablet).

FIBROUS COAT, or PHARYNGEAL APONEUROSIS — Thick above, thi
below. Attached to petrous portion of temporal bone, under surface of body of spher
oid, and, by means of a strong fibrous band (cranio-pharyngeal ligament, Thomso
& Cleland), to pharyngeal spine on under surface of basilar process.

MUCOUS MEMBRANE — Thick on under surface of body of sphenoid; covered wit
columnar ciliated epithelium as low down as floor of nares, with squamous epithelia
below. Beneath it are found numerous glands, which are simple & compoun
follicular and racemose.

VESSELS & NERVES — ARTERIES. Ascending pharyngeal, pterygo-palatine, superi
or descending palatine, superior thyroid. – VEINS. Open into the superior thyroid
internal jugular. – LYMPHATICS. Open into deep glands of neck. – NERVES. Fro
pharyngeal plexus, and from external & recurrent laryngeal nerves.

THE SOFT PALATE.

Musculo-membranous fold, which forms an incomplete septum between the mou
pharynx. Pre

Anterior Surface – Concave; presents a median raphé, continuous with that of hard p

Posterior Surface – Convex, continuous with floor of nasal fossæ; presents the media
jection of the azygos uvulæ.

Upper Border – Attached to posterior border of hard palate.

Lower Border – Free; presents the uvula and the anterior & posterior pillars, whic
latter embrace the tonsil.

ANTERIOR PILLARS – Downwards & forwards to sides of base of tongue; contain
glossi muscles.

POSTERIOR PILLARS – Downwards & backwards to sides of pharynx; contain
pharyngei muscles Are rather broader and approach nearer to each
than the anterior.

ISTHMUS FAUCIUM – Is the space bounded by the free border & pillars of th
palate, the tonsils, and the base of the tongue.

STRUCTURE of the SOFT PALATE

Presents for examination:

APONEUROSIS — Blended with tendon of tensor palati. Is thickest above,
it is attached to posterior border of hard palate.

MUSCLES — Five on each side:

Levator Palati – Under surface of apex of petrous portion of tempora
and outer aspect of cartilaginous portion of Eustachian tube.
Posterior surface of soft palate between the two heads of ori
palato-pharyngeus. – S. by post. or small palatine branch from Meck

Tensor or Circumflexus Palati – Scaphoid fossa at base of internal
goid plate; spine of sphenoid; anterior aspect of cartilaginous por
Eustachian tube.
Winds round hamular process and expands upon anterior surf
aponeurosis of soft palate. – S. by a branch from otic ganglion.

Palato-glossus – Anterior surface of soft palate.
Posterior part of side of tongue, where it blends with stylo-glos

Palato-pharyngeus – Posterior surface of soft palate by two heads sep
by the levator palati.
Posterior border of thyroid cartilage & sides of pharynx.

Azygos Uvulæ – Posterior nasal spine of palate bone & aponeurosis
palate.
Uvula. – S. by posterior or small palatine branch from Meckell's

MUCOUS MEMBRANE — Thin; covered with squamous epithelium, excep
Eustachian tube, where the epithelium is columnar & ciliated. Nu
mucous glands are found beneath it, especially over posterior sur
uvula, in which latter situations they form a continuous layer.

VESSELS & NERVES — ARTERIES. Inferior or ascending palatine, poste
descending palatine, ascending pharyngeal, dorsalis linguæ, tonsil
VEINS. Join the tonsillar & pterygoid plexuses. – LYMPHATICS. To
beneath angle of jaw. – NERVES. From fifth, facial & glosso-pharyng

SHORT POSTERIOR CRANIO-VERTEBRAL MUSCLES.

Rectus Capitis Posticus Major – Spinous process of axis.
Into and beneath outer part of inferior curved line of occipital bone.

Rectus Capitis Posticus Minor – Tubercle on posterior arch of atlas.
Into and beneath inner part of inferior curved line of occipital bone.

Obliquus Capitis Inferior – Spinous process of axis.
Extremity of transverse process of atlas.

Oblquus Capitis Superior – Extremity of transverse process of atlas.
Occipital bone between the two curved lines externally to the complexus
rectus capitis posticus major.

These muscles are supplied by the posterior branch of the suboccipit
nerve; the inferior oblique is also supplied by the great occipit
nerve.

THE VERTEBRAL ARTERY.

Arises from upper & back part of first portion of subclavian.
Upwards & backwards to foramen in transverse process of 6th cervical vertebra, passing
vasculo-nervous bundle of the neck and more particularly behind inferior thyroid ar
internal jugular vein, and then between scalenus anticus & longu
Upwards through the series of foramina in the transverse processes as far as upper border
with the vertebral vein and a plexus of the sympathetic, the artery lying between th
which is in front, and the cervical nerves which emerge behind from the interve
for
Upwards & outwards to, and then through, foramen in transverse process of atlas.
Backwards & inwards behind lateral mass in groove on posterior arch of atlas, lying in the
gular space between the recti & obliqui muscles, and being crossed by the posterior
of the suboccipital nerve and covered by the com
Pierces posterior occipito-atloid ligament, and enters the skull through the foramen magn
Winds round medulla oblongata between hypoglossal nerve and anterior root of subocc
ascends obliquely between anterior surface of medulla oblongata & basilar proces
joins its fellow opposite lower border of pons Varolii to form basilar

BRANCHES — Are cervical & cranial.

CERVICAL:

Muscular – Several, small, to the deep muscles of the neck.

Lateral Spinal – Through intervertebral foramina, and divide into:

Ant. Branch – To posterior surface of bodies of vertebræ;

Post. Branch – To roots of nerves, cord & its membranes.

CRANIAL:

Posterior Meningeal – Two or three, small, to dura mater of cerebellar fo

Posterior & Anterior Spinal – Arise respectively behind upper part o
and in front of m

The two posterior descend behind the roots of the spinal nerves;

The two anterior unite into a single trunk, which descends along
line

Both join with, and are reinforced by, the numerous spinal branches
from the vertebral, ascending cervical, inferior thyroid, the inter
lumbar, ilio-lumbar and lateral sacral; and are thus each of the
tinued as small tortuous vessels, or rather as a series of inosc
vessels, down to the extremity of the cord, where they resolve int
to cauda

Posterior Inferior Cerebellar – Backwards round medulla between p
gastric & spinal accessory nerves, and over restiform body to
fissure or valley on under surface of cerebellum. Gives off an o
under surface of cerebral hemisphere and twigs to choroid plexus
ve

THE TWO FIRST SPINAL NERVES.

POSTERIOR DIVISION OF

First Cervical Nerve (Suboccipital) – Larger than anterior. Emerges between occipital bone & posterior arch of atlas just behind vertebral artery, enters triangle formed by small posterior cranio-vertebral muscles, supplies these muscles & complexus, and joins with posterior division of 2nd cervical nerve. Sometimes gives off a small cutaneous branch, which branch, when it exists, accompanies occipital artery to integument of lower & back part of occiput, and joins with great & small occipital.

Second Cervical Nerve – Three or four times as large as anterior division, and the largest of the posterior cervical nerves. Emerges between posterior arch of atlas & lamina of axis, supplies inferior obliqne, and after joining with posterior division of 1st & 3rd cervical nerves, divides into:

External Branch – Similar to external branches of six lower posterior cervical nerves, but somewhat larger, joins with corresponding branch of 3rd posterior cervical nerve, and supplies the same muscles, & also the complexus.

Internal Branch (Great Occipital Nerve) – Crosses triangle formed by posterior cranio-vertebral muscles, pierces complexus & trapezius, joins with small occipital & with ascending twig from internal branch of posterior division of 3rd, and supplies integument of back of head as far as vertex; gives off an auricular branch to back of ear.

ANTERIOR DIVISION OF

First Cervical Nerve (Suboccipital) – Small. Emerges between occipital bone & posterior arch of atlas below vertebral artery. Passes forwards on inner side of vertebral artery & rectus lateralis muscle, crosses foramen in transverse process of atlas, and descends in front of this process to join with ascending branch of the second. Supplies the rectus lateralis & the recti capitis antici major & minor, and communicates with the pneumogastric, hypoglossal, & superior cervical ganglion of sympathetic.

Second Cervical Nerve – Larger than foregoing, but still much smaller than the posterior division of the same nerve. Emerges between posterior arch of atlas & lamina of axis, passes forwards between transverse processes of the same vertebræ on outer side of vertebral artery, and divides into an ascending branch, which joins the first nerve, and a descending branch, which joins the second. Gives off the small occipital nerve.

ARTICULATIONS of the CRANIUM with the SPINE

Are the *occipito-atloid* and *occipito-axoid* articulations, from which articulations the *a* articulation cannot well be sep

OCCIPITO-ATLOID ARTICULATION — Consists of a double arthrodia b condyles of occipital and superior articular surfaces of atlas; the condyle convex from before backwards & inwards and looking downwards & outwar the articular surfaces of the atlas being concave from before backwards & i and looking upwards & inwards. The ligament

Capsular – Two. Thin & loose; surround the arthrodial articulations. The s membranes of these articulations often communicate with that syndesmo-odontoid artic

Ant. Occipito-Atloid – Two:

SUPERFICIAL – Strong rounded cord from
Basilar process to – *Anterior tubercle of atlas.*

DEEP – Thin & broad membrane from
Anterior margin of foramen magnum to – *Upper border of anterior arch*

Post. Occipito-Atloid – Thin & broad membrane from
Posterior margin of foramen magnum to – *Upper border of posterior arch* It is perforated on either side by vertebral artery & subocci

Lateral Occipito-Atloid – Two. Strong bands from
Jugular process to – *Base of transverse process of atlas.*

OCCIPITO-AXOID ARTICULATION — No direct contact between the two but the two bones are firmly connected together, nevertheless, by the following

Occipito-Axoid – Strong broad band expanded superiorly, and which may be con as a continuation upwards of the posterior common ligament of the of the vertebra

Basilar groove of occipital, where it becomes continuous with dura m skull, to – *Posterior surface of body of axis.* – It covers and conce cruciform lig

Occipito-Odontoid – Three, two lateral & one median.

LATERAL OCCIPITO-ODONTOID OR CHECK LIGAMENTS – Strong rounded cords fron
Rough depression on inner side of condyles of occipital to – *Sides of odontoid pr. near*

MEDIAN OR SUSPENSORY OCCIPITO-ODONTOID LIGAMENT – Strong band from
Anterior margin of foramen magnum to – *Apex of odontoid process.* – This situated between, & blended superiorly, with deep anterior occipito ligt., on the one hand, & upper fasciculus of cruciform ligt. on the

VERTICAL FASCICULUS OF CRUCIFORM LIGT. – V. below.

ATLO-AXOID ARTICULATION — Is a complex articulation consisting: double arthrodia between the articular processes, the articular surfaces of are large, flat, circular, and inclined downwards & outwards. 2. of a doubl throsis rotatorius between the anterior & posterior surfaces of the odontoid p on the one hand, and the posterior & anterior surfaces respectively of the a arch of the atlas & of the transverse ligament, on the other hand, (atlo-odon syndesmo-odontoid articulations, Cruveilhier). The ligaments

Capsular – Two. Thin, loose, strongest externally; surround the two arthrodiæ.

Ant. Atlo-Axoid – Two:

SUPERFICIAL – Strong rounded cord from
Anterior tubercle of atlas to – *Base of odontoid proccess & front of body of ax*

DEEP – Thin & broad membrane from
Lower border of anterior arch of atlas to – *Base of odontoid process & front of body*

Post. Atlo-Axoid – Thin & broad membrane from
Lower border of posterior arch of atlas to – *Upper border of laminæ of axis.*

Transverse – Strong transverse band, broadest in middle, which divides ring of atl a small anterior part, in which anterior part the neck of the od process is firmly constricted, and a much larger posterior part, transmits the cord & its membranes & the spinal accessory nerv is attached on each si

Tubercle on inner surface of lateral mass of atlas – Its anterior surface is line synovial membrane of syndesmo-odontoid articulation. From its & lower borders, or rather from its posterior surface, are given fasciculi, which pass upwards & downwards to be attached, the one *basilar groove*, the other to *posterior surface of body of axis*; with the verse band, these vertical fasciculi form the *cruciform lig*

The synovial membrane of the syndesmo-odontoid articulation communicates with one or both of those of the occipito-atloid arth

HEAD & NECK.

VIII.

NASAL FOSSÆ, AND DEEP VESSELS & NERVES OF NECK.

THE NASAL FOSSÆ.

Two narrow irregular cavities comprised between the orbits & superior maxillary
and between the roof of the mouth & the front part of the base of the
Formed by ethmoid, sphenoid, frontal, superior maxillary, nasal, palate, inferior t
ated & vomer (all the bones of the face except malar & inferior maxil
Communicate with orbit (nasal duct), mouth, (anterior palatine canal), cranium (olf
foramina), spheno-maxillary fossa (spheno-palatine foramen), and wi
frontal, ethmoidal, sphenoidal, & maxillary sinuses. – Pr

ROOF — Narrow, and is from before backwards:
Oblique upwards & backwards and formed by nasal bone & nasal spine of frontal,
Horizontal and formed by cribriform plate of ethmoid,
Oblique downwards & backwards and formed by body of sphenoid. – Presents the s
between the foregoing bones and from before backw
Groove on nasal bone for outer branch of nasal nerve;
Half crest for perpendicular plate of ethmoid;
Olfactory foramina & nasal slit for olfactory and nasal nerves;
Openings of sphenoidal sinuses partly closed by sphenoidal turbinated bones;
Articulation of alæ of vomer with body of sphenoid.

FLOOR — Concave from side to side, and formed by palate processes of superior maxil
palate bones. – Presents the suture between foregoing bones
Upper orifice of the anterior palatine canal;
Half crest for vomer, which terminates in front & behind in the
Anterior & posterior nasal spines.

INNER WALL — Formed principally by the perpendicular plate of the ethmoid
& in front, and by the vomer below & behind, and secondari
nasal spine of the frontal, rostrum of sphenoid, crests of superior
lary, nasal & palate bones. Has an angular deficiency in front wh
filled up by the cartilage of the septum. – Is frequently inclined
or other side; and presents the sutures between the foregoing bon
Vascular & nervous furrows &
Naso-palatine groove for naso-palatine nerve.

OUTER WALL — Formed by:
Lacrymal bone & nasal process of superior maxillary;
Inner surface of ethmoid, superior maxillary & inferior turbinated bones;
Vertical plate of palate bone & inner plate of pterygoid process. – Presents the sutures b
the foregoing bones and from above downw
Superior turbinated process of ethmoid;
Superior meatus, into which open the sphenoidal & posterior ethmoidal s
and the spheno-palatine foramen. – Both are short and are situa
the posterior and upper part of the
Middle turbinated process of ethmoid;
Middle meatus, larger than foregoing, into which open the Antrum of Hig
and through the infundibulum, the anterior ethmoidal cells &
si
Inferior turbinated bone;
Inferior meatus, the largest, presents in front the opening of the nasal duct

FIRST or OLFACTORY NERVE

Arises by three roots.

THE THREE ROOTS — Are the:

External or Long Root — Arises from the *posterior border of the fissure of Sylvius*, and is said to be traceable to the corpus striatum, the anterior commissure, the thalamus opticus & the Island of Reil.

It passes forwards and inwards along the anterior margin of the locus perforatus anticus.

Internal or Short Root — Arises from the *posterior and inner part of the anterior lobe*, and is said by Foville to be connected with the longitudinal fibres of the gyrus fornicatus or convolution of the corpus callosum.

It passes forwards & outwards, and joins the foregoing root just above the origin of the middle or grey root.

Middle or Grey Root — Begins in a pyramidal eminence, the *caruncula mammillaris*, of the grey matter of the posterior part of the anterior lobe, and is continued upon the upper surface of the nerve with a few white fibres derived from the corpus striatum.

The three roots coalesce and form a prismoid band, the

OLFACTORY PROCESS, — which passes forwards in a deep sulcus along the side of longitudinal fissure, and expands into the

OLFACTORY BULB, — from the under surface of which are given off about twenty

TERMINAL BRS., — which pass through the foramina in the cribriform plate of the ethmoid, and — forming *three sets* distributed respectively over the *roof of the nose*, over the *upper third of the septum*, and over the *superior & middle turbinated bones* — proceed between the fibrous & mucous layers of the Schneiderian membrane, ramify and unite and form a plexus with narrow elongated meshes, and probably terminate in the deep processes of the olfactory cells of Schultze.

These latter cells are spindle-shaped nucleated bodies, which stand vertically in great numbers among the columnar epithelial cells of the olfactory region; their extremities are continued into two thread-like processes, one of which terminates abruptly on a level with the free extremities of the epithelial cells, while the other passes downwards towards the attached surface of the mucous membrane.

The olfactory nerve contains a *large proportion of the grey matter*, and is soft and pulpy. Its filaments are deficient in the white substance of Schwann, and are granular and nucleated like the gelatinous nerve-fibres of Remak.

SUPERIOR MAXILLARY NERVE.

Intermediate in size between ophthalmic & inferior maxillary nerves. – Commen
middle of Gasserian gan
Through foramen rotundum, spheno-maxillary fossa & infraorbital canal to infrac
foramen, and divides beneath levator labii superioris into *palpebral, nasal &*
branches, which branches anastomose with facial nerve forming infraorbital
and supply muscles, skin & mucous memb

BRANCHES:

Orbital or Temporo-malar Br. – Into orbit through spheno-maxillary fi
and divides

Temporal Br. – In groove & through foramen in malar bone, joining
lachry

Pierces temporal muscle & fascia to skin of temple, and joins
facial & auriculo-tem

Malar Br. – Through foramen in malar bone to skin of prominent p

Spheno-palatine Brs. – Two. To Meckel's ganglion, of which they forn
sensory

Post. Dental Brs. – Two:

Anterior or Superficial – Over maxillary tuberosity to gums & bucci

Posterior or Deep – Forwards in outer wall of Antrum, joining an
dental nerve, and supplies molar & second bicuspid teeth & m
membrane of An

Ant. Dental Br. – Arises just before exit of superior maxillary nerve from
orbital

Downwards & forwards in anterior wall of Antrum joining with pos
dental nerve, and supplies incisor, canine & first bicuspid teeth
mucous membrane of inferior meatus. A twig joins superior
branch of Meckel's ganglion above eye-tooth, and presents a
ganglion, the ganglion of Boch

SPHENO-PALATINE or MECKEL'S GANGLION.

Triangular, of a reddish grey colour and situated in spheno-maxillary fossa near spheno palatine foramen, mainly behind spheno-palatine branches of superior maxillary nerve the fibres of these branches not being, or being but partly, involved in the ganglion a they descend to the nose & palate. Presents

THREE ROOTS:

Sensory Root — From superior maxillary nerve through its two spheno palatine branches

Motor Root — From facial nerve through Vidian nerve.

Sympathetic Root — From carotid plexus also through Vidian nerve.

