A

COMPENDIUM

OF THE

ANATOMY

OF THE

HUMAN BODY.

INTENDED PRINCIPALLY FOR THE USE OF STUDENTS.

BY ANDREW FYFE.

IN TWO VOLUMES.

VOL. II.

This Edition is prefixed with

A Compendious History of Anatomy,

And the

Ruyschian Art and Method

Of making PREPARATIONS *to exhibit the* STRUCTURE *of the* HUMAN BODY, *illuſtrated with a* Repreſentation *of the*

Quicksilver Tray and its Appendages,

Which are not in the London Edition.

Philadelphia:

PRINTED AND SOLD BY JAMES HUMPHREYS,

At the N.W. Corner of Walnut and Dock-ſtreets.

1802.

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PART IV.

OF THE

VISCERA,

AND

ORGANS OF THE SENSES.

OF THE COMMON INTEGUMENTS.

The Cuticle.

THE *Cuticle*, *Epidermis*, or *Skarf-Skin*, is a thin semitranſparent inſenſible Membrane, which covers the Skin, and adheres to it by ſmall Vaſcular Filaments.

The Cuticle is readily *ſeparated* from the Cutis by boiling water, or by putrefaction, and in the living body, by the application of bliſters.

It is not every where of the ſame *denſity*, being even in the Fœtus, thickeſt in the Palms and Soles; in which parts, the thickneſs is afterwards much increaſed by preſſure.

The *External Surface* is marked by *Furrows*, which correſpond with thoſe in the Cutis Vera.

Upon the Surface of the Body it is *perforated* by the termination of the Exhalent Veſſels,—which throw out the Perſpirable Matter, and which, when increaſed, is conſidered by moſt of the modern Phyſiologiſts, as forming the Sweat;—by the ends of the Excretory Ducts, which are found in particular parts of the Skin;—by the beginnings of the Abſorbents, which take in certain Subſtances applied to the Surface of the Skin; and—by the different Hairs.

The *Perforations*, or *Pores*, are moſt evident upon the Palms and Soles, and upon the Noſe, Ears, and external parts of Generation.

The Cuticle *covers* the Skin through its whole extent, excepting under the Nails.

From the External Surface of the Body, it is *reflected inwards*, to line the large Paſſages; as the Alimentary Canal, the Trachea, the Urethra, Vagina, &c.

In theſe Paſſages, however, the Cuticle becomes leſs uniform in its texture; and in ſome of them, as in the *Stomach*, is either awanting, or is ſo much changed in ſtructure, as to have the appearance of being ſo.

From the Surface of the Cuticle, certain *Proceſſes* are ſent into the Skin, which line the Paſſages by which the Cutis is perforated.

Many opinions have been advanced concerning the *origin* of the Cuticle:—the lateſt and moſt probable is, that it is formed by a condenſation of the Corpus Mucoſum, or by the Extremities of Excretory Veſſels;—its denſity, however, is ſuch, that no veſſels can be traced in it, either by the Eye or by the aſſiſtance of glaſſes.

The Cuticle ſerves to protect the ſenſible parts under it; and to regulate the proportion of the Fluids thrown out or taken in by the Surface of the Skin;—particularly to prevent too great a degree of evaporation.

Corpus Mucosum.

The *Corpus Mucoſum* has been commonly called *Rete Mucoſum*, from the ſuppoſition that it is formed of a *Mucous Net work*, and is ſituated under the Cuticle which it connects to the Cutis Vera.

It is *compoſed* of the terminations of extremely minute Veſſels paſſing between the Cutis and Cuticle, which are ſurrounded by a Mucilaginous or Viſcid Subſtance, properly called *Corpus Mucoſum*.

It is the chief cauſe of that *variety of colour* which characteriſes the natives of different climates, and different people of the ſame climate, being white, or rather of a light-grey ſemi tranſparent colour in the European, black in the Ethiopian, brown in the Aſiatic, &c.

It is *thicker* and *ſtronger* in the Negro than in the white perſon, and can be readily ſeparated in the former into two Layers.

It covers every part of the Surface of the Cutis, excepting below the Nails, where it is awanting; and is of ſuch a light colour in the Palms and Soles of the Negro, as to have been ſuppoſed by ſome authors to be deficient there alſo.

Its *origin* has not yet been ſufficiently aſcertained, nor is it fully determined what particular purpoſes it ſerves.

Among other purpoſes, however, it contributes to preſerve the ſtructure of the tender Veſſels, Ducts, and Papillæ, placed between the Cutis and Cuticle; and in the Negro, it is ſuppoſed to ſerve as a defence againſt the heat of the climate, by preventing the rays of the Sun from penetrating the Skin.

Cutis Vera.

The *Cutis Vera*, or *Skin*, properly ſo called, lies immediately under the Corpus Mucoſum, and gives a general covering to the whole Body.

It is *formed* of Fibres intimately interwoven, and running in every direction, and is ſo plentifully ſupplied with Nerves and Blood-Veſſels, that the ſmalleſt puncture cannot be made in any part of it, without occaſioning pain and bringing Blood.

The *Blood-Veſſels* of the Cutis are ſo numerous, as to appear to form almoſt the whole of its Subſtance, and are of ſuch a ſize as to be readily injected.

It is ſtrong and elaſtic, and may be elongated in every direction, after which it recovers its former dimenſions.

It forms the body of the Skin, and is that part in Quadrupeds of which Leather is made.

The *outer part* of it is denſe and firm, the inner looſe, and gradually degenerating into the common Cellular Subſtance.

It is thicker and looſer on the poſterior than on the anterior part of the Body, and thicker and firmer in the Palms and Soles than in the other parts of the extremities.

The *colour* of the Cutis alſo differs in different parts of the body, in proportion to the quantity of Blood in the extreme Veſſels, and to the thinneſs of the Cuticle.

At the *edge of the Eye-lids*, the *red part of the Lips*, and *margin of the Anus*, the Cutis becomes ſo immediately and remarkably thin, as to appear to be loſt.

Upon the Surface of the Cutis, *ſmall Eminences* are obſerved, called *Papillæ*, *Papillæ Nervoſæ*, and *Papillæ Pyramidales*; the term being borrowed from the Papillæ of the Tongue, which were firſt diſcovered, and to which the name is moſt applicable.

They are conſidered as forming the Organ of Touch, from their being extremely ſenſible; and from their being very Vaſcular, they are alſo regarded as furniſhing a paſſage to part of the Perſpirable Matter.

The *Papillæ* are moſt evident in the Palms and Soles, where they are placed in double rows upon the ridges, which on the points of the Fingers and Toes, generally run in a ſomewhat ſpiral and parallel direction.

The *Ridges* are ſuppoſed to defend the Papillæ, and to increaſe the Surface for Perſpiration.

In ſome places, as in the red part of the Lips, the Papillæ are termed *Villi*, from their reſemblance to the pile of Velvet.

Various kinds of *folds* are obſerved in the Skin; ſome depending upon the form of the Cellular Subſtance, as in the Hips; others on Muſcular Contraction, as in the Fore-head; and others on Articular Motion, as at the Joints of the extremities, —particularly thoſe of the Fingers and Toes;—and theſe folds are thinner than the reſt of the Skin, to allow eaſy motion.

In an *inflamed Skin*, as in the caſe of Small-pox, a Reticular Texture of Veſſels is obſerved, which can be eaſily injected, and has been conſidered by ſome as the Corpus Mucoſum, and by others as an additional Cuticle;—but no ſuch appearance is to be met with in the ſound Skin.

The Cutis Vera ſerves to cover and give form to the Body, it unites the different parts, and defends them from injury. It forms the External Organs of Senſation or of Touch, and gives paſſage to the Fluids which are Perſpired or Abſorbed.

APPENDAGES OF THE SKIN.

Nails.

The *Nails* were formerly regarded as a continuation of the Papillæ of the Cutis, but are now more generally conſidered as a continuation of the Cuticle.