BRS. OF DISTRIBUTION — Are divided into:

Ascending Brs. — Two or three small filaments, which pass up through spheno maxillary fissure to periosteum of orbit

Descending Brs. — Are the:

ANT. OR GREAT PALATINE N. – Through great posterior palatine canal giving off inferior nasal branches to middle meatus & to middl & inferior turbinated bones, and a twig to soft palate Forwards in groove on hard palate, and joins termination of naso-palatin nerve

EXT. PALATINE N. – Through external palatine canal to tonsil & soft palate Is sometimes wanting

POST. OR SMALL PALATINE N. – Through small posterior palatine canal t tonsil, soft palate and levator palati & azygos uvulæ

Internal Brs. — Are the:

SUP. NASAL BR. – Small. Through spheno-palatine foramen to mucous mem brane of superior & middle spongy bones & upper & back part o septum. A twig joins anterior dental nerve in outer wall o antrum of Highmore above eye-tooth & presents a small ganglion the ganglion of Bochdalek

NASO-PALATINE BR. – Through spheno-palatine foramen & across roof o nose to septum, and downwards to anterior palatine foramen Through central division of the anterior palatine foramen, or foramen of Scarpa, right nerve being posterior to left one Joins its fellow in common anterior palatine canal and ends in mu cous membrane of hard palate, joining with anterior or grea palatine nerve

Posterior Brs. — Are the:

VIDIAN N. – Backwards through Vidian canal (if the nerve be traced fro Meckel's ganglion), giving twigs to back of roof & septum of nos and to termination of Eustachian tube, and divides into

LARGE PETROSAL N. – Through cartilaginous substance of foramen lace rum medium, and then in groove on anterior surface of petrou portion of temporal bone beneath Gasserian ganglion & through hiatus Fallopii to geniculate ganglion or intumescentia gangli formis of facial

CAROTID BR. – Soft and of reddish grey colour. Through cartilaginou substance to carotid plexus on outer side of internal carotid artery

PHARYNGEAL OR PTERYGO-PALATINE N. – Small. Through pterygo palatine canal to mucous membrane of upper part of pharynx

INFERIOR MAXILLARY NERVE.

The largest of the three divisions. Both sensory & motor, its two roots uniting imme
after their exit from foramen

Divides a few lines below base of skull into:

ANTERIOR or SMALLER DIVISION — Principally motor. Divides into:

Masseteric Br. – Outwards above external pterygoid muscle and through si
notch to masseter. Gives off a twig to temporo-maxillary articulation &
times one to temporal m

Deep Temporal Brs. – Two, anterior & posterior. Outwards above external
goid muscle and reflected upwards at pterygoid ridge to temporal muscle
sometimes joined, anterior one with buccal nerve, posterior one with mass

Buccal Br. – Pierces external pterygoid, and forwards on buccinator, giving fils
to temporal muscle, integument & mucous mem

Pterygoid Brs. – Two, to internal & external pterygoid muscles. Branch to in
pterygoid gives off motor root to otic ganglion. Branch to external ptery
frequently derived from b

POSTERIOR or LARGER DIVISION — Sensory with a few motor fibres. I

Auriculo-temporal N. – Has generally two roots which embrace middle men
artery. Backwards beneath external pterygoid & neck of co
Upwards with temporal artery between condyle & external ear under co
parotid gland, and divide
Auricular Brs. – Inferior & superior, to outer surface of pinna
ing with great aur
Temporal Brs. – Anterior & posterior; with branches of ter
artery to skin of temporal region & v
Joins facial nerve behind neck of condyle usually by two branches;
off sensory root of otic ganglion and filaments to parotid gl
temporo-maxillary articu

Gustatory or Lingual N. – Between the two pterygoid muscles, where it l
inner side & in front of inferior dental nerve, and is joined by chorda tym
Above deep portion of submaxillary gland & along side of tongue, crossing
ton's
Supplies mucous membrane of mouth & gums, submucous glands, conical
giform papillæ and mucous membrane of t
Gives sensory branches to submaxillary ganglion, and anastomoses with
glossal nerve on anterior margin of hyo-glossus & near tip of t

Inf. Dental N. – Between the two pterygoid muscles, where lies behind & on
side of gust
Between ramus & internal lateral ligament of temporo-maxillary articulat
dental foramen, where gives off nerve to mylo-hyoid n
Along inferior dental canal, giving branches to molar & bicuspid teeth, &
des at mental foramen
Incisor Br. – Onwards in dental canal to canine & incisor teet
Mental Br. – Divides beneath depressor anguli oris into nun
branches to muscles, skin & mucous membrane of low
NERVE to MYLO-HYOID – Along groove on inner surface of ra
under surface of mylo-hyoid & anterior belly of dig
N. — All the terminal branches of the 5th nerve upon th
join with facial

OTIC GANGLION.

Small oval shaped flattened body of a reddish grey colour situated on inner surface o
inferior maxillary nerve & around origin of its internal pterygoid branch, just below
foramen ovale, close to tensor tympani muscle & cartilaginous portion of Eusta-
chian tube which lie on its inner side, and to middle meningeal artery which lie
behind. It presents

THREE ROOTS:

Sensory Root - From auriculo-temporal nerve, and also from glosso-
pharyngeal through small petrosal nerve

Motor Root - From inferior maxillary nerve & its internal pterygoid branch;
also from facial nerve through small petrosal

Sympathetic Root - From plexus on middle meningeal artery.

BRS. OF DISTRIBUTION — Small branches to tensor palati & tensor tympani.

INTERNAL CAROTID ARTERY.

Commences at bifurcation of common carotid opposite upper border of thyroid cartilag
the so-called superior carotid triangle. It is at first very superficial, being covere
by thin anterior border of sterno-mastoid, platysma & fascia, and lying on outer s
& rather behind, external carotid a
May be divided into cervical, petrous, cavernous & cerebral portions.

CERVICAL PORTION — Ascends vertically to carotid foramen, passing (as doe
external ca
BENEATH – Digastric & stylo-hyoid muscles, occipital artery, hypoglossal ne
parotid gland, – then ascending beneath, and being sep
from external carot
Stylo-glossus & -pharyngeus & the styloid process, the glosso-pl
geal nerve and sometimes the pharyngeal branch of the v
Its deep relation
ON INNER SIDE – Pharynx, tonsil, ascending pharyngeal art., superior laryng
BEHIND – Rectus capitis anticus major & transverse processes of the three
cervical vertebræ; – superior cervical ganglion & main
of sympathetic, and superior laryngeal n
BEHIND & EXTERNALLY – Internal jugular vein, and, lying between & behi
two vessels, the pneumogastric n
Usually gives off no branches.

PETROUS PORTION — Ascends in carotid canal in front of tympanum, being surro
by carotid & cavernous plexuses, and then curves forwards & inwards. – Se

Tympanic Branch – To tympanum through a minute foramen i
terior wall of carotid

CAVERNOUS PORTION — Ascends to sphenoid bone, and then runs forwards in
nous groove, lying in inner wall of cavernous sinus, by lining membrane of wh
is covered, and being, on its outer side, crossed by 6th nerve and more dis
related to 3rd, 4th, & ophthalmic branch of th

Gives off:

Ophthalmic Artery – Vide next Tablet.
Arteriæ Receptaculi – Several, small, to walls of cavernous s
dura

CEREBRAL PORTION — Ascends between optic nerve & anterior clinoid process,
rates dura mater of roof of sinus, receives sheath from arachnoid, and after giv
Post. Communicating & Ant. Choroid, divides opposite
extremity of fissure of Sylvi
Ant. & Middle Cerebral – Vide next Tablet.
Ant. Choroid Artery – Arises from internal carotid. or sometimes
middle cer
Backwards through lateral part of transverse fissure of brain to d
ding cornu of lateral ventricle, and supplies choroid p

THORAX.

I.

INNOMINATE VS. & SUP. VENA CAVA.

INNOMINATE VEINS — Two large trunks formed by junction of internal jug
subclavian behind corresponding sterno-clavicular articul

RIGHT INNOMINATE — An inch & a half long, some what smaller than th
and nearly vertical. Lies superficial & external to innominate a
and is separated externally from right lung by right phrenic ne
pleura. Joins with left innominate just below cartilage of 1st rib t
superior cava. Rec

Right Lymphatic Duct - At its origin, in angle of junction be
right subclavian vein & right internal ju

Tributary Branches: - *Right Vertebral, Internal Mammary, Inferior*
roid, & Superior Inte

LEFT INNOMINATE — Three inches long, & somewhat larger than the
Descends obliquely from behind left sterno-clavicular articulati
just below 1st costal cartilage of right side, lying in front of innom
left common carotid & subclavian arteries, and behind sterno-hy
-thyroid muscles, remains of thymus gland, & sternum. Re

Thoracic Duct - At its origin, in angle of junction between left sul
ian vein & left internal ju

Tributary Branches: *Left Vertebral, Internal Mammary, Inferior T*
Superior Intercostal, and sometimes some small *Thymic & Peri*
Veins. - The innominate veins have no v

SUPERIOR VENA CAVA — Short thick trunk (2½ to 3 inches long), slightly c
& convex to the right. Descends vertically along right side of ascending port
arch of aorta & in front of root of right lung from just below 1st costal car
of right side, enters fibrous bag of pericardium about an inch and a half
the heart, becomes invested anteriorly by serous layer on the same bag, and
into upper & front part of right auricle; is separated externally from right
by right phrenic nerve & pleura, and its anterior relations are the same as
of the innominate. - Re

Tributary Branches: - *Vena Azygos Major*, and some small *Pericar*
Mediastinal Veins. - Has no v

INTERNAL MAMMARY ARTERY.

From under surface of subclavian, opposite thyroid axis.

Downwards behind phrenic nerve and internal jugular & subclavian veins to p
terior aspect of costal cartilages a short distance from sternu

Descends between thoracic wall & pleura, giving off branches: –

Perforating, Anterior Intercostal, Anterior Mediastinal, & Comes Nervi Phren

and divides between 6th & 7th costal cartilages & beneath triangularis ste
into branch

Musculo-phrenic, & Superior Epigastric.

Its two venæ comites unite into one trunk before they open into the innominate.

PERFORATING – Forwards through five or six upper intercostal spaces to pectoralis ma
integument, and mam

ANTERIOR INTERCOSTAL —— Outwards in five or six upper intercostal spaces betwe
internal intercostal muscles & pleura, and divide between internal & e
ternal intercostal muscles into superior & inferior branches which inosc
late with corresponding branches of corresponding aortic intercosta
and are similarly distribute

ANTERIOR MEDIASTINAL – Small, irregular; to pericardium, remains of thymus gland
cellular tissue of anterior mediastinu

COMES NERVI PHRENICI (SUPERIOR PHRENIC) – From upper part of artery. Long, slende
with phrenic nerve to diaphragm, and anastomose with musculo-phren
& inferior phrenic from abdominal aort

MUSCULO-PHRENIC – Downwards & outwards behind cartilages of false ribs, supplyi
diaphragm, which it perforates opposite 8th or 9th rib, & abdomin
muscles, and giving off a small anterior intercostal branch to each of t
lower intercostal space

SUPERIOR EPIGASTRIC – Enters sheath of rectus posteriorly, and anastomoses with e
gastric branch of external iliac, lower intercostals & lumbar; gives twi
to rectus & to integument of middle line of abdome

THE PERICARDIUM.

Fibro-serous sac containing the heart & the commencement of the large vessels.

The serous layer forms a common sheath to the aorta & pulmonary artery as abont two inches from their origin. It is then reflected upon the anterior aspect venæ cavæ & pulmonary veins, and upon the inner surface of the fibrous la Marshall's "vestigial fold of the pericardium" containing the remains of the left erior cardinal vein of the embryo, may be seen in front of the root of the left lung.

The fibrous layer is prolonged upon the great vessels of the root of the neck becomes continous superiorly with the deep layer of the deep cervical fascia, that say with the layer of fascia which encloses the omo-hyoid muscles, the carotid ve & the tra

The pericardium is conical in shape, and presents : –

Anterior Aspect – Covered by loose areolar tissue & remains of thymus gland, lungs, pl middle piece of sternum, and costal cartilages of the left side from the 3rd to th

Posterior Aspect – In contact with roots of the lungs, œsophagus & descending aorta.

Lateral Aspects – Covered by pleuræ, and crossed by phrenic nerve & superior phrenic ve

Apex · Directed upwards upon great vessels.

Base – Attached to central or cordiform tendon, & to left anterior costal fibres of diaphragm

THE HEART.

Lies within the pericardium, between the two lungs, behind the lower two-thirds of the sternum, and projects about three inches into the left side, & one into the right side of the thorax. – It presents:

Base – Formed by the auricles, attached to the great vessels, directed upwards backwards & to the right; corresponds to the interval between the 5th & 8th dorsal vertebræ.

Apex – Formed by the point of the left ventricle, directed downwards, forwards & to the left; corresponds to the 5th intercostal space of the left side, two inches below and one to the inner side of the nipple.

Anterior Surface – Formed chiefly by right ventricle, the anterior interventricular groove lying near the left border; convex, looks upwards & forwards, and extends from level of upper borders of third costal cartilages to a line drawn from lower end of gladiolus to situation of apex.

Posterior Surface – Formed chiefly by left ventricle, the posterior interventricular groove lying near the right border; flattened; rests upon diaphragm.

Right Border – Long, thin, rests upon diaphragm; formed by right ventricle.

Left Border – Short thick, much less inclined than the right one; formed by left ventricle.

THE ARCH of the AORTA.

From upper part of left ventricle to left side of lower border of body of 4th dorsal ve
(some authors say 3rd, some say 5th), describing a curve, the convexity of wh
directed upwards & to the right. Is divided i

ASCENDING PORTION — About two inches long. Upwards, forwards, & r
right from opposite centre of sternum on a level with lower border
costal cartilages to upper border of 2nd costal cartilage of right side cl
sternum. Contained in pericardium together with trunk of pulm
artery. – RELATI

IN FRONT – Pulmonary artery, right auricular appendix, pericardium, loose a
tissue, remains of thymus gland, ste
BEHIND – Right pulmonary vessels, & root of right lung.
TO THE RIGHT – Superior vena cava, right auricle.
TO THE LEFT – Trunk of pulmonary artery.

TRANSVERSE PORTION — Backwards & to the left from upper border
costal cartilage of right side close to sternum to left side of body of 3rd
vertebra (some authors say 2nd, some say 4th). – RELATI

IN FRONT – Left pneumogastric & phrenic nerves, cardiac branches of sympa
left lung & p
BEHIND – Trachea, œsophagus, thoracic duct, left recurrent laryngeal
great or deep cardiac p
ABOVE – Left innominate vein, innominate, left common carotid, & left subc
ar
BELOW – Left bronchus, right pulmonary artery, left recurrent laryngeal
remains of ductus arte

DESCENDING PORTION — Along left side of 3rd & 4th to lower border
dorsal vertebra (some authors say along left side of 2nd & 3rd to lowe
der of 3rd, some say along left side of 4th & 5th to lower border of 5th),
it becomes thoracic aorta. – RELATI

IN FRONT – Pleura, root of left lung.
BEHIND – Body of 4th dorsal vertebra (some authors say of 3rd, some say o
TO THE RIGHT – Œsophagus, thoracic duct.
TO THE LEFT – Left lung & pleura.

The aorta is somewhat dilated just above its origin, where i
sents externally three small bulgings corresponding to the sinu
Valsalva; two of these bulgings are anterior, and one is posterio
from the two anterior ones the coronary arteries are seen to arise.
most prominent part of the arch lies about ¼ of an inch behind th
terior surface of the sternum. The height to which the arch u
rises in the chest is about 1 inch below the upper border of the ste

BRANCHES — **Left or Anterior, & Right or Posterior Coronary, Innominate, Left Common Carotid, Left Subclavian.**

THE THORACIC AORTA.

Commences at left side of lower border of 4th dorsal vertebra (some Authors say 3rd, some s 5th). Descends through posterior mediastinum, curving slightly forwards and inclini slightly to the right, and ends at aortic opening of diaphragm in front of 12th dorsal vert bra. – RELATION

IN FRONT – Root of left lung, pericardium, œsophagus.
BEHIND – Vertebræ, vena azygos minor.
TO THE RIGHT – Œsophagus (above), vena azygos major, thoracic duc
TO THE LEFT – Left lung & pleura, œsophagus (below).

BRANCHES:

Pericardiac – Small, irregular; forwards to pericardium.

Bronchial – The nutrient vessels of the lungs. On left side, generally two arisin from thoracic aorta one above the other; on right side, but one usuall arising either from first aortic intercostal, or from front of aorta in commo with artery of left side. Along back of corresponding bronchus, dividing subdividing upon bronchial tubes, and supplying bronchial glands & cellul tissue of lung; give a few twigs to œsophagu

Œsophageal – Usually four or five from front of aorta. Descend obliquely upon œsoph gus anastomosing with each other, and with the œsophageal branch of the inferior thyroid, inferior phrenic & gastri

Posterior Mediastinal – Small irregular branches to glands and cellular tissue mediastinu

Aortic Intercostals – From back of aorta. Usually ten in number, sometimes onl nine, the second intercostal space being sometimes supplied, as well as th first, by the superior intercostal branch of the subclavian. To corre ponding intercostal space, passing o

LEFT SIDE – Beneath smaller azygos & left superior intercostal vein and left cord of sympathetic

RIGHT SIDE – Round bodies of vertebræ beneath œsophagus, thoraci duct, greater azygos, & right cord of sympathetic, – and divid into anterior & posterior branches

ANTERIOR BRANCH, OR INTERCOSTAL PROPER – Upon external intercostal muscle an beneath pleura & a thin layer of fascia, to lower border of rib above, an divides between the two intercostal muscles into branches

Superior – The larger; along groove on inner surface of rib above;
Inferior – The smaller; along upper border of rib below, – which branche supply intercostal muscles, and anastomose with thoracic branches o axillary & anterior intercostal branches of internal mammary.

The three last intercostals are prolonged between abdominal muscles and anastomose with epigastric, inferior phrenic & lumbar; the first on anastomoses with superior intercostal. – In the intercostal spaces the vei usually lies above the trunk of the artery & its superior branch, and th nerve below

POSTERIOR OR DORSAL BRANCH – Backwards on inner side of superior or long costo transverse ligament with posterior branch of corresponding spinal nerve and divides into branches

Spinal – Through intervertebral foramen to cord & its membranes and pos terior aspect of bodies of vertebræ

Muscular – Divides into *internal offset* to multifidus spinæ & integument nea spine, and *external offset*, which passes between sacro-lumbalis & longissimus dorsi to superficial muscles & integument

INNOMINATE ARTERY.

Arises from commencement of arch of Aorta in front of left common carotid.
Upwards & to the right to upper border of right sterno-clavicular articulation, where di
into right common carotid & right subcla
Gives off occasionally the thyroidea ima. Its length is usually from an inch to an inch
half.—RELATIO

In Front — Sternum, sterno-hyoid & -thyroid, remains of thymus gland;
Left innominate & right inferior thyroid veins;
Inf. cervical cardiac br. of right pneumogastric.
Behind — Trachea.
On Inner Side — Left common carotid, remains of thymus gland.
On Outer Side — Right pneumogastric n., right innominate vein, pleura.

Thyroidea Ima — Is very variable in size, when present. Usually arises fro
nominate, sometimes from right common carotid or from Aorta. Ascend
front of trachea to thyroid gl

COMMON CAROTID ARTERY.

Right common carotid arises from innominate artery behind steno-clavicular articulation
Left common carotid arises from highest part of arch of Aorta, is longer, and has a th
cic portion deeply situated within the tho

THORACIC PORTION OF THE LEFT COMMON CAROTID ART.

Upwards & outwards to root of neck. — RELATIONS:
In Front — Sternum, sterno-hyoid & -thyroid, left innominate v.
mains of thymus gl
Behind — Trachea, œsophagus, thoracic duct.
On Inner Side — Innominate artery.
On Outer Side — Left pneumogastric & phrenic ns. & left subclavian
left lung & pl

SUBCLAVIAN ARTERY.

From innominate artery behind upper border of sterno-clavicular articulation (right side) from end of transverse portion of arch of Aorta (left side), to outer border of first ri
Divided into three parts:

FIRST PART — From origin to inner border of scalenus anticus. Differs on the two sides.

RIGHT SIDE — Arches upwards & outwards across root of neck, and is shorter & mor superficial than on left side. – RELATIONS

In Front – Sterno-clavicular articulation, sterno-mastoid, -hyoid, & -thyroid, dee layer of fascia; – and the artery is crossed by Internal & anterior jugular and vertebral veins, pneumogastric phrenic nerves, and cardiac branches of sympathetic

Behind – Longus colli, transverse process of 7th cervical vertebra, cord of sym pathetic, recurrent laryngeal nerve

Below – Pleura.

SUBCLAVIAN VEIN lies below & in front of artery immediately behind clavicle

LEFT SIDE — Ascends nearly vertically, and is longer & more deeply situated. – RELATIONS

In Front – Same, plus left lung & pleura, left innominate v., left com. carotid; – an Pneumogastric & phrenic nerves & cardiac branches of sympathe tic are nearly parellel to the artery

Behind – Same, plus œsophagus & thoracic duct.

On Inner S.–Trachea, œsophagus, thoracic duct, left common carotid artery.

On Outer S.– Pleura.

BRANCHES — **Vertebral, Internal Mammary, Thyroid Axis** – Aris close together near inner border of scalenus anticus, a interval measuring usually from ½ an inch to 1 inch being lef between the origin of the artery & its first branch. On th left side the **Superior Intercostal** also usually arise from this part of the artery

PNEUMOGASTRIC NERVE.

Arises from lateral tract of medulla oblongata below glosso-pharyngeal & above spinal accessory. — Its origin is from a grey nucleus on floor of fourth ven
Through jugular foramen behind glosso-pharyngeal & in same sheath as spinal accessory.
Presents two ganglia, one in and one below jugular foramen:
SUP. OR JUGULAR G. OR G. OF THE ROOT — Small, greyish, rounded. Anastom. with *glosso-pharyngeal, spinal accessory & symp*
INF. G. OR G. OF THE TRUNK — Reddish, cylindrical, nearly an inch in length. Anastom *hypoglossal, spinal accessory, sympathetic, loop between two first cervical*
Descends behind & between int. & comm. carotid arteries & int. jugular v. and in same sheath
Then,

ON RIGHT SIDE:
Between subclavian art. & v. and along side of trachea to back of root of where spreads out into posterior pulmonary p
Along side of œsophagus in the shape of two or more separate cords, which œsophageal plexus with nerve of opposit
As a single cord along back of œsophagus to posterior surface of stomach joins solar & splenic ple

ON LEFT SIDE:
Between and in front of left comm. carotid & left subclavian arteries behin innominat
Across arch of aorta to back of root of lung, where similarly spreads ou joins with its
Along side of œsophagus as above.
As a single cord along front of œsophagus to anterior surface of stomach joins left hepatic p

BRANCHES:

Auricular Br. — Arises from g. of the root, and joins with glosso-pharyngeal.
Across jugular fossa & through opening in temporal bone near styloid pr
Between mastoid process & ext. audit. meatus to integument of back of
Gives off:
ASCENDING BR., which joins trunk of facial in aqueductus Fallopii
DESCENDING BR., which joins auricular branch of facial.

Pharyngeal Br. — Arises from upper part of ganglion of the trunk;
Crosses internal carotid art. either in front or behind;
Anast. with glosso-pharyngeal, sup. laryngeal & sympathetic, and forms ryngeal plexus to muscles & mucous membrane of pha

Sup. Laryngeal N. — Arises from middle of ganglion of the trunk.
Descends by side of pharynx behind int. carotid artery, and divides into
EXT. LARYNGEAL BR. — Joins with pharyngeal plexus & sup diac nerve, and supplies crico-thyroid & inf. const
INT. LARYNGEAL BR. — Pierces thyro-hyoid membrane to noid muscle and mucous membrane of larynx, base of t & aryteno-epiglottidean

Recurr. Laryngeal N. — Ar. in front of, and passes below & behind, subcla on right side, arch of aorta, on left, giving twigs to deep cardiac p
Behind comm. carotid & inf. thyroid arteries, and in groove between tr & œsoph
Beneath inf. constrictor to all the muscles of the larynx except crico-thy
Gives brs. to inf. constrictor, and anastomoses with ext. laryngeal

Cardiac Brs. — Divided into:
CERVICAL CARDIAC, THORACIC CARDIAC } Vide Nerves of the Heart.

Pulmonary Brs. — Divided into ANTERIOR and POSTERIOR, and form the ant. & pulmonary plexuses. (Vide nerves of the

Œsophageal Brs. — Arise, some above, but most of them below, the pulmon

Gastric Brs. — Right pneumogastric supplies post. aspect of stomach and joi lar & splenic plexuses; left pneumog. supplies ant. aspect, and left hepatic p

PHRENIC NERVE.

Phrenic or Int. Respiratory of Sir C. Bell – From 3rd, 4th, and usually also from 5th (cervical ne
Downwards & inwards in front of scalenus anticus.
Between subclavian vein & 1st part of subclavian artery crossing internal mammary
and receiving a filament from sympathetic, sometimes another from 5th & 6th
cervical nerves, and occasionally on the left side, one from the ansa hypoglossi
Crosses arch of Aorta & pulmonary artery, on the left side.
Descends, on the right side, on outer side of right innominate vein & sup. vena cava
In front of root of lung & along side of pericardium to diaphragm, and divides in
to branches which perforate the diaphragm and supply it by its under surface
Both nerves give off twigs to the pericardium & pleura, and join with the phrenic
plexus of the sympathetic, the right nerve sending also a few filaments to the
diaphragmatic ganglion

CORONARY or CARDIAC VESSELS.

CORONARY OR CARDIAC ARTERIES — Two. From upper part of the bu
corresponding to the two anterior sinuses of Valsalva just above free margin of
lunar

Left or Anterior - The smaller. Forwards & to the left between pulmonary
& left auricular appendix, and divides into brai

HORIZONTAL - The smaller; along left auriculo-ventricular groove, and
with horizontal branch of right or posterior cor

DESCENDING - The larger; along anterior interventricular groove to ap
heart, where it joins with descending branch of right or posterior cor

Right or Posterior - The larger. Forwards & to the right between pulm
artery & right auricular appendix, and then backwards along right aur
ventricular groove, sending a large branch down right border of
and divides into bran

HORIZONTAL - The smaller; along left auriculo-ventricular groove, and join
horizontal branch of left or anterior cor

DESCENDING - The larger; along posterior interventricular groove to apex of
where it joins with descending branch of left or anterior cor

CORONARY OR CARDIAC VEINS.

Great Cardiac Vein - Ascends from apex of heart along anterior interventri
groove, turns backwards along left auriculo-ventricular groove, rece
an ascending branch of some size from left border of heart, and open
left extremity of the coronary sinus, its opening being guarded b
v

Posterior Cardiac Vein - Ascends from apex of heart, where it communicates
preceding, along posterior interventricular groove, and opens into
extremity of coronary sinus, its opening being guarded by a valv
receives the veins from the posterior surface of both ventr

Coronary Sinus - Thick trunk about an inch long situated at back part o
auriculo-ventricular groove, and partly covered & concealed by mus
fibres of left auricle. It receives the great & posterior cardiac veins
a small vein, the remnant of the left superior cardinal vein of the em
(Marshall), which passes downwards & to the right along back pa
left auricle. It opens into the lower & back part of the right auricle
to the septum, below the opening of the inferior vena cava & Eusta
valve. Its opening is guarded by the valve of Theb

Small or Anterior Cardiac Veins & Venæ Cordis Minimæ - Several
branches, which collect the blood from the anterior surface of the
ventricle, and from the muscular substance of the heart, and which
separately into the lower part of the right auricle (foramina Thebesii)
larger than the others, runs along the right border of the

THORAX.

II.

PULMONARY VESSELS.

PULMONARY ARTERY.

Short thick trunk about two inches long, which conveys the venous blood from right side of the heart to the l

Arises from apex of infundibulum of right ventricle opposite upper border of 3rd cartilage of left side close to ster

Upwards, backwards & to the left, winding spirally in front & then to the le ascending portion of arch of aorta, the two vessels being contained in one tub sheath of the serous layer of the pericardium. – On either side of the artery ar auricular appendices & the coronary arteries; behind it are the aorta & th au

Pierces fibrous layer of pericardium, and divides below & in front of transverse pc of arch of aorta in

Right Pulmonary Artery – The larger & longer. To the right behind ascen aorta & superior vena cava to root of right lung, in which it lies, both before backwards and from above downwards, between the pulmonary & the bronchus. Divides

SUPERIOR BRANCH – The smaller, to superior & middle lobes.
INFERIOR BRANCH – The larger, to inferior lobe.

Left Pulmonary Artery – The smaller & shorter, connected at its root by remai ductus arteriosus to under surface of arch of aorta. To the left in fro descending aorta, lying, in root of left lung, above the veins & the bron but behind the former & in front of the latter. Divides

SUPERIOR BRANCH – The smaller, to superior lobe.
INFERIOR BRANCH – The larger, to inferior lobe.

PULMONARY VEINS.

Usually four. Commence upon the intercellular passages & air-cells in the cap network of the pulmonary artery, but are also continuous with some of the ter ramifications of the bronchial art

Their smaller divisions are but very little larger than the corresponding branch the pulmonary artery, and they accompany these singly, and form a single for each lo

Their larger branches are destitute of valves, and form a single trunk for each lobe trunk from the middle lobe of the right lung uniting with that from the u

The two trunks from right lung pass behind superior vena cava, right auricle & as ing aorta, and those from left lung cross anteriorly the descending aorta; a invested anteriorly by serous layer of pericar

In the lung the pulmonary vessels are generally found to lie in front of the corres ing bronchial tubes, the artery being above the vein. In the roots of the the pulmonary veins lie in front of the arteries, and the arteries in front o bronchus; and the order from below upwards is *veins*, *artery*, *bronchus*, on the side, *veins*, *bronchus*, *artery*, on the left. There is sometimes a small distinct ve middle lobe of right lung. The two left pulmonary veins often unite into one t

THE LUNGS.

Light, porous, crepitant, elastic.
Of a pinkish white at birth, of a mottled slate colour in the adult; the mottling be coming darker & darker as age advances. Smooth & shining, marked out by dari lines into polygonal spaces corresponding to the bases of the superficial lobules which spaces are variously crossed by other more delicate lines
Conical in shape, and present : –

Outer Surface – Convex, deepest behind. Presents on either side a deep fissure oblique downwards & forwards from near apex to base, and, on the right side, another fissure oblique upwards & forwards from the middle of the foregoing. By these fissures the left lung is divided into two lobes, the right one into three; the inferior lobe is the largest in both lungs, and the middle lobe of the right side, the smallest of all

Inner Surface – Concave, deeply excavated in front, especially on the left side, to make room for the heart; presents the hilum a little above & behind its middle

Anterior Border – Thin, oblique, shorter than the posterior, deeply notched inferiorly on the left side so as to expose the pericardium; comes in contact with its fellow behind middle of sternum, the pleuræ alone being interposed

Posterior Border – Thick, rounded, vertical, longer than the anterior.

Base – Broad, concave, oblique downwards & backwards; rests upon diaphragm, and its circumference fits into the groove between the diaphragm & the ribs. Descends lower down on the left side than on the right

Apex – Passes up into root of neck an inch or an inch & a half above first rib, and, under cover of the scaleni, comes into close contact with first & second portions of subclavian artery

THE RIGHT LUNG is the *shortest* in consequence of the diaphragm ascending higher on the right side than on the left; the *broadest* owing to the inclination of the heart to the left; and somewhat the *largest*. – THE LEFT LUNG is the *longest, narrowest*, and somewhat the *smallest*

THE ROOT of the LUNG

Consists of the bronchus, pulmonary & bronchial vessels, lymphatic vessels & glands, and pulmonary plexuses of the pneumogastric & sympathetic which parts are all enclosed in a pleural sheath, and are bound together by areolar tissue in the following order

FROM BEFORE BACKWARDS

On Either Side: –
Pulmonary veins with the *anterior pulmonary plexus*;
Pulmonary artery;
Bronchus with the *bronchial vessels, lymphatics vessels & glands, and the posterior pulmonary plexus*

FROM BELOW UPWARDS

On Right Side – *Pulmonary veins, pulmonary artery, bronchus*, with &c
On Left Side – *Pulmonary veins, bronchus, pulmonary artery*.

THE ROOT OF THE RIGHT LUNG — Lies behind the superior vena cava & the right auricle; the vena azygos major arches over it from behind

THE ROOT OF THE LEFT LUNG — Passes beneath the arch of the aorta; behind it are the descending portion of the arch, the œsophagus & the thoracic duct. – The root of each lung has also in front of it the phrenic nerve, and behind it, the pneumogastric

THE PLEURA.

Surrounds the lung, lines the parietes of the thorax, and forms the lateral boundary
media

Tracing it horizontally from the sternum it passes: –

Over costal cartilages, ribs, & intercostal spaces;
Forwards along side of posterior mediastinum;
Outwards over posterior aspect of root of lung;
Round posterior part of inner surface, posterior border, outer surface, anterior border,
rior part of the inner surface of lung, dipping into the fissures between the
Inwards over anterior aspect of root of lung;
Forwards along side of pericardium to sternum.

Inferiorly it covers the diaphragm, from which a thin triangular fold, the *ligamentum pulmonis*, passes up along the side of the pericardium to the inner surface of the lung
the lower border of its

Superiorly it ascends into the neck an inch or an inch & a half above the first rib, and,
cover of the scaleni, comes in contact with the first & second portions of the subcl
a

It is thinnest & most adherent over the lung & over the diaphragm. It is thickest & leas
herent over the thoracic walls. Its inner surface is covered by a layer of pavement
thelium, and is moistened by a serous

Its arteries are from the intercostals, internal mammary, phrenic, inferior thyroid, pericar
& bronchial. – Its veins correspond to its arteries. – The lymphatics of the visceral
join with those of the lung; the lymphatics of the parietal layer join with those o
mediastina & the thoracic walls. – Its nerves are derived from the pulmonary ple
(Kölliker), and from the phrenic & sympathetic nerves (Lus

The two pleuræ come in contact behind the middle of the sternum.

THE MEDIASTINUM.

Is the antero-posterior septum comprised between the two lungs & pleuræ. It is divide into three parts by the pericardium, heart, & large vessel

Anterior Mediastinum – Is the part in front of the pericardium, heart, & large vessel It is narrow above, where it contains the remains of the thymus gland, the origi of the sterno-hyoid & -thyroid, the upper part of the left internal mammary vesse a large quantity of loose areolar tissue, & a few lymphatic glands. It is narrow still behind the middle piece of the sternum, where the two pleuræ come in dire contact as low down as the 4th costal cartilage. Quite inferiorly, in consequen of the notch in the lower part of the anterior border of the left lung, it expands the left behind the 4th & 5th intercostal spaces of the left side; here it contains t lower part of the left internal mammary vessels, & that part of the triangular sterni muscle, which overlies the apex of the hear

Middle Mediastinum – Is the part which contains the pericardium, heart & large vesse (ascending aorta, pulmonary vessels, superior vena cava; – the inferior vena ca enters pericardium through opening in cordiform tendon of diaphragm), and al the phrenic nerves. It is the widest part of the mediastinu

Posterior Mediastinum – Is the part behind the pericardium, heart, & large vessel It contains the descending aorta, trachea, œsophagus; the venæ azygos major minor & the left superior intercostal; the pneumogastric & splanchnic nerves; t thoracic duct; fat & lymphatic gland

Posterior Mediastinum.—In the Ninth Edition of *Quain's Anatom* Professor Thane cuts off the upper part of the mediastinum as hitherto describe to form the Superior Mediastinum. "The Superior Mediastinum may be considere "as bounded below by a plane passing through the lower part of the body of t "fourth dorsal vertebra behind, and the junction of the manubrium with the bod "of the sternum in front. Its upper limit corresponds with the superior apertu "of the thorax. In front are the manubrium and the lower ends of the stern "hyoid and sterno-thyroid muscles; and behind are the upper four dors "vertebræ and the lower ends of the longus colli muscles. It contains the trache "œsophagus and thoracic duct; the whole of the transverse part of the arch "the aorta, the innominate artery, and those parts of the left common carot "and subclavian arteries which are contained within the thorax; the innomina "veins and upper part of the superior vena cava; the phrenic and pneumo-gastr "nerves, the left recurrent, and the cardiac nerves; and the cardiac lymphat "glands and remains of the thymus gland."—(*Quain's Anatomy*, Vol. II., p. 477.)

THE TRACHEA & BRONCHI.

THE TRACHEA.

From 5th cervical vertebra to 3rd dorsal. Firm, rounded, & supported by e
ginous rings in front, flattened & membranous b

Relations.

In Front –

Isthmus of thyroid gland, inferior thyroid veins, & thyroide
artery (when the latter e
Remains of thymus gland, left innominate vein, arch of aorta
innominate & left common carotid arteries, great or deep c
plexus, bifurcation of pulmonary a
Sterno-hyoid & -thyroid, anastomotic branch between the an
jugular veins, sternum, fascia, &

Behind –

Œsophagus, which deviates to the left towards lower part of
right recurrent laryngeal

On Either Side –

Lateral lobe of thyroid gland; common carotid artery, internal
lar vein, pneumogastric & sympathetic nerves; inferior th
artery, left recurrent laryngeal nerve (the right nerve lies
what behind the trac
Innominate & common carotid arteries, pneumogastric & left
rent laryngeal nerves; – and farther off, but internally t
pleuræ, right innominate vein & right phrenic nerve, on the
side, left subclavian artery & left phrenic nerve, on th

THE BRONCHI

Commence opposite the 3rd dorsal vertebra a little to the left of the middle
the internal septum which marks the separation of the two tubes being sli
deviated to the left by the preponderance in diameter of the right bronchus
the left one. Both divide in the root of the lung into a large inferior a
somewhat smaller superior branch, the former of which, on the right side,
off a small branch to the middle lobe of the right

RIGHT BRONCHUS – About an inch in length, wider, more horizontal than th
one; enters root of lung opposite 4th dorsal vertebra. – It lies behind
superior vena cava & the right auricle; the right pulmonary artery li
first below it, and then in front of it; the vena azygos major arches ov
from be

LEFT BRONCHUS — Smaller, more oblique, nearly two inches long; enters
of lung opposite 5th dorsal vertebra. – It passes beneath the arch of the ao
the left pulmonary artery lies at first above it, and then in front of it; be
it are the descending portion of the arch, the œsophagus & the thoracic

THE ŒSOPHAGUS.

Commences in middle line of neck opposite 5th cervical vertebra & lower border of cricoid cartilage.

Downwards & to the left behind trachea, left lobe of thyroid gland & left recurrent laryngeal nerve, coming into close contact with left common carotid.

Downwards & to the right behind lower end of trachea & commencement of left bronchus, and between arch of aorta & thoracic duct on the left & the vena azygos major on the right, regaining middle line opposite 5th dorsal vertebra.

Again to the left between heart & pericardium in front and lower part of thoracic aorta behind, being surrounded by the pneumogastrics, which tend, the left one to the front, the right one to the back.

Through œsophageal opening of diaphragm, and opens into stomach (cardiac or œsophageal opening) opposite 9th dorsal vertebra.

Is from 9 to 10 inches long.

THE VENÆ AZYGOS.