They are removed along with it by boiling water, or by maceration.

Like the Cuticle alſo, they are inſenſible, are renewable after having been ſeparated, and have no evident Veſſels.

They differ from it, however, in ſtructure, being formed of *Plates*, and theſe of *Longitudinal Fibres*, which are cloſely compacted.

They begin by a ſquare root, a little before the laſt Joint of the Fingers and Toes.

When ſeparated from the Skin, they are *tranſparent* like Horn, but are coloured in the living Body by the Veſſels of the Cutis, to which they adhere, and from which they derive their nouriſhment.

They are fixed at their roots to a *ſemilunar fold* of the Cutis, and are there covered by a reflection of the Cuticle, which firmly adheres to them.

They grow from the roots, and not from the points.

The nails ſtrengthen and defend the ends of the Fingers and Toes, and thereby ſerve as Buttreſſes.

In the Fingers they increaſe the power of apprehenſion, being uſeful in laying hold of minute objects.

Hairs.

The *Hairs* ariſe by roots or bulbs, which are ſituated in the Cellular Subſtance under the Skin.

The *Bulbs* are of various ſhapes in different parts of the Body, and have Blood-Veſſels diſperſed upon them for their nouriſhment.

Each of the Bulbs has *two Membranes*, or *Capſules*, containing an Oily Fluid between them, which gives colour to the Hair, and for want of which, as in advanced life, or in certain diſeaſes, the Hair is ſuppoſed to change its colour, and become white. It may be remarked, however, that the Hair, after being cut off, continues uniformly to preſerve its colour.

The body of the Hair conſiſts of ſmaller hairs incloſed in a Membrane, and is ſomewhat of the nature of the Nails. Like them alſo, it grows only from the root.

The *uſe* of the Hair is not yet fully known.—It ſerves in general for the ornament, warmth, or protection of the different parts on or near which it is placed.

Sebaceous Ducts or Follicles, and Miliary Glands.

The *Sebaceous Follicles* derive their name from the Fluid they contain becoming like Suet, after acquiring a certain degree of conſiſtency, or being inſpiſſated by ſtagnation.

They are ſeated under the Cutis, and are found in greateſt abundance in thoſe parts which are expoſed to the air, or to attrition; as in the Noſe, Ears, Nipples, Groins, and external Parts of Generation.

The *Sebaceous*, or *Miliary Glands*, are ſo called from their contents, and from their reſemblance to *Millet Seeds*, and are ſeated in the Axilla.

Other Miliary Glands are deſcribed by Authors as being placed under the Skin over the whole Surface of the Body, and as ſerving for the ſecretion of Perſpirable Matter;—but they are not demonſtrable to ſuch a general extent; and the Sweat is conſidered as being derived from another ſource.

Theſe Follicles and Glands ſecrete a fluid which ſerves to lubricate the Skin, and defend it from the inclemency of the weather, or from the effects of friction.

Membrana Cellularis, or Tela Cellulosa, or Reticular, or Cellular Substance.

This is generally conſidered as one of the Integuments, though common to theſe and to the other parts of the Body.

It is *compoſed* of a fine web, formed of many Membranes joined irregularly together, and theſe made up of Cells, which communicate freely with each other wherever they are found.

It is very elaſtic, may be drawn out to a conſiderable extent, after which it ſuddenly recoils, and may be condenſed or compacted to a great degree.

It lines the Skin, covers the Muſcles in general, and enters in between their different Fibres;—is an univerſal covering to all the other parts, and even enters into the compoſition of almoſt every one of them.

It is thickeſt where the parts are moſt expoſed to preſſure, as in the Hips, Palms, and Soles.

The different Cells of which it is compoſed, are conſtantly moiſtened by an Interſtitial Fluid, and in many parts of the Body are filled with Fat.

It has little or no ſenſibility, can be handled freely, or cut or punctured without giving pain.

It ſerves to connect parts to each other,—but ſo as to prevent them from growing together;—it covers them, ſupplies them with ſheaths to move in, and contains the Fat.

Corpus Adiposum, Adeps, Pinguedo, or Fat.

The *Fat* is lodged in the common Cellular Subſtance, but without communicating with it, and is made up of Maſſes compoſed of ſmall Veſicles containing the Fat, and theſe are ſurrounded by a net work of Blood-Veſſels, from which the Fat is ſuppoſed to be ſecreted, without the intervention of Glands.

The *Veſicles* are not found to have any communication with each other, nor have any Excretory Ducts yet been perceived in them,—the Fat being ſuppoſed to tranſude from the Cells.

It is of *different conſiſtency* in different parts of the Body: In the living Body it is generally fluid, though in ſome parts it approaches to a ſolid, and is altogether of this nature in the dead body.

In the Bones it forms the *Marrow*, which has been formerly deſcribed.

The Fat is chiefly *ſituated* immediately under the Skin, and covers almoſt the whole Surface of the Body. It is alſo found between the different Muſcles and Fibres of Muſcles,—within the Orbits, and in the Cheeks,—in the Subſtance of the Mammæ, and about the Heart.

It *abounds* in the Abdomen, about the Kidneys, Loins, Omentum, and Meſentery;—and in the Joints it forms the Subſtances called *Glands of the Joints*, already mentioned.

The Fat is *awanting* in the Scrotum, Penis, and Eye-Lids, and is found only in ſmall quantity in the Fore-head, or about the Joints, where, from its bulk, it would have been inconveni-

ent.—It is also awanting in the Substance of the Viscera situated in the great Cavities of the Body; as the Brain, Lungs, Liver, Spleen, Kidneys, &c.

The Fat serves to lubricate every part of the Body to which it is connected, and facilitates the action of the Muscles. It fills the Interstices, so as to give form and smoothness, and guard against pressure. It serves also as a reservoir of nourishment.

PANNICULUS CARNOSUS,
Described by the Ancients as an
ADDITIONAL COVERING.

This is a general Covering found in the Quadruped, and formed by a thin Subcutaneous Muscle, which serves to agitate the Skin.

It is found only in certain parts of the Human Body; as in the Fore-head, where it is formed by the Occipito-Frontalis Muscle; and in the Neck, where it is formed by the Platysma Myoides.

OF THE BRAIN.

THE term *Brain* is applied to the whole of that Mass which, with its surrounding Membranes, fills the Cavity of the Cranium; and is larger in Man, in proportion to the size of the body, than in any other animal.

The *Membranes* of the Brain were called *Meninges* and *Maters* by the Ancients, from an idea that they gave birth or origin to all the other Membranes of the Body.

They consist of the *Dura Mater*, *Tunica Arachnoidea*, and *Pia Mater*.

The DURA MATER, named from its being of a firmer texture than the other two Membranes, incloses the Brain and all its Appendages, and lines the different parts of the Cranium.

It is *composed* of one Membrane, which, in several parts, is divisible by maceration into two, or even more layers of Fibres.

The *texture* of the Dura Mater is very denſe. It is the thickeſt and ſtrongeſt Membrane of the Body, and is compoſed of Tendinous like Fibres, which have a ſhining appearance, particularly in its inner Surface. In many parts theſe Fibres run in a variety of directions, and decuſſate each other at different angles.

The Dura Mater *adheres* every where to the Surface of the Cranium, in the ſame manner as the Periofteum adheres to the Bones in the other parts of the Body; but it is more firmly connected at the Sutures and Foramina than elſewhere; and ſo much more firmly in Children than in Adults, that in ſeparating it from the Cranium, it is apt to bring along with it ſome of the Fibres of the Bone to which it is attached.—In the adult, the ſeparation of the Bone from the Membrane is leſs difficult, in conſequence of many of the Fibres being obliterated.

The *inner Surface* of the Dura Mater, which is remarkably ſmooth, is in *cloſe contact* with the Brain, but *adheres only* where the Veins go into the Sinuſes,—and is lubricated by a Fluid diſcharged through its Veſſels, which guards the Brain from danger, according as it may be affected by the different ſtates of Reſpiration.