Collect the blood from the intercostal spaces, and are three in number, the major, m
left su

VENA AZYGOS MAJOR, or RIGHT AZYGOS — Commences in the rig
cending lumbar vein, or sometimes in a branch from the inferior cava
right
Through aortic opening of diaphragm on right side of thoracic duct, behind
right side of aorta; – sometimes through righ
Along right side of spine in front of right intercostal arteries to 3rd dorsal ve
Arches forwards over root of right lung, and opens into superior vena cav
before it enters pericardium. Rec
Tributary Branches: – *Nine or ten lower intercostal veins of right side, vena*
minor, several small œsophageal, mediastinal & spinal veins, the right bro
sometimes the *right superior intercostal*, and occasionally the

VENA AZYGOS MINOR, or LEFT LOWER AZYGOS — Arises in left a
ing lumbar vein, or sometimes in a branch from left
Perforates left crus of diaphragm (passes sometimes through aortic opening)
ascends along left side of spine in front of left intercostal arteries to 6th
dorsal ve
Crosses spine behind aorta & thoracic duct, and opens into vena azygos
Re
Tributary Branches: – *Four or five lower intercostal veins of left side, severa*
mediastinal, œsophageal & spina

LEFT UPPER AZYGOS — Receives the blood from those left intercostal veins, u
two or three in number, which are situated between the intercostal vein
open into the left lower azygos and those that open into the left superior
costal. It therefore varies greatly in size, diminishing as these latter ve
crease, & *vice versa*; often it does not exist at all, or one or more of the 5t
& 7th left intercosal veins may merely open directly into the vena azygos
When there is a distinct left upper azygos, it opens either into the azygos
or into the left lower azygos. A few imperfect valves are found in the
azygos vein; distinct valves are found in the intercostal

THE THORACIC & RIGHT LYMPHATIC DUCTS.

THORACIC DUCT — Commences in receptaculum chyli, passes through aortic opening o diaphragm, and then ascends in front of spine as high as 4th dorsal vertebra, lying behind œsophagus, between aorta & vena azygos major. It then inclines to the left and ascends first behind arch of aorta and then behind first portion of subclavian artery of left side; and finally, opposite upper border of 7th cervical vertebra, it arches forwards above pleura & in front of scalenus anticus, and opens into angle of junction between left internal jugular & subclavian veins, its opening being guarded by a pair of valves. It is somewhat tortuous in its course, constricted at intervals on account of the valves it contains; of the size of a goose-quill at its commencement, somewhat narrower in the thorax, again enlarged at the root of the neck. Sometimes it bifurcates, its left division taking the usual course, its right division joining the right lymphatic duct. – It is the common trunk of all the lymphatics of the body except those of the right side of the head, neck, & thorax, right upper limb, right lung, right side of the heart, & part of the convex surface of the liver.

Receptaculum Chyli – Is a dilatation of the commencement of the thoracic duct which lies in front of the 2nd lumbar vertebra, behind & to right side of the aorta, and between it and the vena azygos major & the right crus of the diaphragm. It receives the trunks of the lacteal vessels, and four or five large trunks from the lumbar lymphatic glands.

RIGHT LYMPHATIC DUCT — Is a short thick trunk from half an inch to an inch in length and of about a line or a line & a half in diameter, which collects the lymph from the right side of the head, neck, & thorax, right upper limb, right lung, right side of the heart, & part of the convex surface of the liver. It opens into the angle of junction between the right internal jugular & right subclavian veins, its opening being guarded by a pair of valves.

SUPERIOR INTERCOSTAL ARTERY.

From upper & back part of 1st portion of subclavian on left side of 2nd portion on right side. Passes backwards for a short distance, and gives off its deep cervical branch; it then descends in front of neck of 1st rib, or in front of necks of 1st & 2nd ribs on outer side of 1st dorsal ganglion of sympathetic, gives off one or two branches similar to the aortic intercostals, and joins with the first of the latter arteries.

DEEP CERVICAL OR PROFUNDA CERVICIS – Sometimes arises directly from subclavian. Backwards between neck of 1st rib & transverse process of 7th cervical vertebra, and ascends between complexus & semispinalis colli, anastomosing with vertebral artery & deep branch of arteria princeps cervicis.

INTERIOR of the HEART.

RIGHT SIDE.

Is larger in its auricular portion, and has thinner walls than the left.

AURICLE — Divided into:

Appendix Auriculæ – Narrow indented pouch, which overlaps the arch aorta, and presents on its inner surface the *musculi pectinati*, extend somewhat into the

Sinus – The central cavity; presents: –

OPENING OF THE SUPERIOR VENA CAVA – Somewhat smaller than that inferior cava; situated at the upper & front part; looks wards & forwards, and has near

Tubercle of Lower – Small eminence, scarcely visible in man, situa right wall of auricle between the two venæ

OPENING OF THE INFERIOR VENA CAVA – Somewhat larger than that superior cava; situated at the lower & back part near the se looks upwards & inwards, and presen

Eustachian Valve – Semilunar in form with concave free, and conv tached margins; situated below the opening of the inferio cava between it & the auriculo-ventricular opening, and pass wards & to the left to the anterior margin of the annulus Small in the adult. Contains a few muscular

OPENING OF THE CORONARY SINUS – Situated below the opening of the i vena cava & the Eustachian valve. Presen

Coronary Valve or Valve of Thebesius.

FORAMINA THEBESII – Some of which are the openings of the venæ minimæ, while others are but small blind depre

AURICULO-VENTRICULAR OPENING – With the tricuspid valve (Vide belo

FORAMEN OVALE – In the fœtus. Situated at the lower & back part of s above opening of inferior vena cava; replaced in adult

Fossa Ovalis – Oval depression surrounded by a prominent circular ri

Annulus Ovalis, – and which often presents a small valvular open its uppe

VENTRICLE — Triangular in shape, and has much thinner walls than the le Prolonged upwards & to the left into the *Infundibulum or arteriosus.* Pres

AURICULO-VENTRICULAR OPENING – Oval, broadest from side to side. Si behind the centre of the sternum on a level with the 3rd cost tilages, on the right side of the aortic & left auriculo-vent openings. Guarded

Tricuspid Valve – Presents three triangular segments, which are att superiorly to the margin of the auriculo-ventricular ring & lat to each other, and of which the left one is the largest. The formed by a central fibrous lamina attached superiorly to t rous ring of the opening and covered by a duplicature of the cardium. Their under surface & borders give attachment *chordæ te*

OPENING OF THE PULMONARY ARTERY – Situated at the apex of the conu riosus opposite the upper border of the third costal cartilage left side close to the sternum. Guarded

Semilunar Valves – Three; formed of fibrous tissue surrounded by plicature of the endocardium, and pr

Convex margin – Attached to the fibrous ring of the orifice;

Free margin – Slightly concave, strengthened by a bundle of ten fibres, presenting in the centre a fibro-cartilaginous nodu *corpus Arantii,* and laterally two thin lunated portion *lunulæ.* Above the valves are three small pouch

Sinuses of Valsalva.

COLUMNÆ CARNEÆ – Three sorts, which are attached respectively by on by both extremities, by one extremity only, to the wall of th tricle. The latter a

Musculi Papillares – Three or four; give origin to the *Chordæ Tendi*

INTERIOR of the HEART.

LEFT SIDE.

Has thicker walls than the right, and is smaller in its auricular portion.

AURICLE — Divided, as is the right, into two parts, the

Appendix Auriculæ - Longer, narrower, more curved & indented than on right side and constricted at its orifice; its musculi pectinati are smaller & less numerous. Overlaps pulmonary artery

Sinus - More regularly cuboid than on right side. - Presents:

Openings of the Pulmonary veins - Four, at upper part, two on the right close to septum, two on the left, the latter sometimes uniting

Auriculo-Ventricular Opening - With the Mitral valve (Vide below).

VENTRICLE — Rounded & conical; its walls are thicker than those of the right. Presents

Auriculo-Ventricular Opening - Situated opposite centre of sternum on a level with third costal cartilages, between & behind the aortic & right auriculo-ventricular openings, or rather directly behind the aortic opening (Sibson). Somewhat smaller than on right side. Presents th

Mitral Valve - Larger, thicker & stronger than the tricuspid. Consists of two principal segments, of which the largest is in front. The chordæ tendineæ attached to its under surface are stronger & thicker, but are less numerous, than those on the right side

Aortic Opening - Situated behind centre of sternum on a level with lower border of 3rd costal cartilage, and directly in front of the left auriculo-ventricular opening. Presents th

Semilunar Valves - Larger, thicker & stronger than those of pulmonary artery; lunulæ wider, corpora Arantii more prominent, and sinuses of Valsalva deeper

Columnæ Carneæ - Those attached by one side and those attached by both extremities are smaller & more numerous. The musculi papillares are but two in number, but are larger, and are attached, one to the anterior the other to the posterior wall of the ventricle

STRUCTURE of the HEART—1st Tablet.

Presents for examination the fibrous rings of the arterial & auriculo-ventricular ope
and the muscular

FIBROUS RINGS — The aortic & the two auriculo-ventricular rings lie close together b
the centre of the sternum on a level with the 3rd costal cartilages, and are
together by a fibro-cartilaginous mass which becomes ossified in some of the
animals. – The aortic ring lies in front of the left auriculo-ventricular; the
auriculo-ventricular ring lies between, & to the right of, the two others. – The f
ring of the pulmonary artery is situated at the apex of the infundibulum opposi
upper border of the 3rd costal cartilage of the left side close to the sternum.

These rings give attachment to the mitral tricuspid & semilunar valves, t
muscular fibres of the auricles, and to some of the most superficial fibres of the
tricles. The margin of the arterial rings which is turned towards the auric
scalloped into three semilunar notches filled up by corresponding projections
middle coat of the artery, the attachment of the arteries to the rings being stre
ened externally by the pericardium and internally by the endocar

MUSCULAR FIBRES — Are striated, but are about ⅓ smaller than those of striated
cles generally, and their striation is not so distinct. They divide and anast
with each other, and they often contain fat cells. Their perimysium is but s

Fibres of the Auricles - Are mostly transverse, superficial, & common to
auricles; some however lie deeper, and are proper to each a

SUPERFICIAL, TRANSVERSE, OR COMMON FIBRES – Surround mainly the base
sinuses, and are most marked anteriorly. Some dip into the
auricular se

DEEP OR PROPER FIBRES – May be divided into:

Looped Fibres – Arch over each auricle from before backwards, and a
tached to the auriculo-ventricular rings both in front & b

Annular Fibres – Encircle the appendices auriculæ, and the venæ cavæ
monary & coronary veins, extending for some distance upon the

Fibres of the Ventricles - Vide next Tablet.

STRUCTURE of the HEART—2nd Tablet.

FIBRES OF THE VENTRICLES

Form seven layers differing from each other by the direction of their fibres.

These layers are continuous with each other at the apex & at the base of the heart as follows: – the 1st, or most external layer, with the 7th, or most internal layer.
„ 2nd, „ 6th,
„ 3rd, „ 5th,
The fibres of the 4th or central layer return upon those of the same set.

Together, the 1st & 7th layers form a kind of double ring inclosing all the other layers; the 2nd and 6th layers, a kind of double ring inclosing the 3rd, 4th, and 5th layers; the 3rd and 5th layers, a kind of double ring inclosing the 4th layer. As a consequence the double ring formed by the 1st and 7th layers extends farther towards the apex & the base of the heart than the double ring formed by the 2nd & 6th layers, which latter double ring extends farther than the double ring formed by the 3rd & 5th layers; and the 4th or central layer is the least extensive of all. This explains the greater thickness of the walls of the ventricles towards the middle of their length than at either extremity. – The outer layers, it may be added, are thinner than the inner ones.

The fibres of the three outer layers are inclined downwards & to the left on the anterior aspect of the heart, downwards & to the right on the posterior aspect; and they become less vertical in each successive layer. The fibres of the 4th layer are horizontal or transverse. The fibres of the three inner layers are inclined upwards & to the left on the anterior aspect of the heart, upwards & to the right on the posterior aspect, crossing the fibres of the three outer layers, and becoming more & more vertical or longitudinal in the successive strata.

Some of the superficial fibres, especially those of the posterior surface, pass round and enclose both ventricles; the mass of the fibres, however, enclose but one ventricle.

In the three outer layers the anterior fibres proper to the left ventricle issue from the inner & front part of the corresponding arterial & auriculo-ventricular openings & from the front of the interventricular septum; these anterior fibres pass downwards & to the left, with a few of the anterior common superficial fibres, and get to the back part of the apex. The posterior fibres proper to the left ventricle issue from the outer & back part of the corresponding arterial & auriculo-ventricular openings & from the back of the interventricular septum; these posterior fibres pass downwards & to the right, with a somewhat considerable number of the posterior common superficial fibres, and get to the front of the apex. Here all the fibres, both anterior & posterior, curl inwards in a whirl-like manner, the anterior fibres going to form the three inner strata on the posterior wall of the ventricle, and the posterior fibres going to form the three inner strata on the anterior wall.

In the right ventricle the fibres of the three outer layers issue partly from the corresponding arterial & auriculo-ventricular openings, and are partly continuous with the posterior common superficial fibres. Descending spirally from left to right on the posterior aspect of the heart, and from right to left on the anterior aspect, they reach the anterior interventricular groove. Here a few fibres are continued on to the left ventricle, forming the anterior common superficial fibres; the greater number pass backwards, however, in the interventricular septum, at the back of which they decussate with the fibres of the left ventricle, and blend with the posterior common superficial fibres.

It must be added that none of the fibres, except a few of the most superficial ones, can now be said to *arise* from the arterial & auriculo-ventricular rings. The strata are merely continued opposite these rings, the superficial ones into the deep ones, and *vice versa*

NERVES of the HEART

Are derived from the cardiac plexuses, which plexuses are formed by the cardiac bran of the sympathetic and of the pneumogastric & recurrent laryngeal.

CARDIAC NERVES — Are the three cardiac nerves of the sympathetic, the cer cardiac & the thoracic-cardiac nerves of the pneumogastric, and the cardiac ches of the recurrent laryngeal.

CARDIAC NERVES OF THE SYMPATHETIC — Are three in nu *superior or superficial, middle or great, & inferior,* and arise normally *from* th responding *cervical ganglia.* The superior cardiac nerve, however, frequ arises partly from the communicating cord below the superior ganglion, an inferior one partly from the first dorsal ganglion; when the middle gangl absent the middle cardiac nerve arises from the communicating cord bet the superior & inferior ganglia.

These nerves pass downwards & inwards *to the base of the heart* either singly or in nection with each other or with the other cardiac nerves, varying conside in their relative size and in their precise relations to adjoining struct when one of them is smaller than usual one of the others is increased in si

On the *right side* of the neck the *superior & the middle* cardiac n pass downwards *behind the common carotid* artery, the former passing also in of the inferior thyroid artery & recurrent laryngeal nerve. They then *cr subclavian artery* either in front or behind, and descend *upon the trachea* right side of the *great or deep cardiac plexus.* – On the *left side* the *superior c nerve* usually descends into the thorax *between & in front of* the *left common & left subclavian* arteries and crosses anteriorly the *arch of the aorta to* the *s cial cardiac plexus;* sometimes however it lies deeper than usual and then p behind the aorta to the deep cardiac plexus. – The *left middle cardiac nerve* into the thorax *between & behind the left common carotid & left subclavian a* and then descends *behind the arch of the aorta to* the left side of the *deep c plexus.*

The *inferior cardiac nerve* passes downwards & inwards *to the deep c plexus behind the subclavian artery,* and also, on the right side, behind the *innom*

CARDIAC NS. of the PNEUMOGASTRIC & RECURR. LARYNG

Are divided into:

Cervical Cardiac – Are divided into:

UPPER CERVICAL CARDIAC – Small branches which join the cardiac n of the sympathetic.

LOWER CERVICAL CARDIAC – One large branch which, on the right side cends along the innominate artery and joins one of the cardiac destined to the deep cardiac plexus, and, on the left side, cross arch of the aorta to the superficial cardiac plexus.

Thoracic Cardiac – Arise on the right side both from the trunk of the pn gastric & from its recurrent laryngeal branch, but on the left side fro recurrent branch only. They all go to the deep cardiac plexus either or in connection with the other deep cardiac nerves.

THE CARDIAC PLEXUSES.

The cardiac nerves form two primary cardiac plexuses termed the superficial & the deep c great, and two secondary plexuses, the anterior & the posterior coronary, which two latte plexuses are derived from the preceding, as are also in part the anterior & the posteric pulmonary plexuses.

SUPERFICIAL CARDIAC PLEXUS — The smaller. Is situated beneath arch of aort in front of right pulmonary artery and on right side of ductus arteriosus. It com municates by several filaments with the left half of the deep cardiac plexus.

It is formed by the left superior cardiac nerve of the sympathetic, the left inferior cervica cardiac branch of the pneumogastric, and by several filaments from the deep cardia plexus. It often presents a small ganglion, the ganglion of Wrisberg.

It gives off the greater part of anterior coronary plexus, and several filaments to anterio pulmonary plexus of left side.

DEEP OR GREAT CARDIAC PLEXUS — The larger. Is situated between trache & arch of aorta, its right half lying above right branch of pulmonary artery, its lef half lying rather on left side of trachea and being connected by several filaments wit the superficial plexus.

It is usually formed by every one of the cardiac nerves excepting the left superior cardia nerve of sympathetic & left inferior cervical cardiac nerve of pneumogastric.

Its right half sends branches – behind right pulmonary artery to posterior coronary plexu & to right auricle; – in front of right pulmonary artery, outwards, to right anterio pulmonary plexus, inwards, in front of pulmonary trunk to anterior coronary plexus – Its left half gives off: – several filaments to superficial cardiac plexus, numerous fila ments to posterior coronary plexus & to left auricle, a few branches to left anterio pulmonary plexus.

ANTERIOR CORONARY PLEXUS — Is derived chiefly from the superficial cardia plexus, but partly also from the deep. It passes forwards between aorta & pulmonary artery and accompanies the left or anterior coronary artery & its branches.

POSTERIOR CORONARY PLEXUS — Is derived chiefly from the left half of the deep cardiac plexus, but partly also from the right. Its branches accompany the right o posterior coronary artery and its branches.

The filaments of the coronary plexuses ramify in the substance of the heart and beneath the pericardium & endocardium. Numerous small ganglia are found upon them, especially in the vicinity of the boundary rings between the auricles & ventricles

SPLANCHNIC NERVES.

Usually three in number, and termed *great, lesser, & least.*

Arise as follows from the six or seven lower dorsal ganglia:

GREAT SPLANCHNIC NERVE – Ganglia from 5th or 6th to 9th or 10th: – Is also connected with the dorsal ganglia above as high as the 3rd, or sometimes even as high as the 1st.

LESSER SPLANCHNIC NERVE – 10th & 11th ganglia.

LEAST SPLANCHNIC NERVE – 12th ganglion.

Pass downwards & inwards upon bodies of vertebræ being either more or less separate & distinct from each other, or more or less plexiform, and frequently presenting, when plexiform, either one relatively large ganglion, the ganglion splanchnicum, or several smaller ones.

Perforate diaphragm conjointly or separately.

End, the two first mainly in solar plexus, the last mainly in the renal. – The majority of the fibres of the great splanchnic nerve descend directly to the semilunar ganglion of same side

The great splanchnic nerves are white & firm in texture, as are also the branches of the superior mesenteric plexus.

GANGLIATED CORDS & GANGLIA of SYMPATHET

GANGLIATED CORDS — Lie on each side & along the whole length of spinal column, verging inferiorly upon the coccyx in the ganglion impar, and being prolonged superi into the head along internal carotid artery. They are usually single, sometimes do occasionally wanting here & there. Relatively to the size of the ganglia they are lar in the dorsal region. They are divided i

Cervical Portion – Lies in front of transverse processss of cervical vertebræ be internal jugular vein, and presents three ganglia (Vide Cervical portion of S pathe

Thoracic Portion – Lies in front of heads of ribs & intercostal vessels, beneath ple on outer side of venæ azygos, at first at a small distance from, and then clos bodies of vertebræ. It presents eleven or twelve gan

Lumbar Portion – Penetrates into abdomen, on right side through a small openin right crus of diaphragm, on left side either through aortic opening or throug small separate opening in left crus. It lies in front of bodies of vertebræ on i side of psoas, behind inferior vena cava on the right side, behind abdominal aort the left. It presents four or five gan

Sacral Portion – Lies in front of sacrum on inner side of anterior sacral foramina, converging towards its fellow inferiorly, usually ends in the ganglion im

PREVERTEBRAL GANGLIA — Usually three cervical, eleven or twelve dorsal, fou five lumbar, four sacral, one coccygeal. More or less oval or triangular in shape, elongated from above downw

Cervical – Vide cervical portion of sympathetic.