The Dura Mater ſerves as a *defence* to the Brain, and ſupplies the place of a *Periofteum* to the inſide of the Bones of the Cranium, giving nouriſhment to them,—as is evident from the numerous drops of Blood which appear after removing the Skull-cap.

From the inner ſide of the Dura Mater, *Proceſſes* are ſent off, which divide the Brain into certain parts, and ſerve to keep it ſteady, *viz.*

I. The Falx, *Superior Longitudinal Proceſs*, or *Septum Cerebri*, which is formed by a doubling of the Dura Mater, and is ſituated between the Hemiſpheres of the Brain.

It *begins* at the middle of the Sphenoid, and Criſta Galli of the Ethmoid Bone, and runs along the upper and middle part of the Head, adhering firſt to the Frontal, then to the joining of the Parietal, and afterwards to the middle of the Occipital Bone.

In its paſſage it becomes gradually broader, extends from the Cranium to near the Corpus Callofum, and terminates behind in the middle of the Tentorium.

It runs from behind forwards in a ſtraight direction, and has ſome reſemblance in ſhape to a *Sickle* or *Scythe*, from which circumſtance it has obtained the name of *Falx*.

Between the under edge of the Falx and Baſe of the Cranium, there is a *large ſpace, of an oval form*, occupied by that part of the Brain which is common to the two Hemiſpheres.

The Falx ſupports the Tentorium, and prevents the two ſides of the Brain from preſſing upon each other.

II. The TENTORIUM CEREBELLI, or *Transverse Septum*, or *Lateral Processes* of the Dura Mater.

The *Tentorium* is continued laterally from the Falx, is connected behind to the inner Transverse Ridges and Grooves of the Occipital Bone, and at the fore and outer edges, to the Ridges and great Angles of the Temporal Bones, and terminates at the Posterior Clinoid Process of the Sphenoid Bone.

Between the middle and inner edges of the Tentorium and posterior Clinoid Process of the Sphenoid Bone, there is a large *Notch*, or *Foramen Ovale*, where the Brain and Cerebellum are united, or where the Tuber Annulare is chiefly situated.

The Tentorium keeps the Falx *tense* and forms a *floor* or *vault* over the Cerebellum, which prevents the Brain from pressing upon it.

III. The FALX MINOR, or *Septum Cerebelli*, which is placed between the Lobes of the Cerebellum. It descends from the under and back-part of the Falx in the middle of the Tentorium, adheres to the inferior Longitudinal Spine of the Os Occipitis, and terminates insensibly at the edge of the Foramen Magnum of that Bone.

Besides the Processes of the Dura Mater already described, there are four of inferior consideration, two of which are situated at the sides of the Sella Turcica and two at the edges of the Foramina Lacera.

Several other Processes pass out at the different openings of the Cranium, to be connected to the Pericranium, or to accompany the Spinal Marrow and Nerves :—These of the last description shall be afterwards taken notice of.

The *Arteries* of the Dura Mater are derived partly from the External Carotids, and partly from the internal Carotids and Vertebrals.

The *Veins* of this Membrane are of two kinds. One set of them, like the Veins in other parts of the body accompany the Arteries ;—the others are termed *Sinuses* and differ from Veins only in this, that they are of a triangular Figure, and inclosed in a doubling of the Dura Mater, which is so tense over them, as to become affected in consequence of the pressure from surrounding parts.

In the bottom of the Sinuses are *small Transverse chords* termed *Chordæ* WILISII, which may add a little to their strength, and assist in preventing them from being too much distended.

The Sinuses serve to carry the Blood from the Brain, and convey it to the Veins of the Neck, for which purpose they are properly fitted, their covering from the Dura Mater giving them strength, and their frequent communications preventing congestion.

The Principal SINUSES *are,*

I. The SUPERIOR LONGITUDINAL SINUS, which begins at the Crista Galli of the Ethmoid Bone, runs along the upper edge of the Falx, becomes gradually larger in its progress, and terminates in the Lateral Sinuses.

II. The TORCULAR HEROPHILI, or *fourth Sinus* of the Ancients; the term *Torcular* is applied to it from the supposition that the Blood is squeezed in that Sinus as in a Wine press.—It is chiefly formed of the Vena Galeni, runs between the Falx and Tentorium, and and terminates with the former Sinus in the beginning of the Lateral Sinuses.

III. The TWO LATERAL SINUSES, which are formed by the Longitudinal and Torcular Sinuses, run in depressions of the Occipital and Temporal Bones, first transversely, then in a winding direction downwards, and terminate at the Base of the Cranium, in the beginning of the Internal Jugular Veins.

Besides the Sinuses mentioned above, several others of less consideration will be pointed out in the particular description of the Veins.

The *Nerves* of the Dura Mater are so very minute, that they have not as yet been distinctly traced, and it is found to possess very little sensibility in the sound state.

Upon the side of the superior longitudinal Sinus, and contiguous parts of the Brain, there are *numerous small Granulations*, of a *whitish* colour, called *Glandulæ* PACHIONI.

Besides these Granulations, there are others of the same name, of a *Fleshy* colour, situated on certain parts of the outer Surface of the Dura Mater, and frequently projecting so much as to form deep pits in the Skull.

The nature of these Granulations is still unknown.—By some they have been supposed to belong to the Lymphatic System.

The TUNICA ARACHNOIDEA, named from its cob-web appearance, is an exceedingly thin, tender, and transparent Membrane, in which no vessels have been hitherto observed.

It is spread uniformly over the Surface of the Brain, inclosing all its Convolutions, without insinuating itself between any of them.

At the upper part of the Brain, it adheres so closely to the subjacent Coat by fine Cellular Substance, that it can scarcely be separated from it; but in different parts of the Base of the Brain, particularly about the Tuber Annulare and Medulla Oblongata, it is merely in contact with the Membrane under it, and may readily be raised from it by the assistance of the Blow-pipe.

The Tunica Arachnoidea, like the Cuticle, covers and defends the parts under it.

The PIA MATER, named from its tenderness, is somewhat of the nature of the former covering, but is extremely Vascular.

It covers the Brain in general, enters double between all its Convolutions, and lines the different Cavities called Ventricles.

It serves to contain and support the Vessels of the Brain, and allows them to divide into such minute parts, as to prevent the Blood from entering the tender Substance of this Viscus with too great force.

The *Arteries* of the Pia Mater are the same with those of the Brain and are derived from the Internal Carotids and Vertebrals.

The *Veins* differ in no respect from those of the other Viscera, excepting in this, that they do not accompany the Arteries.

The Brain is divided into *Cerebrum*, *Cerebellum*, *Tuber Annulare* and *Medulla Oblongata*.

Cerebrum.

The *Cerebrum* is situated in the upper part of the Cranium, which it completely fills.

It is divided into two halves, termed *Hemispheres*, which are separated from each other by the Falx.

Each of the Hemispheres is of an *oval form*, or they somewhat resemble an egg cut into two longitudinal halves. The inner sides are flat, the upper and outer parts convex, and the under Surface irregular.

The under Surface is divided into *two Anterior*, *two Lateral*, and *two Posterior Lobes*, or *Processes*.

The *Anterior Lobes* are situated in the fore-part of the Base of the Cranium.

The *Lateral* or *Middle Lobes*, are lodged in the Fossæ formed by the Temporal and Sphenoid Bones.

The *Posterior Lobes* are placed over the Cerebellum, and are separated from it by the Tentorium.

Between the Anterior and Lateral Lobes, there is a *Furrow* formed by the Anterior Clinoid Processes of the Sphenoid Bone, which has been termed *Fossa*, or *Fissura Magna* Sylvii.

The Surface of the Brain is divided into many turnings or windings, termed *Circumvolutions*, which run in various directions, and are of different sizes and lengths on different parts of the Brain.

The Circumvolutions are every where connected to the Pia Mater by an infinite number of small Vessels,—called by Ruysch, *Tomentum Cerebri*,—which run into the Substance of the Brain; as may be readily seen, upon separating the Circumvolutions a little from each other.