Dorsal – Lie most of them in front of heads of ribs, the nine or ten first at a little dist from, the two or three last close to, bodies of corresponding vertebræ; occasion one or two ganglia lie opposite the corresponding intervertebral foramina. T are smaller than the cervical & lumbar. The first one is the largest and is blended with the inferior cervical. The last one is usually stellate in shape, is sometimes blended with the first lumbar. – They pres

ROOTS, OR BRANCHES OF COMMUNICATION WITH THE DORSAL NERVES – Usually tw number: – Either both ascend obliquely upwards & outwards to join dorsal nerve above just before its bifurcation, or one ascends as above scribed, and the other descends to join the dorsal nerve below in co ponding situation. Sometimes one or two ganglia have a third root resul from bifurcation of one of the roots to adjoining dorsal nerves, and occasionally, an additional root to second dorsal nerve al

INTERNAL BRANCHES, OR BRANCHES OF DISTRIBUTION – Those from five or six upper g lia are small & greyish; they mainly supply thoracic aorta & its bran & bodies of vertebræ & their ligaments; those from third & fourth ganglia posterior pulmonary plexus. Those from six or seven lower ganglia are la & whiter; they give off a few small branches to aorta, and join to form great, lesser, & last splanchnic nerves (V. Solar Ple

Lumbar – Rather larger & more distinct than the dorsal, and situated at a greater dist from the corresponding intervertebral foramina, the first one often lying opp body of second lumbar vertebra, and the last one opposite sacro-vertebral arti tion. – They pres

ROOTS, OR BRANCHES OF COMMUNICATION WITH THE LUMBAR NERVES – Two or three for Are longer & more slender than those of dorsal ganglia, and pass beneath fibrous arches of psoas in company with lumbar arteries & v

INTERNAL BRANCHES, OR BRANCHES OF DISTRIBUTION – Give a few twigs to bodies of tebræ & their ligaments, and assist in forming the aortic & hypoga plex

Sacral – Smaller than the dorsal & lumbar, and diminish in size as they descend close to inner side of anterior sacral foramina, those of opposite sides approxim as they descend, and usually blend in front of coccyx in a median ganglion, coccygeal ganglion or ganglion impar. – They pr

ROOTS, OR BRANCHES OF COMMUNICATION WITH THE SACRAL NERVES – Usually two for ganglion; are short & s

INTERNAL BRANCHES, OR BRANCHES OF DISTRIBUTION – Those of the two upper ganglia inferior hypogastric or pelvic plexus; the others descend upon the ar sacra media, and supply the sacrum & coccyx & their ligaments, and coccygeal g

THE LARYNX.

THE LARYNX—1st Tablet.

CARTILAGES — Nine; three single, three pairs: –

THYROID — The largest. Consists of two quadrilateral plates or *alæ* joined in front
acute angle, the highest & most prominent part of which angle is term
Outer Surface – Presents on either side the *pomum Adami.* Pr
Ob.'que Line – For sterno-thyroid & thyro-hyoid; passes obliquely downwards
wards from tubercle near root of superior cornu. The surface
gives attachment to inferior const
Inner Surface – Covered by mucous membrane externally & above. Prese
middle li
Receding Angle – To which are attached the true & the false vocal cords, the
arytænoidei & -epiglottidei muscles, and the thyro-epiglottic lig
& apex of the epi
Upper Border – Deeply notched opposite pomum Adami, rounded & promin
either side of notch, concave laterally; gives attach. to thyro-hyoid m
Lower Border – Shorter, straighter, connected to cricoid cartilage by crico-t
membrane & n
Posterior Border – Thick & rounded; gives attachment to stylo- & palato-phar
and is prolonged upwards & downwards respectively in
Superior Cornu – Long, narrow; points upwards, backwards & inwards, and
attachment to lateral thyro-hyoid ligs
Inferior Cornu – Shorter & thicker; points downwards forwards & inwards
presents internally a small facet for articulation with cricoid car

CRICOID — Annular in shape, broad behind, narrow in front; thicker & stronge
smaller than foregoing. Pre
Outer Surface – Gives attachment in front & at sides to crico-thyroideus & inferio
strictor; and then presents on either side from before backv
Tubercle – Surmounted by an articular facet, for articulation with lesser cornua
Broad Rough Depression – For attachment of crico-arytænoideus posticus; roid cart
Median Vertical Ridge – For attachment of longitudinal fibres of œsophagus.
Inner Surface – Smooth, lined with mucous membrane of larynx.
Upper Border – Inclined downwards & forwards. Gives attachment in front & at
to crico-thyroid membrane & crico-arytænoideus lateralis, and prese
its posterior & highest part, on either side of a slight median notch
small oval facets for articulation with arytænoid carti
Lower Border – Horizontal; connected to first cartilaginous ring of trachea by f
membrane of that

ARYTÆNOID — Two, small, pyramidal. Rest upon posterior & highest part of uppe
der of cricoid cartilage, and pr
Anterior Surface – Convex, rough; gives attachment to false vocal cord & upper
Posterior Surface – Excavated for attach. of arytænoideus. culus of thyro-arytæno
Internal Surface – The narrowest, flattened, covered with mucous membrane.
Base – Broad. Presents a smooth concave facet for articulation with cricoid cart
and three angles, of which angles two are prominent & important
Antero-Internal Angle – Long & pointed; gives attachment to true vocal cord
lower fasciculus of thyro-arytæno
Postero-Ext. Angle – Short & rounded; gives attach. to the crico-arytænoidei later
Apex – Pointed, curved backwards & inwards; articulates on either side with the pos

CORNICULA LARYNGIS or CARTILAGES of SANTORINI — Two
conical nodules of yellow elastic cartilage sometimes joined to apices of aryt
cartilages, which apices they prolong backwards & inv

CUNEIFORM CARTILAGES or CARTILAGES of WRISBERG — Two sma
of yellow elastic cartilage directed upwards & outwards in free border of ary
epiglottidean folds a little in front of arytænoid cartilages; their anteri
tremity is slightly enl

EPIGLOTTIS — Median lamella of yellow elastic cartilage in the form of a leaf wit
stalk below, and the lamina or expanded part above. Pre
Apex – Long & narrow; attached by thyro-epiglottic ligament to upper part of rec
Base – Broad, rounded, free. angle of thyroid car
Anterior Surface – Free in its upper part, where it curves forwards towards b
tongue, to which it is connected by the three glosso-epiglottic folds
herent below, where it is attached by hyo-epiglottic ligament to uppe
der of hyoid
Posterior Surface – Free, smooth, concave from side to side, convex from above
wards. Covers superior aperture of larynx during second act of deglu
and is studded with numerous small pits for the reception of mucous g
Lateral Margins – Convex, directed backwards; connected to arytænoid cartila
the arytæno-epiglottidean

THE LARYNX—2nd Tablet.

LIGAMENTS — Are:

EXTRINSIC — Three; connect larynx to hyoid bone. – They are:

Thyro-Hyoid Membrane – Broad fibro-elastic membrane from
Upper border of thyroid cartilage to
Upper border of hyoid bone, being separated from posterior surface of hyoi bone by a little loose cellular tissue in which a bursa is usually foun It is thickest towards middle and perforated laterally by superior laryn geal vessels & nerves. Behind it are the epiglottis & the mucous mem brane of the base of the tongue, with a considerable amount of adipos tissue & some mucous gland

Lateral Thyro-Hyoid Ligaments – Rounded fibro-elastic cords from
Superior cornua of thyroid cartilage to
Extremities of greater cornua of hyoid bone. – These ligaments often contain small cartilaginous nodule, the *cartilago tritice*

INTRINSIC — Connect cartilages of larynx as follows: On the one hand the cricoi to the thyroid & arytænoid, on the other the epiglottis to the thyroid. They are

Crico-Thyroid Membrane – Yellow elastic lamina divided into:
CENTRAL PORTION – Thick, triangular, broadest below; connects
Contiguous margins of cricoid & thyroid.
LATERAL PORTIONS – Thinner; extend from
Upper border of cricoid cartilage as far back as crico-thyroid arthrodia to
Lower border of inferior or true vocal cord, uniting firmly with the latter especially in front. – The central portion is concealed by crico-thyroi muscles, except in mesial line, and is crossed by crico-thyroid branche of superior thyroid arteries; the lateral portions are covered by the thyro & lateral crico-arytænoid muscles, and are lined internally by mucou membrane of larynx

Crico-Thyroid Capsules – Thin, strongest behind; enclose the arthrodia articulations between cricoid & inferior cornua of thyroid, and ar lined internally with synovial membrane

Posterior Crico-Arytænoid Ligament – Short but strong band from
Back of cricoid cartilage to
Back of base of arytænoid.

Crico-Arytænoid Capsules – Thin; surround the arthrodial articulation between upper border of cricoid cartilage & bases of the arytænoid and are lined internally with synovial membrane

Thyro-Epiglottic Ligament – Long & slender band connecting
Apex of epiglottis to
Upper part of receding angle of thyroid.

Hyo-Epiglottic Ligament – Somewhat indistinct; extends amidst a con siderable amount of adipose tissue from
Anterior surface of epiglottis to
Upper border of hyoid bone.

To the foregoing ligaments must be added the superior & inferior thyro-arytænoid described with the vocal cords, and the somewhat indistinct fibro-cartilaginous capsules frequently found between the arytænoid cartilages & the cornicula laryngis.

THE LARYNX—3rd Tablet.

MUSCLES of the GLOTTIS — Are four on each side, and one in the middle line.

Crico-Thyroideus – Front & sides of cricoid cartilage.
Lower border & inferior cornu of thyroid cartilage. – S. by superior
geal nerve.
Tilts the thyroid cartilage forwards, and thus elongates & tenses the vocal

Thyro-Arytænoideus – Lower part of receding angle of thyroid cartilage, & po
surface of crico-thyroid membrane.
By two fasciculi into anterior surface of arytænoid cartilage, an
anterior or internal angle of its base. – S. by recurrent laryngeal nerve.
Draws the arytænoid cartilage forwards, and thus shortens and relaxes t
cords; it also assists in compressing the sacculus laryngis. The former action
of its lower & stronger fasciculus, which lies parallel with, & on the out
of, the inferior or true vocal cord; the latter action is that of its upper & t
fasciculus, which lies on the outer side of the sacculus laryngis.

Crico-Arytænoideus Lateralis – Side of upper border of cricoid cartilage.
External or posterior angle of base of arytænoid cartilage. – S. by
rent laryngeal nerve.
Rotates the arytænoid cartilages so as to bring together their anterior or i
angles & the true vocal cords which are attached to them, and thus constricts the

Crico-Arytænoideus Posticus – Broad depression on side of posterior surf
cricoid cartilage.
External or posterior angle of base of arytænoid cartilage. – S. by
rent laryngeal nerve.
Rotates the arytænoid cartilages so as to separate their anterior or internal
& the true vocal cords which are attached to them, and thus dilates the glottis.

Arytænoideus – Posterior surface & outer border of both arytænoid cartilage
senting superficial oblique & deep transverse fibres. – S. by both the supe
the inferior or recurrent laryngeal nerves.
Brings together the two arytænoid cartilages, and thus constricts the glotti
cially in its posterior part. – Sometimes a small fasciculus, the *Kerato-cri*
(Merkel), extends, below the preceding, from the cricoid cartilage to the in
cornu of the thyroid cartilage.

MUSCLES of the EPIGLOTTIS — Are three in number.

Thyro-Epiglottideus or Depressor Epiglottidis – Inner surface of the t
cartilage externally to origin of thyro-arytænoid.
Margin of epiglottis & arytæno-epiglottidean fold.
Depresses the epiglottis, and assists in compressing the sacculus laryngis.

Arytæno-Epiglottideus Inferior or Compressor Sacculi Laryngis –
tænoid cartilage just above false vocal cord.
Margin of epiglottis.
Depresses the epiglottis, and assists in compressing the sacculus laryngis.

Arytæno-Epiglottideus Superior – Apex of arytænoid cartilage.
Arytæno-epiglottidean fold.
Constricts the superior aperture of the larynx during the second act of degluti
The oblique fibres of the arytænoideus are sometimes considered as belong
the arytæno-epiglottidei, which muscles would then decussate in the m
line behind the horizontal fibres of the arytænoideus, or arytænoideus p

THE LARYNX—4th Tablet.

MUCOUS MEMBRANE

Is stretched, on entering the larynx, between the arytænoid cartilages & the epiglotti forming the *arytæno-epiglottidean folds*. These contain the thyro- & the arytæno epiglottidean muscles, the cornicula laryngis & the cartilages of Wrisberg, and large amount of loose cellular tissue, the occasional infiltration of which tissu constitutes the so-called œdema of the glottis.

It is thin, and of a pale rosy colour. It is particularly thin & adherent over the epiglotti and still more so over the true vocal cords, where it is transparent enough for th ligamentous fibres to be seen through its substance.

Its epithelium is columnar ciliated below the superior vocal cords, and also, in front, a high as the middle of the epiglottis; above these points it loses its cilia, and gradu ally assumes the squamous form. It is squamous over the true vocal cords.

It is highly sensitive in the upper part of the larynx.

MUCOUS GLANDS — Simple tubular, and conglomerate; particularly abundant ove the posterior surface of the epiglottis, in which situation they are received into num erous small pits in the substance of the cartilage; but they are found everywhe beneath the mucous membrane, excepting over the true vocal cords. The glands the sacculus laryngis, from 60 to 70 in number, pour out their secretion upon the i ferior or true vocal cords which it is destined to lubricate. The so-called *arytæno glands* are collected into a somewhat large mass in the arytæno-epiglottidean fold in front of the arytænoid cartilages.

VESSELS & NERVES — ARTERIES. Are the laryngeal branches of the superior inferior thyroid. – VEINS. Open into the superior, middle & inferior thyroid. – LYM PHATICS. Terminate in the deep cervical glands. – NERVES. Are the superior and th inferior or recurrent laryngeal branches of the pneumogastric, and filaments fro the sympathetic. The superior laryngeal nerve supplies the mucous membrane, th crico-thyroid muscle, & in part the arytænoid; the inferior or recurrent laryngea nerve supplies in part the arytænoid, and all the other muscles, excepting the crico thyroid.

THE LARYNX—5th Tablet.

INTERIOR of the LARYNX.

Is divided in two by the glottis or rima glottidis.

GLOTTIS or RIMA GLOTTIDIS — Antero-posterior opening comprised tween the inferior or true vocal cords in its anterior three-fourths, and betw the arytænoid cartilages in its posterior fourth.

In tranquil breathing it is triangular with base backwards. It is loze shaped when fully dilated, as in violent inspirations. It is reduced to a nar slit when sound is emitted; the vocal cords then lying parallel to each ot and their degree of approximation & tension increasing with the height of sound produced.

In the adult male it is nearly an inch long, and may be dilated to ne half an inch. In the female, and in the male before puberty, its dimensions about one-third

Inferior or True Vocal Cords - Extend from near middle of receding a of thyroid cartilage below the false vocal cords to anterior or inte angle of the base of the arytænoid cartilages. They consist of a str band of yellow elastic fibrous tissue, the *inferior thyro-arytænoid liga* which band is continuous inferiorly with the lateral portion of the c thyroid membrane, is covered internally by a very thin & adherent l of mucous membrane, and is strengthened externally by the th arytænoid mu

PART ABOVE the GLOTTIS — Is broad & triangular, & presents for ex natio

Superior Aperture of the Larynx - Triangular, obliquely inclined downw & backwards, and bounded in front by the epiglottis, & laterally by arytæno-epiglottidean f

Superior or False Vocal Cords - Extend from near middle of receding ang thyroid cartilage above the true vocal cords to the anterior surface o arytænoid cartilages; they consist of a fold of mucous membrane taining a thin band of yellow elastic fibrous tissue, the *superior t arytænoid ligament*, from which a delicate expansion extends over sacculus laryngis. They bound superiorly the openings o

Ventricle of the Larynx - Deep oblong saccular depression comprised bet the superior & inferior vocal cords, and corresponding externally t thyro-arytænoid muscle. It is continued superiorly & in front by a row opening int

Sacculus Laryngis or Laryngeal Pouch - A prolongation of the foreg which passes upwards & forwards between the superior vocal c the thyroid cartilage, and is covered externally by the t epiglottideus & by the thin upper fasciculus of the thyro-aryta and internally by the arytæno-epiglottideus inferior or compr sacculi laryngis. The mucous lining of the pouch is supported expansion from the superior vocal cord, and presents the openin from 60 to 70 mucous glands, whose secretion lubricates the in vocal c

PART BELOW the GLOTTIS — Is flattened from side to side above, cir below, continuous inferiorly with canal of tra

THE NERVE CENTRES & THEIR COVERINGS.

COVERINGS of the BRAIN & CORD—1st Tablet.

The immediate coverings of both are three in number, and though presenting marked d
ences, they bear the same names, *dura mater*, *arachnoid* & *pia*

THE DURA MATER — Is a thick, dense, fibrous membrane, which is lined inte
by the parietal layer of the arac

Dura Mater of the Brain – Forms the internal periosteum of the skull; it is
longed round all the cranial nerves, blending with their sheaths and bec
at their point of exit continuous with the pericranium; it is also prolonged
the orbit.

Its outer surface is rough & fibrillated; it is most adherent opposite the sutu
the base of the skull, and presents superiorly numerous glandulæ Pacchionii.

Its inner surface is smooth; it sends three processes inwards, the *falx cereb*
the *tentorium* & *falx cerebelli*, in the attached margins of which processes ar
pectively contained the superior longitudinal, the lateral & superior petro
the occipital sinuses, the falx cerebri having also the inferior longitudinal
in its free margin.

Its arteries are derived from the middle & small meningeal, and from the menin
branches of the anterior & posterior ethmoidal, internal carotid, ascending ph
geal, occipital & vertebral, which arteries however supply principally the
of the skull. Its veins, with the exception of the two which accompany the m
meningeal, join with the diploic veins and open into the sinuses. – Its nerv
small branches from the fourth cranial nerve, the Casserian ganglion, the op
mic branch of the fifth, the eighth, & the sympathetic.

Dura Mater of the Cord – Differs from that of the brain in that it does not for
internal periosteum of the bodies & laminæ of the vertebræ, which periosteu
distinct fibrous membrane separated from the dura mater by loose areolar
& by a plexus of veins, in that it sends no prolongations inwards, contai
sinuses, and forms, especially in the cervical & lumbar regions, but a loose s
round the cord and the roots of the spinal nerves.

It is attached *superiorly* to the circumference of the foramen magnum, and *ant*
it is slightly adherent along its whole length to the posterior common liga
of the spine.

Laterally when viewed from *within*, it is seen to give attachment to the proces
the ligamentum denticulatum, and to present a double series of foramina fo
passage of the anterior & posterior roots of the nerves; when viewed from *w*
it is seen to form a separate sheath to the roots of the nerves as far as their
of junction, and then to be continued upon the nerves, forming part of
neurilemma.

Opposite the *termination of the cord* it blends with the pia mater to form the liga
tum centrale, which passes down to the back of the coccyx, and which, in its u
part, contains the filiform prolongation of the grey matter of the cord termed
filum terminale.

COVERINGS of the BRAIN & CORD—2nd Tablet.

THE ARACHNOID

Is a serous membrane of which the parietal layer lines the dura mater with a layer of squamou epithelial cells, while the visceral layer surrounds the brain & cord, from which it is sepa rated by the subarachnoidean space.