Between the Hemispheres a white Substance is observed, called *Corpus Callosum*, from its being a little firmer than the rest of the Brain.—It goes across the Brain, under the Falx, and is merely a continuation of Medullary Substance, running hori-

zontally, and joining the two ſides of the Hemiſpheres to each other.

In the middle of the Corpus Calloſum there is a longitudinal *Raphe*, with a Medullary Cord on each ſide, from which many tranſverſe ſtreaks iſſue. Theſe Cords, like the Corpus Calloſum itſelf, become gradually broader towards the poſterior extremity.

An horizontal Section, a little above the middle height of the Brain, or upon a level with the Corpus Calloſum, ſhews the diviſion of the Subſtance of the Brain into outer or inner, or *Cortical* and *Medullary* parts.

The outer Subſtance is termed *Cineritious*, from its being of a *greyiſh* or *aſh* colour,—though a little tinged with brown;—and *Cortical*, from its *ſurrounding* the inner part of the Brain, as the Bark does the Pith of a Tree

It is termed by ſome Authors Glandular, and by others *Secretory*, from a ſuppoſition that a Fluid was ſecreted in it.

The *Cineritious Subſtance* covers the Brain in general, and enters deep between its Convolutions, is of a ſoft conſiſtence, and compoſed of numerous ſmall Veſſels carrying red Blood; but it is uniform, and without any appearance of a Fibrous texture.

The inner Subſtance is termed *White* or *Medullary*, and is conſidered as giving origin to the different Nerves. It has been by ſome called *Excretory*, having been ſuppoſed to be formed of hollow Tubes continued from the Veſſels of the Cortical part;—but no Cavities have ever been obſerved in the ſoft Fibres of which it is compoſed.

It is greater in quantity, and ſomewhat firmer in texture, than the Cineritious Subſtance, and is ſo intimately connected as to appear to be a continuation of it.—The ſoft Fibres or ſtreaks of the Medullary Matter, run in general in a parallel and tranſverſe direction.

In many parts of the Cineritious Subſtance, Medullary Matter appears; and, on the contrary, in different parts of the Medullary Subſtance, Cineritious Matter is found; the two being frequently blended together in the form of ſtreaks. *See* MONRO *on Nervous Syſtem.*

The *Centrum Ovale* of VIEUSSENS. This is the Medullary Subſtance of the Brain, forming a kind of Nucleus, which is ſeen after removing the Cineritious Subſtance, and all the Medullary parts mixed with it, which lie between the Cortical Convolutions.

To obtain a proper view of the Centrum Ovale, the Nucleus ought to be cut in ſuch a manner as to preſerve the Corpus Calloſum, and the ſame convexity with that of the general convexity of the Brain.

The Centrum Ovale forms an *arch* or *roof* over the two Lateral Ventricles; and the under part of this roof, which is smooth and uniform, constitutes the upper part of these Ventricles.

Vieussens considered the Centrum Ovale as the *great Dispensatory of the Animal Spirits.*

The Ventricles of the Brain are four in number, two of which are called *Lateral.*

The four Ventricles have their sides contiguous to each other, are chiefly formed of Medullary Matter, and are lined with a continuation of the Pia Mater, which differs from that covering the exterior Surface of the Brain, in having fewer Vessels dispersed upon it.

They are constantly moistened by a Fluid, which prevents their opposite sides from adhering to each other.

The *use* of the Ventricles, like many other parts of the Brain, is still unknown.

The *Lateral*, formerly called *Superior Ventricles*, are situated in the Hemispheres, one in each, and run Horizontally in the same direction with the Hemispheres themselves.

They are of an irregular form, lying under the Centrum Ovale, and have each three winding corners, compared to Ram's Horns, which are therefore called *Cornua.*

The *Anterior Cornua* are separated only by the Septum Lucidum.

The *Posterior Cornua*, called also *Digital Cavities*, are at a considerable distance from each other, but approach nearer at their pointed extremities; while the *inferior Cornua*, the beginning of which is seen, run downwards and forwards, and terminate in the Lateral Lobes of the Brain.

In each of the Posterior Cornua there is an Elongation, which terminates in a point, and is called *Ergot* by the French, from its resemblance to the Spur of a Cock; or, *Hippocampus Minor*, from its similarity to, and connection with, the substance termed *Hippocampus Major.*

In the fore-part of the bottom of the Lateral Ventricles, are two large Eminences, called *Corpora Striata*, which become gradually narrower, and recede from each other at their posterior extremities.

The *Structure* of these is Cineritious externally, and mixed with Medullary Striæ within, some of which form large Transverse Medullary Arches, and others run more in a straight direction.

Between the posterior parts of the Corpora Striata, are situated the *Thalami Nervorum Opticorum*, which have a roundish form and Medullary Surface, and are of a Striated appearance within, but the Striæ are less distinct than in the Corpora Striata.

Upon the Surface of these Bodies, there are small *Eminences* or *Tubercles*, some of which are placed upon their superior, and others upon their inferior extremities.

The inner parts of the Thalami are flat and contiguous, and above they are so closely connected as to form one continued Surface, called *Commissura Mollis* of the Optic Thalami.

The posterior parts of the Thalami turn downwards and outwards, after which they are elongated, to form the two white Cords, called *Tractus Optici*.

In the Groove between the Corpora Striata and Thalami, there is a Medullary Band on each side, called *Centrum Semicirculare Geminum of* VIEUSSENS, or *Tænia Semicircularis of* HALLER, or simply *Tænia*.

Over the Thalami is placed the *Choroid Plexus*,—named from its being composed of a Chorus of Vessels and Membranes. It is a fine Vascular Web, consisting of small ramifications of Arteries and Veins, connected by the Pia Mater, and spread upon the Surface of the Thalami, and some of the adjacent parts.

The Choroid Plexus frequently contains numerous round *Globules*, resembling Hydatids, which have been considered by some Authors as Lymphatic Glands.

Under the Raphe of the Corpus Callosum, is placed the *Septum Lucidum*, which, when viewed laterally, is observed to be broad before, curved at its edge, and to become gradually narrower towards its posterior extremity.

It is connected above to the Corpus Callosum, below to the Fornix, and forms a distinct partition between the lateral Ventricles.

It is formed of two Cineritious and Medullary *Laminæ*, more or less separated from each other at their fore-part, by a small Cavity, called *Fissure*, or *Fossa* of SYLVIUS or *Sinus* of the Septum Lucidum, which, however, does not communicate with the Lateral Ventricles, though in some subjects it reaches a considerable way backwards, and, as well as the other Cavities of the Brain, has been found full of water in Hydrocephalous cases.

Under the Septum Lucidum is placed the Substance which has been compared in shape to a *Vault* by the Ancients, and from that has obtained the name of *Fornix*.

The *Fornix* is merely a continuation of the Corpus Callosum, and forms a sort of hollow Ceiling, with four *Pillars* called *Crura*, or *Cornua*, from their winding direction, of which there are two anterior and two posterior.

The *two Anterior Crura* are short, run close together, and become enlarged at their inferior parts. The *two Posterior Crura* are long, considerably distant from each other, and form Curvatures which correspond with the course of the Inferior Cornua of the Lateral Ventricles.

That part of the Crura Fornicis lying in the Inferior Cornua of these Ventricles, forms thin borders, getting the name of *Corpora Fimbriata*; but, according to the VIC D'AZYR, they are more properly termed *Tænia Hippocampi*, from being united with the great Hippocampus.

The body of the Fornix is *narrow* anteriorly, and becomes considerably *broader* behind, where it is incorporated with the Corpus Callosum.

The under Surface of the posterior part of the body of the Fornix, is impressed with numerous transverse and oblique Lines, which have been called *Psalterium*, or *Lyra*, from some resemblance they bear to the ancient musical instruments of these names.