Visceral Layer of the Arachnoid of the Brain — On the upper surface of th hemispheres it is thin & transparent, and passes over the convolutions withou dipping into the sulci. – At the base of the brain it is thicker and slightly opaque Crossing from side to side between the two temporo-sphenoidal lobes and between th two hemispheres of the cerebellum & the medulla oblongata, it bounds inferiorly th *anterior & posterior subarachnoidean spaces.*

It is reflected round the cranial nerves in the shape of loose sheaths as far as their poin of exit from the skull, where it becomes continuous with the parietal layer.

Visceral layer of the Arachnoid of the Cord — Forms, especially in the lower part but a loose sheath round the cord & the roots of the nerves.

This sheath is single round the two roots of each spinal nerve, and is continued as far a their exit from the dura mater; the arachnoid is also reflected over the processes o the ligamentum denticulatum.

THE SUBARACHNOIDEAN SPACE

Is comprised between the pia mater & the visceral layer of the arachnoid, and contain the cerebro-spinal fluid. It usually communicates with the general ventricular cavity of the brain by an opening in the layer of pia mater which bounds the fourth ventricl inferiorly.

It is narrow on the surface of the hemispheres, but is greatly expanded both at the base of the brain in the situation of the anterior & posterior subarachnoidean spaces, and also round the spinal cord.

It is crossed by numerous fibrous bands in the situation of the base of the brain and a the upper part of the back of the cord, and is partly subdivided by an incomplet membranous septum which connects the arachnoid with the pia mater opposite th posterior median fissure.

COVERINGS of the BRAIN & CORD—3rd Tablet.

THE PIA MATER

On the cerebrum & cerebellum the pia mater is a delicate areolar membrane, very t
vascular. It is thick, dense, and but slightly vascular, on the pons, the crura cerebri
cord.

It is everywhere intimately adherent to the nervous substance; it dips down betwe
convolutions of the cerebrum and the laminæ of the cerebellum, and passes into the
rior and posterior median fissures of the cord; it is prolonged upon the nerves and
roots.

The pia mater of the brain penetrates into the ventricular cavities through the tran
fissure, and forms the velum interpositum and the choroid plexuses. – It usually pr
an opening at the lower extremity of the fourth ventricle, by which opening the sub
noidean space of the brain & cord communicates with the ventricular cavities of the

The pia mater of the cord presents anteriorly the linea splendens, a whitish longitudinal
band, and laterally, the ligamentum denticulatum. This latter descends along the
length of the side of the cord between the anterior & the posterior roots of the nerve
outer edge is denticulated; the denticulations, about twenty-two in number, cro
subarachnoidean space with the arachnoid reflected over them, and become attac
the dura mater in the intervals of the successive pairs of spinal nerves. The first de
lation is situated opposite the foramen magnum, between the vertebral artery & the
glossal nerve. — Opposite the termination of the cord the pia mater blends with the
mater to form the ligamentum centrale, which latter passes down to the back of the c
and, in its upper part, contains the filiform prolongation of the grey matter of the
termed the filum terminale.

THE SURFACE of the CEREBRUM.

The cerebral hemispheres are now described as presenting five lobes: the frontal, parietal, occipita & temporo-sphenoidal lobes, and the central lobe or Island of Reil. These lobes are seen mos extensively on the upper or convex surface of the hemisphere

UPPER OR CONVEX SURFACE OF THE CEREBRUM: — Presents:

FOUR PRINCIPAL FISSURES — Which partly separate the five lobes:

ASCENDING & HORIZONTAL LIMBS OF THE FISSURE OF SYLVIUS – The former ascends in front of the central lobe and amongst the fronta convolutions. – The latter passes backwards behind the central lobe, an separates the temporo-sphenoidal lobe from the frontal & parietal lobes

FISSURE OF ROLANDO — Begins near the middle of the longitudinal fissur and passes downwards & forwards to near the horizontal limb of th fissure of Sylvius, separating the frontal & parietal lobes.

EXTERNAL PARIETO-OCCIPITAL FISSURE — Separates the parietal an occipital lobes above. – Is very variable in extent, and is sometime scarcely recognisable except by its being continuous with the interna parieto-occipital fissure, or perpendicular fissure of the inner surface the hemisphere

OUTER SURFACE OF THE FIVE LOBES:

Frontal Lobe – Presents:

ASCENDING FRONTAL CONVOLUTION – Forms the anterior boundary of the fissure o Rolando, and is continuous round the lower end of that fissure with th ascending parietal convolution. It is joined in front to the

SUPERIOR, MIDDLE & INFERIOR TRANSVERSE FRONTAL CONVOLUTIONS, – Which pas forwards one above the other to the anterior extremity of the hemisphere

Parietal Lobe – Presents:

ASCENDING PARIETAL CONVOLUTION – Forms the posterior boundary of the fissur Rolando, and is continuous below round the lower end of that fissure, wit the ascending frontal convolution. – Behind this convolution are thre complex and variable convolutions termed the parietal lobule, the supra marginal convolution & the angular gyrus.

PARIETAL LOBULE – Is situated on the side of the longitudinal fissure betwee the parieto-occipital fissure, & the fissure of Rolando, and, is contin uous in front with the upper part of the ascending parietal convolution and joined behind to the superior occipital by the first annectant con volution.

SUPRA-MARGINAL CONVOLUTION – Is situated below and in front of the preceding and in front of the angular gyrus. It is separated from the ascendin parietal convolution by the intra-parietal fissure, and is connected behin with the angular gyrus.

ANGULAR GYRUS – Is situated behind the preceding, below and behind the par ietal lobule. It blends below with the superior & middle temporo-sphe noidal convolutions, and is connected behind with the middle occipita by the second annectant convolution

Temporo-Sphenoidal Lobe – Presents three well marked antero-posterior con volutions, which are superposed to each other.

SUP. TEMPORO-SPHENOIDAL CONVOLUTION – Lies between the horizontal limb the fissure of Sylvius and the parallel fissure, and is continuous behin with the angular gyrus.

MIDDLE TEMPORO-SPHENOIDAL CONVOLUTION – Is separated from the lower one b the inferior temporo-sphenoidal fissure, and is continuous posteriorl with the angular gyrus and connected by the third annectant with th middle occipital convolution.

INF. TEMPORO-SPHENOIDAL CONVOLUTION – Is partly seen on the under surface the cerebrum, and is connected behind to the third occipital by the fourt annectant convolution.

Occipital Lobe – Presents three rather badly defined convolutions, which ar superposed to each other, and are more or less antero-posterior.

SUP. OCCIPITAL CONVOLUTION – Is connected to the parietal lobule by the fir annectant convolution.

MIDDLE OCCIPITAL CONVOLUTION – Is connected to the angular gyrus & to th middle temporo-sphenoidal convolution by the second and third annec tant convolutions.

INF. OCCIPITAL CONVOLUTION – Is connected to the inferior temporo-sphenoid convolution by the fourth annectant convolution.

Central Lobe or Island of Reil – Is deeply situated between the frontal temporo-sphenoidal lobes at the bottom of the outer part of the fissure Sylvius. It presents five or six convolutions, which are nearly straigh and mainly directed upwards and outwards, and of which the posteri ones are the largest.

UNDER SURFACE of the CEREBRUM

Presents from before backwards

IN THE MEDIAN LINE:

Anterior part of the Longitudinal Fissure – Bounded behind by the ant
extremity or genu of the corpus callo

Anterior Extremity or Genu of the Corpus Callosum – Curves d
wards and backwards. Its narrowing reflected portion, beak or rost
is connected with the lamina cinerea, and gives off two white bundles
peduncles, which cross the anterior perforated space to the entran
the fissure of Syl

Lamina Cinerea – A thin layer of grey substance stretching, above the optic
missure, with which it is connected, from the rostrum of the co
callosum to the tuber cinereum, and continuous laterally with the
matter of the anterior perforated sp

Optic Commissure or Chiasma with the **Optic Tracts** – Vide Optic N

Interpeduncular Space – Lozenge-shaped, comprised between the crura ce
and the optic tracts, and containing from before backwa

TUBER CINEREUM with the INFUNDIBULUM & PITUITARY BODY – The form
which is a conical eminence of the grey matter of the floor of the
ventricle connected by a hollow infundibuliform process, the infu
bulum, with the latter, which latter is a small reddish grey vas
mass divided into an anterior & a posterior lobe, and the natu
which, especially in its anterior lobe, is very similar according t
Sharpey, to that of the ductless or vascular glands. It is proporti
tely larger in the fœtus, and is then hollow, its cavity being contin
with that of the 3rd vent

CORPORA ALBICANTIA – Two small round white bodies formed by the twis
upon themselves of the anterior crura of the fornix before they
up to the optic thal

POSTERIOR PERFORATED SPACE – Formed by a layer of grey substance, w
constitutes the posterior part of the floor of the 3rd ventricle a
continuous around the corpora albicantia with the base of the t
cinereum. It is perforated by numerous small foramina for
passage of blood vessels to the optic thal

Crura Cerebri – Vide Mesocephalon.

LATERALLY:

Under Surface of the Frontal Lobe – Presenting internally the lower e
the marginal convolution, on the outer side of which is the olfac
sulcus containing the olfactory nerve and

Anterior Perforated Space – Formed by a layer of grey substance corres
ding to the under surface of the corpus striatum, and perforated
numerous small foramina for the passage of vessels to that body.
bounded in front by the posterior and inner part of the frontal lobe
the roots of the olfactory nerve, and behind & to the inner side by
optic tract & commissure, and is continued externally into

Fissure of Sylvius – Which separates the frontal and temporo-sphenoidal l
and divides on the outer surface of the cerebrum into two branche
limbs, which enclose the middle lobe or Island of

Under Surface of the Temporo-sphenoidal Lobe.

Behind these parts appear when the medulla oblongata & cerebellum
removed, in the median l

Middle part of the Transverse Fissure – Comprised between
corpora quadrigemina and

Posterior Extremity or Splenium of the Corpus Callosu
Behind which is

Posterior Part of the Longitudinal Fissure – And laterally the

Under Surface of the Occipital lobe.

INNER SURFACE of the CEREBRUM

Presents for examination:

Marginal Convolution & Convolution of the Corpus Callosum separated from each other by t
Calloso-marginal Fissure;
Quadrate & Occipital Lobules separated from each other by the
Internal Parieto-occipital Fissure, and separated by the
Calcarine Fissure from the internal temporo-sphenoidal convolutions;
Internal Temporo-sphenoidal Convolutions, three in number, superior (dentate convolution
middle (gyrus uncinatus) & inferior, and separated from the foregoing by t
above-mentioned calcarine fissure and from each other by t
Dentate & Collateral Fissures.

Marginal Convolution – Forms the lateral boundary of the anterior half of the longitudin
fissure. Beginning at the anterior perforated space, it first passes forwards on t
inner side of the olfactory sulcus as far as the apex of the frontal lobe, and the
curves upwards & backwards along the upper margin of the hemisphere to a litt
behind the fissure of Roland

Convolution of the Corpus Callosum or Gyrus Fornicatus – Begins anteriorly wi
the foregoing, and then winds backwards along the convex surface of the corp
callosum from which it is separated by the so-called ventricle. Posteriorly
joins above with the quadrate lobule, and then, becoming slightly constricted,
reflected downwards & forwards round the splenium and continued into the gyr
uncinatu

Calloso-Marginal Fissure – Separates the two foregoing convolutions along the
whole length, and then ascends to the upper margin of the hemisphere separatin
the marginal convolution from the quadrate lobul

Quadrate Lobule – Quadrilateral. Bounded above, in front, & behind respectively by t
margin of the hemisphere, and by the calloso-marginal & internal parieto-occipit
fissures. Blends inferiorly with the gyrus fornicatu

Occipital Lobule – Triangular. Bounded behind, in front, & below respectively by the inn
margin of the hemisphere and by the internal parieto-occipital & calcarine fissure

Internal Parieto-Occipital Fissure – Separates the two foregoing lobules. It
continuous superiorly with the external parieto-occipital fissure; inferiorly
joins with the calcarine fissur

Calcarine Fissure – Extends horizontally forwards from the apex of the occipital lo
to the point of junction of the gyrus fornicatus with the gyrus uncinatus.
separates the occipital lobule from the middle temporo-sphenoidal convolution, an
joins anteriorly with the internal parieto-occipital fissur

Superior Temporo-Sphenoidal or Dentate Convolution – Is but a narrow band
grey matter which lies internally to the fascia dentata. It blends anteriorly wit
the uncu

Dentate Fissure – Corresponds to the hippocampus major, and separates the dentat
convolution from the gyrus uncinatu

Middle Temporo-Sphenoidal Convolution or Gyrus Uncinatus – Comprise
between the calcarine & collateral fissures, and extends along nearly the whol
length of the temporo-sphenoidal lobe. It is slightly constricted towards its middl
& enlarged in front & behind; anteriorly it presents a small hooked prolongatio
the uncus, which curves upwards & backwards, and joins with the dentate convolu
tion & with the corpus fimbriatum

Collateral Fissure – Extends along nearly the whole length of the temporo-sphenoids
lobe, separating the gyrus uncinatus from the inferior temporo-sphenoidal convolu
tion. It corresponds towards its middle to the eminentia collaterali

Inferior Temporo-Sphenoidal Convolution – Appears both on the inner & under surface
of the hemispheres, and is joined behind by the fourth annectant to the inferio
occipital convolution

INTERNAL STRUCTURE of the HEMISPHERES.

PARTS SEEN BEFORE OPENING THE VENTRICLES:

Centrum Ovale Minus - With the puncta vasculosa & the convoluted marg
the divided grey m

Ventricle of the Corpus Callosum - Comprised between the corpus callos
the gyrus forni

Centrum Ovale Majus - Into which the fibres of the corpus callosum are cont
on either

Corpus Callosum - Thick stratum of transverse & radiating white fibres whic
nect the two hemispheres; arched from before backwards, thick
broadest behind, thinnest towards centre. It pre

UPPER SURFACE - Convex from before backwards, striated transversely, ma
by a median depressed raphé which is bounded by two slightly ele
bands termed the *nerves of Lancisi.* More externally, beneath the
fornicatus, are other similar bands, the *striæ longitudinales lat*

UNDER SURFACE - Blended behind with the fornix. In front, where it form
roof of the lateral ventricles, it is connected with the fornix by the se

ANTERIOR EXTREMITY OR GENU - Curves downwards & backwards, presenti
narrowing reflected portion, the *beak or rostrum.* This latter is conn
with the lamina cinerea, and gives off two small white bands or *pedu*
which cross the anterior perforated space to the entrance of the fissu
Sy

POSTERIOR EXTREMITY OR SPLENIUM - Thick & rounded. Forms upper boun
of middle portion of transverse fissure, and is joined in front with the f

THE LATERAL VENTRICLES

Consist of a central cavity or body, and three prolongations or cornua.

Central Cavity or Body – Presents:

ROOF – Formed by under surface of corpus callosum.

INNER WALL – Formed by septum lucidum.

FLOOR – Formed from before backwards by the *corpus striatum, tænia semicircularis, thalamus opticus, choroid plexus, corpus fimbriatum & fornix.*

Ant. Cornu – Passes downwards & outwards round anterior extremity of corpus striatum.

Post. Cornu or Digital Cavity – Curves backwards, downwards, outwards, and then backwards, downwards & inwards in substance of occipital lobe. On inner part of its floor is the hippocampus minor, a longitudinal eminence which corresponds to calcarine fissure of Huxley.

Middle or Descending Cornu – Curves backwards, outwards & downwards round optic thalamus, and then forwards & inwards to near anterior extremity of temporo-sphenoidal lobe. Its floor presents the *hippocampus major, pes hippocampi, pes accessorius, corpus fimbriatum, choroid plexus, fascia dentata & transverse fissure.*

PARTS SEEN on FLOOR of LATERAL VENTRICLE

Are from before backwards

CORPUS STRIATUM — Large pear-shaped mass of grey matter embedded externally in substance of frontal lobe. Pre

ANT. EXTREMITY – Broad; projects into anterior part of body of lateral ventricle, formin of its floor, and into anterior cornu of the same

POST. EXTREMITY – Narrow; passes backwards and outwards on outer side of optic thala

The corpus striatum is divided into two portions, the intra- & extra-ventri by a layer or stratum of ascending & diverging white fibres which form the or the *corona radiata of Reil.* Part of these fibres are derived from the inferior c ciculated portion, and also from the upper part or tegmentum, of the crus ce part of them originate in the corpus str

TŒNIA SEMICIRCULARIS — Whitish semi-transparent band of fibres, which descen teriorly in connection with anterior crus of fornix, and is lost posteriorly in desce cornu of lateral ventricle; it partly conceals the vena corporis s

OPTIC THALAMUS — Large ovoid mass of grey matter white superficially, similar to striatum, behind & internally to which it is situated, and similarly traversed by nur ascending & diverging white fibres, which are partly derived from upper portion o cerebri, olivary fasciculus, fasciculus teres, processus e cerebello ad testes & corpora q gemina, and which partly originate in the thalamus. Pre

ANT. EXTREMITY – Narrow, situated behind anterior crus of fornix; forms posterior bound foramen of

POST. EXTREMITY – Broad & rounded. Projects into descending cornu of lateral ventricl is continuous on inner side with tubercula quadrige

UPPER SURFACE – Anteriorly it forms part of floor of lateral ventricle, and presents a elevation, the anterior tubercle; posteriorly it is covered by fornix, which rests u

UNDER SURFACE – Continuous with posterior rounded extremity. In its posterior part it roof of descending cornu of lateral ventricle, and presents two small eminence *corpora geniculata internum et externum*, which are connected respectively with in outer bands of origin of optic tract. In its anterior part it rests upon the crus c and is penetrated by the radiating fibres above ment

INNER SURFACE – Forms lateral boundary of 3rd ventricle. Is joined to its fellow by the n soft, or grey commissure, and presents inferiorly the grey matter of the interior thalamus uncovered by the white. The superior peduncle of the pineal gland rates this surface from the

OUTER SURFACE – Continuous anteriorly with posterior narrow extremity of corpus str and embedded posteriorly in white substance of temporo-sphenoida

CHOROID PLEXUS — The thick, convoluted & fringe-like margin of the velum interposi Vide Velum interpo

CORPUS FIMBRIATUM or TÆNIA HIPPOCAMPI — The thin lateral margin posterior crus of the

FORNIX — Triangular longitudinal lamella of white matter broad behind, narrow in front, si below corpus callosum with which it is joined behind, and to which it is connected in by septum lucidum; forms roof of third & posterior part of floor of both lateral vent Pre

BODY – Presents:

Upper Surface – Joined behind with corpus callosum, and connected in front to the by septum lucidum; forms posterior part of floor of both lateral vent

Under Surface – Marked posteriorly by a few transverse & anteriorly converging which form the *lyra*. Forms centrally the roof of 3rd ventricle; rests laterally optic thalami. Is covered by velum interpo

ANTERIOR CRURA – Descend behind anterior white commissure & in front of optic thal forming anterior boundary of foramen of Monro, and perforate grey substa floor of 3rd ventricle to corpora albicantia, in which they twist upon themselves then ascend to corresponding optic thal

POSTERIOR CRURA – Diverge into the descending cornua of lateral ventricles, becoming conti with inner border of hippocampus major. Their thin lateral margin is the *corp briatum* or *tænia hipp*

PARTS SEEN in DESCENDING CORNU of LATERAL VENTRICLE.

HIPPOCAMPUS MAJOR or CORNU AMMONIS – Is a white eminence which curves downwards, forwards, & inwards along floor of descending cornu of lateral ventricle, and which corresponds to the dentate fissure & to the reflected portion of the convolution of the corpus callosum or gyrus fornicatus, which portion has been described of late years as the anterior part of the *gyrus uncinatus*. It enlarges anteriorly and ends in the

PES HIPPOCAMPI – The anterior rounded extremity of the hippocampus major; it more or less resembles the paw of an animal, being marked along its margin by slight notches or depressions separating rounded intervening elevations

PES ACCESSORIUS or EMINENTIA COLLATERALIS – A small rounded eminence, simlar to the preceding, situated between the two hippocampi at junction of middle & posterior cornua. It corresponds to the collateral fissure

CORPUS FIMBRIATUM or TÆNIA HIPPOCAMPI – The prolongation of the thin lateral margin of the posterior crus of the fornix; is continuous with inner border of hippocampus major

CHOROID PLEXUS – Vide next Tablet.

FASCIA DENTATA – The grey serrated border of the dentate convolution, which is separated from the gyrus uncinatus by the dentate fissure of Huxley. It lies beneath the corpus fimbriatum & the margin of the choroid plexus

TRANSVERSE FISSURE – Vide next Tablet.

TRANSVERSE FISSURE of the BRAIN & INTR CEREBRAL PORTION of PIA MATE

TRANSVERSE FISSURE OF THE BRAIN

Is of a horse-shoe shape, and about 3 inches wide.

Its central part is horizontal and comprised between the tubercula quadrigemi the posterior extremity or splenium of the corpus calle

Its lateral portions curve downwards & forwards, and are comprised betwee optic thalami & crura cerebri below & in front and the hippocampi majo corpora fimbriata above & be

This fissure transmits the pia mater into the interior of the brain.

INTRA-CEREBRAL PORTION OF THE PIA MATER

Forms on the one hand the velum interpositum & the choroid plexuses of the la & the 3rd ventricles, and, on the other, the choroid plexuses of the 4th vent

Velum Interpositum – Is a triangular fold of pia mater which is reflected int interior of the brain through the transverse fissure. It pres

CENTRAL PORTION – Invests pineal gland, and covers under surface of fornix. the under surface of this central portion two small vascular fringe choroid plexuses of the 3rd ventricle, hang down into the latter c

LATERAL MARGINS – Spread out on either side beneath the corresponding mar the fornix & its continuation, the corpus fimbriatum, into the body & cending cornu of the corresponding lateral ventricle, resting, as d margins of the fornix, upon the optic thalami. These lateral margin thick, convoluted & fringe-like; they constitute the choroid plexuses o lateral ventricles further described b

POSTERIOR MARGIN OR BASE – Is turned backwards towards the transverse fi It is continuous with the general pia mater; it receives the anteri posterior choroid arteries and emits the venæ G

ANTERIOR BIFID EXTREMITY – Continuous through the foramina of Monro wit anterior pointed extremities of the lateral margins above describ choroid plexuses of the lateral vent

Choroid Plexuses of the Lateral Ventricles – Are nothing more than the convoluted & fringe-like margins of the velum interpositum. When th described separately, that is to say irrespectively of the velum interpo of which they are a portion, they may be said to penetrate into the des ing cornua of the lateral ventricle through the lateral portions o transverse fissure. Hence they ascend into the body of the lateral v cle along the side of the corpus fimbriatum, winding round the pos extremity of the optic thalamus. Then continuing along the side fornix, they taper to a point, and passing through the corresponding men of Monro, they join with each other and with the anterior bifur extremity of the central & thinner portion of the velum interpos

Choroid Plexuses of the 3rd Ventricle – Are two small vascular fringes hang down from the under surface of the central portion of the interpositum into the cavity of the 3rd ventricle; they diverge sl b

Choroid Plexuses of the 4th Ventricle – Are two similar fringes which p into the 4th ventricle from the layer of pia mater which closes that v cle inferiorly; they pass upwards & outwards from near the point o inferior vermiform process to the outer margin of the restiform

THE THIRD VENTRICLE

Is a narrow median fissure comprised between the optic thalami, and extending to th
base of the brain. It present

Roof – Formed by under surface of fornix and by velum interpositum.

Floor – Corresponds to interpeduncular space on under surface of cerebrum, and is form
from before backwards by the lamina cinerea, tuber cinereum & infundibulu
corpora albicantia and locus perforatus posticus. It is oblique downwards
forwards, and is covered by a thick layer of grey matter. It presents in the fœt
the opening of the iter ad infundibulu

Lateral Walls – Formed by inner surface of optic thalami, which surface is bounded above
superior peduncles of pineal gland, and is covered below by part of the gr
matter of the third ventricle prolonged upwards from its floor. – The lateral wa
are joined together by the middle or soft commissure, a transverse band of gr
matter continuous with the remainder of the grey matter of the 3rd ventricle.

Ant. Extremity – Formed by anterior crura of fornix. In front of these is the anteri
commissure, a transverse band of white fibres, which perforates laterally t
corpora striata & spreads out into the substance of both hemispheres. – Betwe
the crura & the optic thalami are the foramina of Monro, through which t
lateral & 3rd ventricles communicate, and the anterior extremities of the velu
interpositum pass from the 3rd into the lateral ventricles to form the choro
plexuses of the latte

Post. Extremity – Formed by posterior commissure, a transverse band of white fibres co
necting posteriorly the optic thalami. Below this is the opening of the iter
tertio ad quartum ventriculum, and above are the tubercula quadrigemina & t
pineal glan

For parts above mentioned see foregoing Tablets.

THE CEREBELLUM.

Oblong from side to side & flattened from above downwards. Presents two surfaces & cumference, and consists of two lateral hemispheres connected by a median lob vermiform process, which latter is divided into two parts, the superior & the in

UPPER SURFACE — Flattened on either side, slightly elevated in the centre. Pre

Superior Vermiform Process – Presents from before backwards three elevatio

LOBULUS CENTRALIS, MONTICULUS CEREBELLI, & COMMISSURA SIMPLEX, which joins with the commissura brevis of the inferior vermiform pr

Lateral Hemispheres – Divided by a deep fissure into

ANTERIOR OR SQUARE LOBE, the anterior, inner & broader portion, and the

POSTERIOR OR SEMILUNAR LOBE, the narrow, posterior or marginal portion.

UNDER SURFACE — Rounded & elevated laterally and depressed in the centre. Pre

Inferior Vermiform Process – Lies in a deep depression, the *valley* or *vallecul* prised between the two hemispheres, and presents from behind forwar

COMMISSURA BREVIS, PYRAMID & UVULA, the former of which joins with the missura simplex of the superior vermiform pr

The uvula is situated between the two *tonsils*, with which it is conn by a grey commissure the *furrowed band*. Its rounded apex, the *nod laminated tubercle of Malacarne* projects into the 4th ventricle, and i nected with the flocculi by a thin valvular fold of white substanc *posterior medullary velum* or *commissura ad flocculum*, which fold is covered in & concealed by the t

Lateral Hemispheres – Present five lobes:

FLOCCULUS, SUB-PEDUNCULAR LOBE, OR PNEUMOGASTRIC LOBULE – Prominen subdivided into several small laminæ and situated below & behin middle peduncle of the cerebellum, behind the roots of the pneumog

AMYGDALA OR TONSIL – Rather larger than foregoing and similarly subdi projects into the valley on either side of the uvula, to which it is conn by the furrowed

DIGASTRIC LOBE – Corresponds in situation to the anterior part of the squar of the upper su

SLENDER LOBE – Corresponds in situation to the posterior part of the fore squar

POSTERIOR INFERIOR LOBE – Corresponds in situation to the posterior or s na

CIRCUMFERENCE — Deeply notched in front & behind by the

INCISURÆ CEREBELLI ANTERIOR & POSTERIOR, – Of which the former embrace tubercula quadrigemina & the superior peduncles, while the latter re the falx cerebelli; – also divided into upper & lower lips

GREAT HORIZONTAL FISSURE – Which extends uninterruptedly from one n peduncle to the

The other fissures are more or less parallel to the foregoing, and de more or less concentric curves concave forwards & inwards; some fi however are more or less oblique, and coalesce with the others so as extend over the whole breadth of the hemispheres. The largest fi separate the lobes above described, the smaller ones demarcate the la or folia, which latter cover the surface of the cerebellum and projec into the bottom of the larger fis

THE PEDUNCLES of the CEREBELLUM.

Superior, or Processus e Cerebello ad Testes – Arises in the laminæ of the inferior vermiform process and also in the interior of the corpus dentatum passes upwards & inwards on either side of the middle line, being joined to its fellow by the valve of Vieussens, and ascends beneath the tubercula quadrigemina to the crura cerebri & optic thalami, partly decussating in the middle line

Middle, Processus e Cerebello ad Pontem or Crus Cerebelli – The great transverse commissure of the cerebellum. Connects the laminæ of the lateral parts of one hemisphere to the corresponding laminæ of the opposite side, and forms the pons Varolii & the deep transverse fibres of the mesocephalon

Inferior, or Processus e Cerebello ad Medullam – If traced from below upwards, it may be said to proceed from all three columns of the cord, *i.e.* from the postero-external bundles of the anterior & middle columns, & from the fasciculus cuneatus or external bundle of the posterior column the latter bundle being much the largest of the three. It ends in the laminæ of the middle part of the cerebellum, especially in those of the upper surface.

THE MEDULLA OBLONGATA.

The upper enlarged part of spinal cord.

Extends from lower border of Pons Varolii, above, to point of decussation of anterior pyr below, which point corresponds pretty nearly to upper border of atlas.

Flattened from above downwards and forwards, and presents:

ANTERO-INFERIOR ASPECT – Rests upon basilar groove.

POSTERO-SUPERIOR ASPECT – Forms part superiorly of floor of 4th ventricle, and i tinuous inferiorly with posterior surface of cord.

Divided, as is the cord, into two lateral halves, by

ANTERO-MEDIAN FISSURE – Continuous below with that of cord, being partly interr however, by decussation of anterior pyramids. Terminates above, just belo pons, in a small recess, the foramen cœcum.

POSTERO-MEDIAN FISSURE – Continued above into ventricle of Arantius & po median fissure on floor of 4th ventricle, and below into postero-median f of cord.

SURFACE OF THE MEDULLA OBLONGATA.

Each half presents from before backwards between the two median fissures:

Anterior Pyramid – Pyramidal-shaped bundle of white fibres, the apparent longation of anterior column of cord; narrow below, enlarged and round above, constricted just below the pons. Gives origin in its upper part cranial nerve.

Olivary Body – Oval prominent mass broader above than below, shorter than about as broad as, the pyramid. – It is separated from the pyramid by a n groove, which gives origin to 9th or hypo-glossal nerve, and from the lowe of which numerous arciform fibres are seen to proceed. These wind up and outwards round lower end of olivary body, sometimes crossing its su A few arciform fibres emerge from the anterior median fissure, and cross an aspect of pyramid (Sappey, Hirschfeld).

Lateral Tract – Is continuous with lateral column of cord. It is broad below, it includes all that part of the medulla comprised between anterior py and restiform body; above it is pushed backwards, and is narrowed, by th jection of the olivary body. It is separated from restiform body by a groove situated in a line with posterior lateral fissure of cord, and gives from above downwards to the facial, glosso-pharyngeal, pneumogastric & accessory nerves.

Restiform Body or Fasciculus Cuneatus – Is the outer & larger, while the

Posterior Pyramid or Fasciculus Gracilis – Is the inner & smaller portion wide & thick bundle of white fibres continuous below with posterior c of cord, which bundle diverges from its fellow superiorly, and thus exposes grey matter of floor of 4th ventricle and forms lower part of l boundary of that cavity. This wide & thick bundle used to be called, still sometimes called *the* restiform body. – From its inner edge there pr inwards a thin lamina of white matter termed the *ligula*, which may be consi as forming part of roof of 4th ventricle. Opposite apex of calamus scrip the posterior pyramid presents an enlargement, the *processus clavatus*. In fr the processus cuneatus, behind & a little below olivary body & in a line postero-lateral fissure of cord, is a small greyish eminence, the *grey tube Rolando*, which is formed by the projection of the substantia gelatinosa.

Grey Matter of Floor of 4th Ventricle – Vide 4th Ventricle.

THE FOURTH VENTRICLE.

Rhomboidal cavity bounded by the medulla oblongata & mesocephalon below & in front and the cerebellum above & behind, and closed in inferiorly by the layer of pia matter extending between these parts. Presents:

FLOOR — Lozenge-shaped, oblique downwards & backwards, covered by a stratum of grey matter from which arise the 6th, 7th, 8th, & 9th nerves* (Vide structure of medulla oblongata, 2nd Tablet); bounded on either side below by the posterior pyramids & restiform bodies, and above by the processus e cerebello ad testes. Presents the following parts, which give rise to the appearance termed the *calamus scriptorius*

POSTERO-MEDIAN FISSURE – Continued above into the aqueduct of Sylvius or iter a tertio ad quartum ventriculum, below into the ventricle of Arantius or short upper expanded part of the central canal and into the postero-median fissure of the cord.

LINEÆ TRANSVERSÆ – A few white fibres very variable in number sometimes scarcely recognisable, which emerge from the lower part of the postero-median fissure, cross the eminentiæ teretes, and join, some of them the crus cerebelli, others the roots of the auditory nerve; a few sometimes ascend to the locus cœruleus.

EMINENTIÆ TERETES – Two spindle-shaped elevations, greyish & slightly marked below, whiter & more prominent above, due to the fasciculi teretes, as they ascend beneath the grey matter on either side of the postero-median fissure. – On either side of these eminences is a

GROOVE, or rather, in well marked bodies, TWO SMALL FOSSÆ, which lie, the posterior, inferior & narrowest one, near the lower extremity of the ventricle, and the anterior, superior & broadest one, opposite the crus cerebelli. The latter fossa leads upwards to the

LOCUS CŒRULEUS – A bluish spot due to an accumulation beneath the surface, of dark vesicular matter termed the *substantia ferruginea*. From this spot the

TINEA VIOLACEA, – A bluish streak, the continuation upwards of the locus cæruleus, ascends on the outer side of the eminentia teres to the opening of the aqueduct of Sylvius.

ROOF — Formed above by the superior peduncles of the cerebellum & the valve of Vieussens, below by the tonsils, the inferior vermiform process with the uvula, the nodule or laminated tubercle of Malacarne, & by the posterior medullary velum or commissura ad flocculum. Still lower down is the ligula.

LATERAL BOUNDARIES — Formed by the superior peduncles of the cerebellum above, and by the diverging restiform bodies & posterior pyramids below.

UPPER EXTREMITY — Presents the opening of the aqueduct of Sylvius or iter a tertio ad quartum ventriculum.

LOWER EXTREMITY — Usually presents an opening in the layer of pia mater which bounds the ventricle inferiorly, through which opening the ventricular cavities of the brain communicate with the subarachdoidean space of the brain & cord.

Choroid Plexuses of 4th Ventricle - Vide intra-cerebral portion of the pia mater.

THE MESOCEPHALON

Is the connecting link between the cerebrum, cerebellum & medulla oblongata. It consists
following pa
Pons Varolii or *Tuber Annulare* with the superficial & deep transverse fibres of the
Peduncles of the Cereb
Crura Cerebri divided into *under or fasciculated portion* and *upper part or tegmentum;*
Inferior Peduncles of the Cerebellum, and *Superior Peduncles* with the *Valve of Vieussens;*
Tubercula Quadrigemina & Pineal Gland.

Pons Varolii or Tuber Annulare – Broad transverse band of white fibres which arch
bridge from one hemisphere of the cerebellum to the other, forming lateral
middle peduncles of the cerebellum. Prese

UNDER SURFACE – Marked by a median shallow groove for basilar artery. Gives off lat
the two roots, anterior small or motor, posterior large or sensory, of the 5th p
cranial n

UPPER BORDER – The most prominent & the most convex, from beneath which the
cerebri are seen to em

LOWER BORDER – Less prominent & less convex, into which the anterior pyramids, o
fasciculi & lateral tracts of the medulla are seen to penetrate, and from the an
aspect of which the 6th cranial nerves are sometimes given off. – Laterally the
Varolii is continued into th

Middle Peduncles of the Cerebellum or Crura Cerebelli – Which form its two l
po

Crura Cerebri – Two thick cylindrical or slightly flattened bundles of white fibres about ¾
inch long & rather wider in front than behind, which emerge from the an
border of the pons and pass forwards & outwards to the corpora striata &
thalami. They are crossed externally by the 4th nerve & inferiorly by the optic
the anterior border of which latter is slightly adherent to them. Their inner b
bounds posteriorly the interpeduncular space, and gives origin to the 3rd c
nerve. They are divided into an under or fasciculated portion & an upper porti
tegmentum, between which two portions is a small mass of grey matter, the *locus*

Inferior Peduncles of the Cerebellum or Processus e Cerebello ad Medulla
Two thick bundles of white fibres which descend from the inner & under part
cerebellum to the back of the medulla, where they join the processus cuneati.
form the lower part of the lateral boundary of the 4th ven

Superior Peduncles of the Cerebellum or Processus e Cerebello ad Testes
thick bundles of white fibres which ascend from the upper & inner part of the
bellum to the testes, forming part of the roof & of the lateral boundary of the 4th
tricle. They are connected together l

Valve of Vieussens – Thin transparent lamina of white matter narrow in front, where it pr
a slight median ridge, the frenulum, and, on either side of this, the roots of th
nerve, broader behind, where it is continued into the under surface of the su
vermiform process and is crossed by a few transverse bands of grey matter prol
upwards from the cerebellum. It forms the roof of the aqueduct of Sylvius &
of the roof of the 4th ven

Tubercula Quadrigemina – Four small rounded eminences separated by a crucial depre
and situated below the posterior extremity or splenium of the corpus callosum,
& behind the posterior commissure & the 3rd ventricle, above & in front of the
ior peduncles of the cerebellum & the valve of Vieu

ANTERIOR OR NATES – Are larger, darker, slightly oblong from before backwards, and conn
with the optic thalami & the commencement of the optic tracts by two broad
bands, the *brachia ant*

POSTERIOR OR TESTES – Are smaller, lighter in colour, more exactly rounded, and conn
with the optic thalami & the commencement of the optic tracts by two narrower l
the *brachia pos*

Pineal Gland or Conarium – Small conical reddish-grey body situated between the
retained in position by a fold of pia mater derived from the under surface of the
interpositum, and connected with the remainder of the cerebrum by means of
transverse fibres belonging to the posterior commissure, and also by means

PEDUNCLES – Two on each side:
Anterior or Superior – Run forwards over upper & inner part of optic thalami to an
crura of fornix, with which they
Posterior or Inferior – Descend vertically upon inner surface of optic thalami.
The pineal gland consists of grey matter with a few white fibres, and is
vascular. In its interior are one or two small cavities, which sometimes
municate with the 3rd ventricle, and which contain a transparent viscid fluid
small amount of sabulous matter termed the *acervulus*

THE SPINAL CORD

Extends from point of decussation of anterior pyramids (which point corresponds pretty nearl to the upper border of the atlas) to lower border of body of first lumbar vertebra, where terminates in a slender filament, the filum terminale, which descends for a short distanc into the ligamentum centrale.

Is from 15 to 18 inches long & slightly flattened from before backwards. Presents two enlarge ments, the cervical and the lumbar. The cervical, the larger, extends from the thir cervical to the first dorsal vertebra, and is widest from side to side; the lumbar, th smaller, is situated opposite the last dorsal vertebra, and is widest from before backward

Presents fissures and columns.

FISSURES:

ANTERO-MEDIAN – Wider than the posterior, and penetrates to about or third of the thickness of the cord, its depth increasing slightly infe iorly. It contains a well-marked prolongation of the pia mater, and bounded behind by the anterior or white commissure.