The body of the Fornix is joined above to the Septum Lucidum; below it is connected to the Thalami Optici by a Vascular Membrane, called *Tela Choroidea*, which spreads over the Thalami, and unites the Choroid Plexus of the Lateral Ventricles.

The PEDES HIPPOCAMPI, GREAT HIPPOCAMPUS, or CORNUA AMMONIS,—named from a supposed resemblance to these parts,—are two Medullary Eminences, which arise from the sides of the posterior extremity of the Corpus Callosum, and are situated in the inferior Prolongations of the Lateral Ventricles.

They run through the whole extent of the Prolongations, first behind, then at the outer part of the posterior Pillars of the Fornix, and are so intimately connected with them, that they have been considered by some Authors as forming part of the Pillars themselves.

They are small at their origin, from which they continue to increase to their farther extremity.

Like the greater part of the Ventricles, they are covered externally with a Medullary Lamina;—internally they are found to consist of Medullary and Cineritious Laminæ, of a convoluted appearance.

At the inner edge of the Pedis Hippocampi, there is a *plaited, serrated*, or *indented Margin*, which, in the generality of Quadrupeds, is much larger, in proportion to the size of the Brain, than it is in Man.—The resemblance, however, to the human kind, in the structure of this particular part of the Brain, is more striking in the Ape than in any other Quadruped.

In the bottom of the Lateral Ventricles, behind the anterior Crura of the Fornix, and before the meeting of the Choroid Plexuses of these Ventricles, below the anterior part of the body of the Fornix, and over the fore-part of the third Ventricle, there is a HOLE, of an *oval form*, by which the Lateral Ventricles communicate freely with each other. *See* MONRO'S *Obs. on Nerv. Syst.* 1783, and *Treatise on the Brain*, 1797.

After dividing and turning back the Fornix, another communication from the above paſſage is found, called *Foramen Commune Anterius, Vulva*, or *Iter ad Infundibulum*; but properly, ITER AD TERTIUM VENTRICULUM, or Paſſage to the third Ventricle.

Between the Commiſſura Mollis of the Optic Thalami, and Subſtance called Pineal Gland, there is a ſmall paſſage termed ANUS, or *Foramen Commune Poſterius*, which has been ſuppoſed by ſome Authors to form a communication between the back-part of the third Ventricle and Lateral Ventricles; but it is completely ſhut up by the Tela Choroidea, and alſo by the Fornix, which adheres cloſely to this Membrane.

The THIRD VENTRICLE is in form of a deep Fiſſure, placed between the inner ends of the Thalami Optici, having the Commiſſura Mollis of theſe Thalami ſituated above, the Crura Cerebri below, and the bodes of the Thalami on each ſide.

The INFUNDIBULUM is a paſſage of conſiderable ſize, of a Cineritious and Medullary ſtructure, which leads downwards and forwards, gradually contracting, and becoming ſolid at its under end, where it terminates in the *Glandula Pituitaria* and thus, contrary to the opinion of the Ancients, preventing the paſſage of any Pituitous Fluid from it to the Noſe.

The GLANDULA PITUITARIA is of an oval form, about the ſize of a Field-Bean, lodged in the Sella Turcica, and ſurrounded by a doubling of the Dura Mater.

On the outſide it is of a browniſh colour, being formed of Cineritious Matter; it is whiter within, where it is mixed with Medullary Subſtance.

The Glandula Pituitaria was formerly ſuppoſed to abſorb a Fluid from the Infundibulum, and tranſmit it to the Noſe. It has been already mentioned, however, that the Infundibulum is impervious; and the real uſe of this Gland, as well as of the other Tubercles of the Brain, ſeems ſtill unknown.

At the fore-part of the third Ventricle, and immediately before the Anterior Crura of the Fornix, there is a white Medullary Cord, which runs tranſverſely through the Corpora Striata, and has the name of COMMISSURA CEREBRI ANTERIOR.

At the back-part of the third Ventricle, and under the root of the Pineal Gland, there is another Cord ſimilar to the former, but ſhorter, called COMMISSURA CEREBRI POSTERIOR. The *Commiſſuræ Cerebri* aſſiſt in uniting the two ſides of the Brain to which they are fixed.

From the under and back-part of the third Ventricle, there is a Paſſage which leads to the fourth, under the name of ITER AD QUARTUM VENTRICULUM, *Canalis Medius*, or *Aquæductus* SYLVII.

After the posterior part of the Fornix, and the Tela Choroidea to which it adheres, have been removed, there appear at the back-part of the third Ventricle, behind the Thalami, and over the Iter a Tertio ad Quartum Ventriculum, the NATES and TESTES, or TUBERCULA QUADRIGEMINA, and PINEAL GLAND.

The NATES, or *Tubercula Quadrigemina Anteriora*, are placed uppermost, and are of a rounder form than the TESTES, or *Tubercula Quadrigemina Posteriora*,—which lie immediately below the former.—The Testes are broader from one side to the other than from top to bottom, and of a white colour.

A longitudinal Section shews the Tubercula to be covered externally with a thin Medullary Lamina, and to be Cineritious within.

In Man they are more nearly of an equal size than in Quadrupeds, as in the Ox, Sheep, &c. in which the Nates are large, round, and of a brown colour, and the Testes small and long.

Over the *Nates*, and under the back-part of the *Fornix*, is placed a small body, of a Cineritious nature, about the size of a Garden-Pea, and of a Conoid figure, called GLANDULA PINEALIS, from its resemblance in shape to a *Pine* or *Fir Cone*.

In consequence of being always present, and seldom found in a diseased state, it has been celebrated by DES CARTES, as being, according to his supposition, the *Seat of the Soul*.

The *Pineal Gland* is fixed at its root to the Commissura Cerebri Posterior, and sends out *two long Medullary Peduncles*, or *Foot-stalks*, to be fixed to the upper and inner side of the Thalami and to the Anterior Crura of the Fornix.

Near, or in the Substance of the Pineal Gland, small Calcareous Concretions are sometimes found, called by SOEMMERING, *Acervulus Cerebri*, from their being generally found collected in a heap.

They do not appear to be the effects of disease; nor are they met with till after the age of Puberty.

CEREBELLUM.

The *Cerebellum* is situated in the Inferior Fossæ of the Occipital Bone, under the Posterior Lobes of the Brain, and is separated from these Lobes by the Tentorium.

It is somewhat of a roundish form, though a little broader from one side to the other than from before backwards. It is only about a fifth or sixth part of the size of the Cerebrum, and much simpler.

It is divided behind by the Falx Minor into two Lobes or Hemispheres, but has no separation above like the Brain.

Its Surface is divided into numerous Circumvolutions, which from arches, decussating each other in many parts, at sharp angles.

The Circumvolutions run chiefly in a Lateral direction, and are formed of Laminæ, with deep Sulci between them, into which as in the Brain, the Pia Mater insinuates itself, which may be readily seen by making a puncture into the Arachnoid Coat, and blowing in air till it distend the Cellular Substance, and separate the Coats from each other.

It has two middle Eminences, called *Appendices Vermiformes*, from their resemblance to Earth Worms, one of which is situated anteriorly and superiorly, the other inferiorly and posteriorly.

Each of the Lobes of the Cerebellum is again divided into *Monticuli*, or *Lobules*, which have different names according to their relative situations, connections with other parts, &c. They vary a little in the different Subjects, but are best distinguished from the direction of their Convolutions.

The Substance of the Cerebellum consists of Cineritious and Medullary Matter, as in the Cerebrum; but the Cineritious bears a greater proportion to the Medullary in the former than in the latter.

When the Cerebellum is cut in a vertical direction, the Medullary part is then found to bear a striking resemblance to the branching of the shrub called *Arbor Vitæ*, from which circumstance it has obtained the name of this shrub.

When cut in slices nearly parallel to the Base of the Brain, the Medullary Substance appears in Laminæ, corresponding to those of the Surface of the Cerebellum; and when cut to a considerable depth, there is a Centrum Medullare uniting the Lateral Lobes as in the Brain.

Between the Cerebellum; the under part of the Tuber Annulare, and upper part of the Medulla Oblongata, the *Fourth Ventricle* is situated, which extends from the Eminences called *Testes* to the posterior inferior Notch of the Cerebellum.

A little lower than the Testes, the Ventricle becomes wider, and forms an angle behind, from which again it contracts, and becoming narrower and pointed below like a writing-pen, is called *Calamus Scriptorius*.

Over the under end of the Aquæductus Sylvii, and upper part of the fourth Ventricle, there is a thin Medullary Lamina, called *Valvula*, but properly *Velum* VIEUSSENII.

At the sides of the Velum Vieussenii there are two Medullary tracts, called *Processus ad Testes*, or *Columnæ Valvulæ* VIEUSSENII.

The under end of the Ventricle is found to be shut up by its Choroid Plexus, which prevents any communication between this Cavity and that of the Spine.

UNDER SURFACE OF THE BRAIN.

Near the middle of the Base of the Brain, and between its Lateral Lobes, there are two small, round, white bodies, termed *Eminentiæ Mammilares*, or *Corpora Albicantia*, Medullary without, Cineritious within, mistaken by some Authors for Glands.

In the Corpora Albicantia, various Medullary *Strata* terminate, which come from different parts of the Brain.

Immediately before the Corpora Albicantia, two large white Cords are observed, called *Crura*, or *Pedunculi Cerebri*, or *Crura Anteriora Medullæ Oblongatæ*, which arise from the Medullary Substance of the Brain, and gradually approach each other in their course, till they unite with the Tuber Annulare.

Their Surface is flat, and composed of distinct Medullary Fibres; internally they are composed of a Mixture of Cineritious and Medullary Matter, the former of which being of a darker colour at one particular part than in any other of the Brain, has been termed *Locus Niger Crurum Cerebri*.

Between the Crura Cerebri and Corpora Albicantia, there is a Cineritious Substance, called *Pons* TARINI, which joins these two bodies of the opposite sides together, and assists in forming the bottom of the third Ventricle.

From the Medullary part of the Cerebellum, which forms the trunk of the Arbor Vitæ two white cords arise, under the name of *Crura Cerebelli*, or *Crura Posteriora*, or *Pedunculi Cerebelli*, which unite with the Crura Cerebri, to compose the *Tuber Annulare*, or *Pons* VAROLII, so named from forming a Ring or Bridge over the Crura. This ring is intimately incorporated with, and formed by these Crura.

The *Tuber Annulare* is situated over the back part of the body of the Sphenoid and Cuneiform Process of the Occipital Bone. Many transverse streaks run on its Surface, and it is divided into two lateral parts by a longitudinal depression, occasioned by the situation of the Vertebral Artery,

At the fore and back parts of the Tuber, are the *Foramina Cæca Anterius et Posterius*, the former placed between the third, and the latter between the sixth Pair of Nerves: These two Foramina penetrate only a little way at the edges of the Tuber, and receive a Plexus of Vessels.

In the Substance of the Tuber, there is much Cortical Matter, which is formed into *Striæ*, running in different directions.

Continued from the Tuber, there is a large Substance in form of an inverted Cone, which extends to the Foramen Magnum of the Occipital Bone, under the name of *Medulla Oblongata*.

Upon the Surface of the Medulla Oblongata, two small Eminences appear, which run longitudinally and contiguous to each

other and from their ſhape have the name of *Corpora Pyramidalia*, or *Eminentiæ Pyramidales*.

Between the Corpora Pyramidalia, there is a deep Fiſſure, into which the Pia Mater penetrates, and where Blood-veſſels paſs into the interior part of the Medulla.

At the outſide of the former Eminences, are two others, ſomewhat of the form of Olives, from which they are termed *Corpora Olivaria*, or *Eminentiæ Olivares*.

More externally than theſe, are two other Eminences, leſs evident than the former, which have been deſcribed by ſome Authors by the name of *Corpora Pyramidalia Lateralia*.

The Medulla Oblongata is divided into two lateral portions, by an anterior and poſterior Fiſſure, and the two portions are formed of Medullary Matter without, and a large proportion of Cineritious Matter internally, and joined together by Medullary Fibres.

The BRAIN is the *Grand and Primary Organ of Senſe*, with which the Mind is ſuppoſed to be moſt immediately and intimately connected, and from which the Nervous Influence is found, by experiment, to be communicated to all the other parts of the Body.

ORIGIN *of the* NERVES.

The Nerves ariſe from the Medullary parts of the Brain, ſome in ſolid Cords, others in ſeparate Threads which afterwards unite into Cords; and have their name in numerical ſucceſſion, according to their ſituations, beginning anteriorly.

The *Firſt*, or *Olfactory Pair of Nerves*, ariſe from the back-part of the poſterior lobes of the Brain, and run towards the Criſta Galli of the Ethmoid Bone, over which each forms a browniſh-coloured Bulb, from whence numerous ſmall Nerves are ſent off.

The *Second Pair*, or *Optic Nerves*, are the continuations of the Thalami Optici. They are united immediately before the Infundibulum, and form an intimate intermixture of parts, and again ſeparate previous to their paſſing into the Orbits.

The *Third Pair* ariſe by numerous Threads, which are ſoon collected into Trunks.

The *Fourth Pair*, which are the ſmalleſt Nerves of the Body, ariſe behind the Teſtes, and have a long and winding courſe.

The *Fifth Pair*, which are the largeſt Nerves in the Brain, have each an anterior ſmall, and a poſterior large Faſciculus, which ariſes from the ſide of the Tuber Annulare.

The *Sixth Pair* ariſe from the beginning of the Medulla Oblongata, where it joins the Tuber Annulare. Each of the Nerves of this Pair has a ſmall Thread at its inner part.

The *Seventh Pair* arise from the beginning of the lateral parts of the Medullary Oblongata, and are divided on each side into a *Portio Mollis*, and *Portio Dura*.

The *Eighth Pair* arise by small Fasciculi from the Corpora Olivaria.

The *Ninth Pair of Nerves* also arise by small Fasciculi, a little below the former, from the Corpora Pyramidalia.

The Origin of the Nerves will be described at greater length, in a subsequent part of the Volume.

OF THE EYE.

The *Eyes*, which constitute the Organ of Vision, are situated in the Cavities of the Orbits, and are surrounded by several parts, some of which protect them from injury, and others assist in the performance of their various motions.

The *Orbits* are formed of two Cones, situated in the fore-part of the Cranium, with their Apices behind, their Axes in an horizontal situation, and their Bases turned obliquely outwards.

Each of the Orbits is formed of different Processes of the following Bones, viz.

The upper part of each Orbit, by the Orbitar Plate of the Frontal Bone;—the inferior, by the Orbitar Plates of the superior Maxillary and Malar Bones;—the internal, chiefly by the Orbitar part of the Os Unguis and Pars Plana of the Ethmoid Bone;—the external, by the Orbitar Plates of the Sphenoid and Malar Bones;—the posterior, by the Sphenoid and Palate Bones;—and the anterior edge of the Orbit, by the Frontal, superior Maxillary, and Malar Bones.

The Cavities of the Orbits are lined with Productions of the Dura Mater, which pass out at the Foramina Optica and Lacera and, at the anterior edges of the Orbits, join the Periosteum of the Face, where they supply the place of Ligaments to the Palpebræ.

Supercilia.

The *Supercilia*, or *Eye-Brows*, which are peculiar to the Human species, are the arches of Hair situated upon the Supercilia-

ry Ridges of the Frontal Bone. The Hairs are placed obliquely, with their roots towards the Nose, and the Arches elevated a little above the reſt of the Fore-head, by a conſiderable quantity of Cellular Subſtance lying under the Skin.

They are moved in different direct ons by the action of the Frontal Corrugator, and Orbicularis Palpebrarum Muſcles.