POSTERO-MEDIAN – Narrower than the anterior. It penetrates to th very centre of the cord, is most marked above and below, and contai but a very delicate process of pia mater. It is bounded in front by th posterior or grey commissure.

ANTERO-LATERAL (SO-CALLED) – Consist simply of a linear series of for mina corresponding to the points of emergence of the anterior roots the spinal nerves.

POSTERO-LATERAL – Correspond to the line of attachment of the posteri roots, and lead down to the grey matter.

POSTERO-INTERMEDIARY (Hirschfeldt, Sappey) – Two delicate longitudin furrows situated on either side of the postero-median fissure and mo marked in the cervical region.

COLUMNS – Are demarcated by the fissures, and are termed

ANTERIOR, LATERAL, POSTERIOR AND POSTERO-MEDIAN – The two form being usually joined under the name of antero-lateral, and the poster median being usually included in the posterior.

Gives off 31 pairs of nerves.

STRUCTURE of the SPINAL CORD—3rd Tablet.

Continuation Upwards of the White Fibres of the Columns in the Medulla Oblonga

Anterior Column – Is thrust aside in the medulla oblongata by those antero-inte fibres of the lateral column, which, after decussating in the middle line, form innermost & greater part of the anterior pyramid of the opposite side. It divides into three bundles as follo

INNERMOST BUNDLE – Joins externally the above mentioned antero-internal fibre the lateral tract, and forms the smaller & outermost part of the ant pyramid of the same

MIDDLE BUNDLE – Surrounds the olivary nucleus, above which it forms, with a fibres arising from this nucleus, the olivary fasciculus or f

EXTERNAL OR POSTERIOR BUNDLE – Passes upwards & backwards to join the proce cuneatus, and goes to form part of the inferior peduncle of the cerebel

Lateral Column – Divides into three bundles as follows:

ANTERO-INTERNAL BUNDLE – Passes forwards & inwards between the anterior colu thrusting these columns aside, and forms, after decussating in the mi line, the innermost & greater part of the anterior pyramid of the opposite

MIDDLE BUNDLE – Ascends with the fasciculus gracilis beneath the grey matte the floor of the 4th ventricle, forming part of the fasciculus te

EXTERNAL OR POSTERIOR BUNDLE – Passes upwards & backwards to join the fascic cuneatus, and goes to form part of the inferior peduncle of the cerebel

Posterior Column – Divides into two bundles as follows:

INTERNAL BUNDLE OR FASCICULUS GRACILIS – The smaller. Ascends beneath the matter of the floor of the 4th ventricle, and goes to form part of the f culus t

EXTERNAL BUNDLE OR FASCICULUS CUNEATUS – The larger. Diverges from its fello the apex of the calamus scriptorius, and passes upwards & outwards to the greater part of the inferior peduncle of the cerebel

N.—The reader is here reminded once for all that by the "continuation nerve-fibres referred to in this & other Tablets, the Author means, not continuation of the individual tubular fibres (respecting the absolute or & termination of which tubular fibres little is yet positively known), the continuation of the several *bundles* of nerve-fibres, which continua is marked by the general direction of the fibres.

STRUCTURE of the MEDULLA OBLONGATA—1st Tablet

Presents for examination longitudinal, antero-posterior & transverse fibres, and grey matter.

LONGITUDINAL FIBRES — Form five bundles continuous on the one hand with the columns o the cord, and on the other with the longitudinal fibres of the mesocephalon, *i.e.*, three larg ones, *anterior pyramid, lateral tract & fasciculus cuneatus*, and two smaller ones, *olivary fasciculu or fillet, & posterior pyramid or fasciculus gracili*.

Their mode of Continuation with the Columns of the Cord – Is as follows: –

ANTERIOR PYRAMID – With antero-internal bundle of lateral column of opposite side, and wit innermost bundle of anterior column of same side. The former bundle forms the innermos decussating & by far greater portion of the anterior pyramid; the latter bundle forms tha small outer portion of the ant. pyramid, the fibres of which do not decussate in the middle line

LATERAL TRACT – With lateral column of same side.

FASCICULUS CUNEATUS – With external & greater part of posterior column, and with external o posterior bundles of anterior & lateral columns all of same side

OLIVARY FASCICULUS OR FILLET – Partly with middle bundle of anterior column of same side; it other fibres are derived from the olivary nucleus

POSTERIOR PYRAMID OR FASCICULUS GRACILIS – With posterior column of same side.

Their mode of Continuation with the Longitudinal Fibres of the Meso-cephalon – Is as follows: –

ANTERIOR PYRAMID – Ascends through the mesocephalon to the inferior or fasciculated portion o the crus cerebri, from whence its fibres are prolonged to the corpora striata

N.—The cerebellar fibres & the fibres to the olivary body, which are said in some of ou best standard works on Anatomy to be derived from the anterior pyramid, are derived no from the anterior pyramid itself, that is to say not from the pyramidal-shaped bundle, which in the *surface description* of the cord, is called the "anterior pyramid," but from the middle & external bundles of the *anterior column of the cord*. (Vide continuation upwards of the white fibres of the columns of the cord into the medulla oblongata)

LATERAL TRACT – Divides into three bundles as follows (or rather it is the *lateral column of th cord* which thus divides, for the division here referred to takes place a little below the point of decussation of the pyramids, that is to say below the point which is usually taken as the boundary between the medulla & the cord): –

Antero-internal Bundle – Passes upwards & inwards, decussating with its fellow, and forms the innermost & greater part of the anterior pyramid of the opposite side

Middle Bundle – Ascends with the fasciculus gracilis beneath the grey matter of the floor of the 4th ventricle, forming part of the fasciculus teres

External or Posterior Bundle – Passes upwards & backwards to join the fasciculus cuneatus, and goes to form part of the inferior peduncle of the cerebellum

FASCICULUS CUNEATUS – Passes up to the cerebellum with the external or posterior bundles of the anterior & lateral columns of the cord, forming with them the inf. peduncle of the cerebellum

OLIVARY FASCICULUS OR FILLET – Divides into two bundles as follows: –

Antero-internal Bundle – Ascends through the mesocephalon with the middle bundle of fibres of the lateral tract, and joins the upper part or tegmentum of the crus cerebri.

Postero-external Bundle – Passes upwards & outwards through the mesocephalon, issues from the transverse fibres of the pons externally to the crus cerebri, and finally ascends over the superior peduncle of the cerebellum to the tubercula quadrigemina, decussating with its fellow above the aqueduct of Sylvius

POSTERIOR PYRAMID OR FASCICULUS GRACILIS – Ascends with the middle bundle of the lateral column beneath the grey matter of the floor of the 4th ventricle, forming part of the fasciculus teres

ANTERO-POSTERIOR FIBRES — Form a median septum most marked at the upper part of the medulla. They partly decussate with each other (Clarke). Some emerge from the antero-median fissure, or pass between the anterior pyramid & the olivary body and emerge below the roots of the 9th nerve; these two sets form the arciform fibres mentioned in the surface description of the medulla. Others emerge from the postero-median fissure, and form the lineæ transversæ of the floor of the 4th ventricle.

TRANSVERSE FIBRES — The arciform fibres form a superficial set. A deep set join the olivary nuclei & the nuclei contained in the posterior pyramids & processus cuneati.

GREY MATTER —

ARTERIES of the BASE of the BRAIN.

Are the anterior & middle cerebral branches of the internal carotid and the pos
cerebral of the basilar, which are joined together by the anterior & pos
communic

Anterior Cerebral – Anterior & smaller of the branches of bifurcation of internal c
opposite inner extremity of fissure of Sy
Forwards & inwards towards longitudinal fissure, being connected with each oth
ANTERIOR COMMUNICATING, – A small branch about two lines in length.
Round genu and along upper surface of corpus callosum, and join with posterior
bral. Give off small branches to anterior perforated space and to in
under surfaces of frontal

Middle Cerebral –The larger of the two terminal branches of internal carotid.
Forwards & outwards along fissure of Sylvius, giving twigs to anterior perfo
space, and divides into branches to pia mater of frontal, parietal & ten
sphenoidal lobes, and to central lobe or Island of Reil. – Sometimes
off anterior ch

Posterior Communicating – Very variable in size.
From back part of internal carotid just before its bifurcation.
Backwards parallel to its fellow, and inosculates with posterior cerebral.

Posterior Cerebral – Two; terminal branches of basilar.
Forwards and outwards for a short distance giving numerous branches to pos
perforated space, and join posterior communic
Backwards & outwards on crura cerebri in front of 3rd nerve, and, curving sl
inwards, divide into numerous branches to inner, under, & outer su
of occipital

CIRCLE OF WILLIS — Is formed in front, laterally & behind respectively by:
Anterior cerebral arteries joined by the *anterior communicating*,
Trunks of internal carotids & *posterior communicating*,
Posterior cerebral & *basilar*.
Within the circle of Willis are comprised from before backwards the l
cinerea, optic commissure, tuber cinereum with the infundibulum, c
albicantia & posterior perforated

APPENDIX.

CARPUS & TARSUS.

How to Distinguish Bones of the Carpus into Right & Left.

It is easy to recognise whether a bone of the carpus belongs to the right or to the left side when it is placed in position as follows:

Scaphoid – Largest articular facet above;
Rough transverse groove behind;
Tubercle on outer side.

Semilunar – Convex articular facet above;
Largest rough surface in front;
Semilunar articular facet on outer side.

Cuneiform – Convex surface partly articular & partly non-articular, above
Flat surface partly articular partly non-articular in front;
Small surface or angle on inner side.

Pisiform – Articular facet behind;
Non-articular part of same surface below,
Concave surface on inner side.

Trapezium – Saddle-shaped articular facet below;
Ridge in front;
Rough lateral surface on outer side.

Trapezoid – Saddle-shaped articular facet below;
Large rough surface behind;
Its projecting part on inner side.

Os Magnum – Head above;
Large rough surface behind;
Projecting part of the same (or tubercle of the base) on inne
side

Os Unciform – Unciform process below & in front;
Its concavity to outer side.

BONES of TARSUS—1st Row.

THE ASTRAGALUS

Supports the tibia, rests upon the os calcis, articulates on either side with the ma
& in front with scaphoid. Is irregularly cuboid, and presents six sur

Upper Surface – Presents:

TROCHLEAR SURFACE – Broadest in front, convex from before backwards, s
ly concave from side to side; in front of which surface i

Upper Surface of the Neck – Rough for ligaments.

Under Surface – Presents:

Deep Groove – Directed forwards & outwards and broadest in front, fo
terosseous calcaneo-astragaloid ligament; this groove sepa

TWO ARTICULAR FACETS – For os calcis; the posterior one, the largest, is
cave; the anterior one, the smallest, is convex, continuous with
anterior articular surface and sometimes divided into two parts
for lesser process of os calcis, one for calcaneo-scaphoid ligament.

Inner Surface – Presents:

TRIANGULAR ARTICULAR FACET – Small, continuous with trochlear surface, fo
ternal malleolus; below this face

Rough Groove – For deep portion of internal lateral ligament of ankle-

Outer Surface – Presents:

TRIANGULAR ARTICULAR FACET – Much larger, concave from above downw
also continuous with trochlear surface; in front of whic

Deep Depression – For anterior fasciculus of external lateral ligame
ankle-

Anterior Surface – Forms the

HEAD – Oval, oblique downwards & inwards, & convex for scaphoid, contin
inferiorly with anterior facet of under surface, and supported
constricted part

NECK.

Posterior Surface – Very narrow, and represented merely by a slight

Groove – Oblique downwards & inwards for tendon of flexor longus polli

THE OS CALCIS

Irregularly cuboid; presents six surfaces.

Upper Surface – Presents from before backwards:

Upper Surface of Greater Process – Presenting a rough depresssion for e
sor brevis digito

TWO ARTICULAR SURFACES – For astragalus, and an intervening *deep groove* ob
forwards & outwards, and broadest in front for interosseous calca
astragaloid ligament. – The posterior & external facet is convex,
largest, and situated on the body of the bone. The anterior or i
nal facet is concave, the smallest, and situated on the lesser pro
it is sometimes divided into

Rough Saddle-shaped Surface – Belonging to the portion of the bone w
projects backwards to form the

Under Surface – Rough, convex from side to side, widest behind. Presents
behind forwa

Two Tubercles – The internal, the largest, for abductor pollicis & f
brevis digitorum; the external, the smallest, for abductor minimi d

Rough Surface – For outer head of flexor access. & long calcaneo-cuboid

Tubercle & Transverse Groove – For short calcaneo-cuboid ligament.

Inner Surface – Concave for passage of vessels, nerves, & flexor tendons. C
attachment to inner head of flexor accessorius, and is surmounted by

LESSER PROCESS, OR SUSTENTACULUM TALI – Which articulates above with
astragalus, is grooved inferiorly for tendon of flexor longus pol
and gives attachment by its inner margin to a part of the super
fibres of the internal lateral ligament of the ankle-j

Outer Surface – Presents towards its middle a

Tubercle – For middle fasciclus of external lateral ligament of ankle-j
and in front of the tube

Two Grooves – Separated by a slight ridge for tendons of peronei.

Anterior Surface – Concavo-convex for articulation with cuboid; is surmounted
ternally by a rough prominent tubercle which is an important g
in Chopart's amputa

Posterior Surface – Rough & broad below for insertion of tendo Achillis & plan
muscle, narrow & smooth above, where it is covered by a b

BONES of TARSUS—2nd Row.

THE SCAPHOID — Presents:

ANTERIOR SURFACE – Convex, broadest externally; presents
three triangular facets for the cuneiform.
POSTERIOR SURFACE – Concave, for head of astragalus, also broadest externally.
CIRCUMFERENCE – Rough, convex above, concave below. Presents below & internally a
tubercle, for tendon of tibialis porticus; and sometimes externally a
facet, for cuboid.

THE CUBOID — Presents:

Articular Surfaces – Three:

ANTERIOR – Presents two facets,
inner, smaller, quadrilateral for 4th metatarsal,
outer, larger, triangular for 5th metatarsal.
POSTERIOR – Quadrilateral, concavo-convex for os calcis.
INTERNAL – Presents towards middle & upper part a
large anterior facet for external cuneiform; and sometimes behind this a
smaller posterior facet for scaphoid. – The remainder of this surface is rough for ligaments.

Non-Articular Surfaces – Three:

SUPERIOR – Rough, oblique downwards & outwards.
INFERIOR – Presents from before backwards:
deep groove oblique forwards & inwards, which transmits tendon of peroneus longus, and is bounded behind by a prominent
ridge for long calcaneo-cuboid ligament, which ridge begins externally in a prominent
tubercle presenting a small facet for a sesamoid bone;
rough surface for short calcaneo-cuboid ligament, and part of the flexor brevis pollicis.
OUTER – A mere border notched by commencement of peroneal groove.

THE CUNEIFORM BONES

Three, wedge-shaped, & six sided. All three present

COMMON CHARACTERS:

DORSAL SURF. – Quadrilateral, and rough for ligaments. Looks obliquely inwards in the internal cuneiform, in which bone it also presents a small groove or facet for tendon of tibialis anticus.
PLANTAR SURF. – Rough rounded border in the two outermost. In the innermost it is a broad rough surface marked behind by a tubercle for the tibialis posticus.
POSTERIOR SURF. – Triangular & concave from above downwards. They articulate with the three facets on anterior surface of scaphoid, and lie in the same transverse line.
ANTERIOR SURF. – Triangular in the two outermost, kidney-shaped in the innermost; they articulate with the bases of the three innermost metatarsal bones. These surfaces present an indented outline: the middle cuneiform being shorter than the two others, its anterior surface is depressed.
LATERAL SURF. – Articulate with each other, the cuboid, both sides of the base of the 2nd metatarsal bone & the inner side of the base of the 4th; the lateral surfaces of the 3rd cuneiform presenting each of them two facets, and the adjoining surfaces of the 1st & 2nd presenting a facet angular in shape & running along the superior & posterior borders. The inner surface of the internal cuneiform is a mere rounded border.

DISTINCTIVE CHARACTERS

BETWEEN THE THREE BONES.
FIRST – Larg size, irregular form, anterior kidney-shaped surface, facet for tibialis anticus, tubercle for tibialis posticus.
SECOND – Small size, square-shape of dorsal surface, angular articular facet along the upper & back part of its inner surface.
THIRD – Intermediate size, two facets on both of its lateral surfaces.
BETWEEN THE BONES OF THE TWO SIDES — Are evident in the case of the first & second cuneiform. To have the three points necessary to place the third one in position all that is requisite is to remark that the ant. internal facet is rather larger than the ant. extern-

METATARSAL BONES (Distinctive Characters).

FIRST METATARSAL BONE — The shortest & much the thickest.

SHAFT – Very thick & strong.

TARSAL EXTREMITY – Presents a large semilunar facet for internal cuneiform, but h lateral articular facets. It is prolonged below & externally into a pron tubercle for tendon of peroneus l

DIGITAL EXTREMITY – Large & broad. Presents inferiorly two grooved facets for sesam

SECOND METATARSAL BONE — The longest; received posteriorly into the between the three cuneiform

TARSAL EXTREMITY – Presents:

Tarsal Facet – Triangular, for middle cuneiform.

Lateral Facets – Three: – One internal for internal cuneiform; two external f ternal cuneiform & 3rd metatarsal. These two latter facets are often d into upper & lower halves by a rough horizontal groove for an interosseo

THIRD METATARSAL BONE — A little shorter.

TARSAL EXTREMITY – Presents:

Tarsal Facet – Triangular, for external cuneiform.

Lateral Facets – Two: – One internal & one external for 2nd & 3rd metatarsal b former facet is often divided into upper & lower halves by an interosseous g

FOURTH METATARSAL BONE —

TARSAL EXTREMITY – Presents:

Tarsal Facet – Quadrilateral, for cuboid.

Lateral Facets – Three: – One ext. for 5th metatarsal, two int. for 3rd metatarsa ternal cuneiform; the facet for the external cuneiform being sometimes a

FIFTH METATARSAL BONE — The shortest but one.

TARSAL EXTREMITY – Presents:

Tarsal Facet – Triangular, cut obliquely forwards & inwards, for cuboid;

Internal Lateral Facet – For 4th metatarsal;

Prominent External Tubercle – For peroneus brevis.

N.B. — The foregoing characters supply the three points requisite to place the b position, and therefore to distinguish between right bones and left

METACARPAL BONES (Distinctive Characters).

METACARPAL B. OF THUMB — The shortest.

SHAFT – Thick & broad; its palmar surface looks inwards.

CARPAL EXTREMITY – Saddle-shaped for trapezium (convex from before backw concave from side to side) & broadest externally; no lateral

DIGITAL EXTREMITY – Broader & less convex anteriorly than in the other me pal bones; presents two small lateral facets for sesamoid

METACARPAL B. OF INDEX — The longest.

CARPAL EXTREMITY – Larger than in the others, and presents posteriorly longation upwards & inwards towards os magnum. Has four art surfaces, one saddle-shaped above for trapezoid, and three othe trapezium, os magnum & 3rd metacarpal

METACARPAL B. OF MIDDLE FINGER — The longest but one.

CARPAL EXTREMITY – Presents a prolongation upwards & outwards behi magnum, and has four articular facets, one for os magnum, one f metacarpal bone, and two f

METACARPAL B. OF RING FINGER — Short.

CARPAL EXTREMITY – Pretty regularly cuboid. Presents five facets for unc os magnum, 3rd (two facets), & 5th metacarpal

METACARPAL B. OF LITTLE FINGER — The smallest & the shorte

CARPAL EXTREMITY – Has a prominent tubercle on inner side for extensor ulnaris; carpal facet is saddle-shaped for unciform; only one facet for 4th metacarpa

N.B.—The foregoing characters supply the three points requisite to the bones in position, and therefore to distinguish between bones and left