They are intended partly for ornament, and partly as ſhades over the Eyes, thereby preventing them from being injured by extraneous Matter, or by too great a quantity of light. They alſo aſſiſt in expreſſing the paſſions of the Mind.

Palpebræ.

The *Palpebræ*, or *Eye-lids*, are chiefly compoſed of a doubling of the Skin, incloſing part of the Orbicularis Palpebrarum Muſcle, and the Cartilages called *Tarſi*, and forming angles at their outer and inner extremities, termed *Canthi*, or *Corners of the Eye*.

The *Upper Eye-lid* is the one which moves principally in cloſing or opening the Eye, the under moving only when the Eye-lids are ſhut with uncommon force.

The *motions* of the Eye-lids are performed by the action of the Orbicularis and Levator Palpebrarum Muſcles.

The Eye-lids ſerve as Curtains or Veils, to defend the Eyes during ſleep: They likewiſe prevent them from being injured by extraneous objects, or by too much light. By their frequent motion they increaſe the ſecretion of the Tears, apply them properly to the Surface of the Eye, and conduct what remains, after waſhing the Eye, to the Puncta Lacrymalia.

Tarsus.

This is a *thin Cartilaginous Arch*, ſituated in the edge of each Eye-lid, that in the upper one being conſiderably broader than the one below, and each broader at its middle than towards its extremities.

Their edges are ſo placed, that when the Eye-lids are ſhut, a groove is left next the Eye by which the Tears are conveyed towards the Noſe.—They terminate at a little diſtance from the inner angle of the Eye.

They ſerve to keep the Eyelids extended, allow them to be accurately applied to each other, and prevent them from being collected into folds.

Glandulæ Sebaceæ, Ciliares, or Meibomianæ,—the laſt term obtained from their being deſcribed by Meibomius,—are placed between the Tarſus and lining of the Eye-lids, and are formed of a ſeries of white lines or Follicles, running in ſerpentine directions, which, when viewed through a magnifier, appear like rows of Pearls, from which an Oily or Sebaceous Matter, reſembling little worms, may be readily ſqueezed out

through the Foramina or puncta Cilaria, placed upon the edges of the Eye-lids.

The Matter of the Sebaceous Glands facilitates the motion of the Eye-lids, and prevents their accretion during ſleep.

Cilia.

The *Cilia*, or *Eye-laſhes*, are ſtiff Hairs placed in the edges of the Eye-lids. Thoſe of the upper Eye-lid are bent upwards, and are conſiderably longer than thoſe of the under Eye-lid, which are bent in the oppoſite direction. In both Eye-lids, they are awanting near the inner Angle.

The Cilia prevent duſt, inſects, &c. from getting into the Eye, aſſiſt in moderating the quantity of light ſent into it, and add to the beauty of the Face.

Glandula Lacrymalis.

The *Glandula Lacrymalis*, called, till of late years, the *Glandula Innominata* Galeni, is ſituated upon the upper and outer part of the Eye, in a hollow behind the outer end of the Superciliary Ridge of the Frontal Bone.—It is a Gland of the Conglomerate kind, of a yellowiſh colour, of an oblong form, and a little flattened, with one end pointing to the Noſe, the other to the outer angle of the Eye.

Beſides this, there is a chain of *Smaller Glands*, lying between the principal Gland and upper Eye-lid, and connecting them together.

In the direction of the Smaller Glands, there are ſeveral Excretory Ducts,—deſcribed by Dr. Monro, 1758,—which run nearly parallel to, but do not communicate with each other.

The Excretory Ducts, on account of their ſmallneſs, are not often ſeen, and are difficult of injection. They terminate on the inner ſide of the upper Eye-lid, near the outer angle of the Eye, and upper edge of the Tarſus.

The *uſe* of this gland is to ſecrete the Tears, which are ſpread over the Surface of the Eye by their own weight, and by the motion of the Eye-lids, for the purpoſe of preſerving the delicacy of the Eye, and particularly the tranſparency of the Cornea.

Puncta Lacrymalia.

The *Puncta Lacrymalia* are two ſmall Orifices placed near the inner angle of the Eye, one in the upper, the other in the under Eye-lid, at the extremity of the Tarſus, and oppoſite to each other.

Each Punctum is ſeated obliquely upon a ſmall eminence, and is ſurrounded with a Cartilaginous Circle, which keeps it conſtantly open.

The Puncta Lacrymalia are the Orifices of two ſmall Canals, which run in the direction of the edges of the Eye-lids towards

the ſide of the Noſe, where they approach each other, and terminate together in the Lacrymal Sac.

The Tears which remain after moiſtening the Eye are abſorbed by the Puncta, after the manner of Capillary attraction, and are conveyed through their Ducts into the Lacrymal Sac by the impulſe of the Eye-lids.

Caruncula Lacrymalis.

The *Caruncula Lacrymalis* is a ſmall Gland of a reddiſh colour, of the Conglomarate kind, ſituated between the inner angle of the Eye-lids and Ball of the Eye, which ſupplies Sebaceous Matter to this part of the Eye-lids, and ſerves in particular to ſeparate the Puncta Lacrymalia, and to direct the Tears to them while the Eye-lids are ſhut.

Minute Hairs are found upon the Surface of this body, ſerving to entangle ſmall objects which get into the Eye.

Valvula Semilunaris.

The *Valvula Semilunaris* is a ſmall doubling of the Tunica Conjunctiva, which lies between the Caruncula Lacrymalis and Ball of the Eye.

It is larger in the Ape and other Quadrupeds than in the Human ſpecies, and ſtill larger in Birds, in which, as well as in Quadrupeds, it is called *Membrana Nictitans*.

It is in form of a Creſcent, the horns of which are turned towards the Puncta Lacrymalia, and aſſiſts the Caruncula in conducting the Tears to the Puncta.

THE BALL OF THE EYE.

The *Ball, Globe*, or *Bulb* of the Eye, is of a ſpherical form, to collect the rays of light into a proper Focus, and is ſurrounded behind by a quantity of ſoft Fat, to allow the Eye and its Muſcles to move with facility.

The Ball of the Eye is compoſed of *Coats*, *Humours*, *Veſſels*, and *Nerves*, to be next deſcribed.

COATS.

Tunica Adnata.

The *Tunica Adnata*, or *Conjunctiva*, named from its connecting the Eye to the Orbit, is a reflection of the Skin continued from the Eye-lids over the whole fore-part of the Ball of the Eye.

It adheres ſlightly by means of Cellular Subſtance to the White of the Eye, but ſo firmly to the Cornea, as to be ſeparated from it with difficulty.

It is ſo remarkably thin, that the colour of the ſubjacent parts ſhine readily through it.

Between this Coat and the white part of the Eye, there is a quantity of looſe Cellular Subſtance, which is very Vaſcular, and is the common ſeat of *Ophthalmia*.

The Tunica Adnata ſupports the Ball of the Eye, prevents extraneous bodies from getting to the back-part of it, and forms a ſmooth covering to leſſen the friction between the Eye and Eyelids.

Cornea.

The *Cornea*, ſo called from its reſemblance to Horn, is termed by many Authors *Cornea Lucida*, to diſtinguiſh it from the Sclerotica, named *Cornea Opaca*.

It forms the anterior Pellucid Covering of the Eye, is more convex than the reſt of the Ball, and is joined to the Tunica Sclerotica, like the Segment of a ſmall Sphere to that of a larger one. The convexity, however, varies in different perſons, ſo as to form a ſhort or long ſighted Eye, according as the Cornea is more or leſs prominent.

In a recent ſubject, it is hard, denſe, and tranſparent; but after maceration in water, it becomes ſoft and opaque, and may be readily ſeparated, eſpecially in young Animals, into different Lamellæ, the anterior of which is the continuation of the Tunica Adnata.

By a ſlight degree of putrefaction, it may alſo be ſeparated from the Tunica Sclerotica.

In the Whale, the edge of the Cornea is received into a diſtinct Groove formed by the Sclerotica.

In a ſound ſtate, it has no Veſſels which carry red Blood, though ſuch are frequently ſeen on it when the Eye is inflamed.

Its nerves are too ſmall to be traced; yet it poſſeſſes exquiſite ſenſibility.

It collects the rays of light, and tranſmits them to the Eye, protects the tender parts within it, and contains the Aqueous Humour.

Iris.

The *Iris*, which is named from being in ſome perſons of different colours, is the only Coat which poſſeſſes motion. It was conſidered as a continuation of the Choroid Coat, until deſcribed by Zinn, who ſhews that it is only connected to this Coat by the medium of the Ciliary Circle.

It is placed at a little diſtance from the Cornea, begins a ſmall way behind the junction of that Coat with the Sclerotica, and running acroſs, it forms a Septum, a little convex anteriorly, and perforated in the middle by a Hole, called the Pupil, or ſight of the Eye.

The term *Pupil* is applied, becauſe it repreſents objects no larger than a Pupilla or Puppet.

In the Fœtus, the Pupil is covered with a Vaſcular Membrane, termed *Membrana Pupillaris*, which generally diſappears between the ſeventh and ninth month of geſtation.

Upon the back-part of the Iris, there is a dark-coloured Pigment, considered by the Ancients as a posterior Layer of the Iris, called by them *Uvea*, from its resemblance in colour to the Grape.

When the Paint is washed off, the Iris exhibits two sets of Fibres,—concerning which Authors have entertained various opinions,—one in the form of Radii, the different colours of which give the diversity of colour to the Eye; the other circular, and surrounding the inner edge of the Iris, and considered by Dr. Monro as the Sphincter Muscle of the Pupil.

The Iris has also many Blood-vessels, which can be readily injected; and has a greater proportion of Nerves than almost any other part of the Body.

It floats in the Aqueous Humour, and is of such a nature, that upon exposure to a strong light, or when the Eye looks upon a near object, the diameter of the Pupil is diminished; and vice versa.

The different motions of the Iris are supposed to be excited by the sensibility of the Retina, and the quantity of light falling upon that Nerve.

The Iris serves to regulate the quantity of light sent to the bottom of the Eye.

Tunica Sclerotica.

The *Tunica Sclerotica*, which is named from its hardness, is the largest and strongest Coat of the Eye, covering the whole Ball, excepting the parts occupied by the entrance of the Optic Nerve behind, and by the Cornea before.

It is so firmly fixed to the edge of the Cornea, as to have been considered by many Anatomists as a continuation of the same substance; but it differs from the Cornea in the following particulars; it is of a pure white colour, is formed of Fibres running in every direction, and closely interwoven with each other, is not divisible into Layers, and may be separated from it by art, as has been already mentioned.

It is thickest posteriorly, and receives a little tinge on the inner Surface, from the Choroid Coat, with which it is in contact.

It gives form and strength to the Eye, and supports the tender parts within it.

The Tendons of the four Recti Muscles of the Eye are fixed to the fore-part of the Tunica Sclerotica; and these, or the Cellular Vaginæ covering them, have been supposed to give an additional whiteness to the Eye; and the part giving this whiteness has been termed *Tunica Albuginea*:—But the Sclerotic Coat is every where of a pure white, and can receive little additional brightness from any such coverings.

Tunica Choroides.

This Coat derives its name from the Veſſels with which it abounds, forming a *Chorus*; or from its ſuppoſed reſemblance to the Membrane called *Chorion*, which ſurrounds the Fœtus in Utero.

The *Choroides* lies under the *Sclerotica*, and is connected to it by the Trunks of Veſſels and Nerves which paſs from the one Coat to the other, and alſo by a tender Cellular Subſtance, of a brown colour, with which the inner Surface of the Sclerotica is tinged.

It begins at the entrance of the Optic Nerve into the Eye, runs between the Sclerotica and Retina, nearly to the Cryſtalline Lens, where it is more firmly connected to the Sclerotic Coat than it is elſewhere, by means of the Ciliary Circle.

The *Ciliary Circle*, or *Ciliary Ligament* as it is called, is compoſed of a quantity of condenſed ſhining Cellular Subſtance, which forms a white Ring connecting the fore-part of the Choroides, and the root or outer Margin of the Iris, to the Sclerotica.

The Choroid Coat is much thinner and more tender than the Sclerotic, and is one of the moſt Vaſcular parts of the Body, ſeeming at firſt ſight to be entirely compoſed of Veſſels.—The greater number of thoſe on the outſide run in whirls; while thoſe on the inſide, running nearly parallel to each other, gave riſe to the ſuppoſed exiſtence of the *Membrana Ruyſchiana*.

It is alſo furniſhed with numerous Nerves, which are united with its Veſſels by a fine Cellular Texture.

In the human Eye, the Choroides is of a duſky brown colour, both externally and internally; but the colour varies conſiderably in the eyes of different animals.

The inner Surface of this Coat, which is *Villous*, was deſcribed by Ruysch as a *diſtinct Lamina*, and has been termed by many Anatomiſts *Tunica Ruyſchiana*;—Haller however, and Zinn, and many others who followed them, have demonſtrated this Coat to conſiſt of only one Lamina; though in Sheep, and in ſome other animals, it appears to be double.

Upon the inner ſide of the Choroides, there is a dark-coloured Mucus, called *Pigmentum Nigrum*,—ſuppoſed to be produced from the Veſſels of this Coat,—which is blackeſt and thickeſt at the fore-part of the Eye, where it adheres ſo tenaciouſly as to be removed with difficulty; but behind it is thinner, more fluid, and more eaſily removed; becoming gradually leſs evident, and almoſt diſappearing round the Optic Nerve.

In advanced age, the Pigmentum Nigrum becomes more diluted, and of a lighter colour; ſo that the Veſſels of the Choroid Coat may be ſeen ſhining through the Vitreous Humour.

Though HALLER denies that the *Membrana Ruyſchiana* can ever be ſeparated, in the Human Eye, from the Choroides,—he retains the name, to denote the black Surface of this Coat.

In grameniverous animals, in fiſhes, and in thoſe animals which go in queſt of prey in the night, the Paint is of a light and ſhining colour in the bottom of the Eye, and is called *Tapetum*.—In an entirely white Rabbit, the Paint is awanting, and the Eye has a red colour from the Veſſels of the Choroid Coat; but the redneſs diſappears when the animal is dead.

At the fore-part of the Choroid Coat, and oppoſite to the Ciliary Circle, there is a black radiated Ring, called *Corpus Ciliare*, which is about the ſixth part of an inch in breadth towards the Temple, but ſomewhat narrower towards the Noſe.

In the poſterior portion of the Corpus Ciliare, there are numerous pale radiated *Ciliary Striæ*, but ſo covered with the Pigmentum Nigrum, as not to be diſtinctly ſeen till the Paint is removed.

Near the connection of the Corpus Ciliare with the root of the Iris, theſe Striæ become gradually broader and more elevated, and form about ſeventy white *Plicæ* or *Folds*, termed *Proceſſus Ciliares*, the intervals of which are alſo covered with Pigmentum Nigrum.

The *Proceſſus Ciliares*, which obtain their name from their reſemblance to the Cilia of the Eye-lids, are commonly formed each of two or more Striæ, are not all of an equal ſize, and many of them forked at their extremities.

The Corpus Ciliare, formed of the Ciliary Striæ and Ciliary Proceſſes, has no appearance of Muſcularity, though the contrary has been ſuppoſed by ſome Authors. A fine Injection ſhews it to be chiefly formed of a continuation of the Blood-veſſels of the Choroid coat, the branches of which divide into ſuch minute parts, as to give the whole a Villous appearance.

The Corpus Ciliare is glued to the Retina, at the fore-part of the Vitreous Humour, and a little behind the edge of the Cryſtalline Lens; but the Ciliary Proceſſes float in the Aqueous Humour in the poſterior chamber of the Eye, at the inner ſide of the root of the Iris, and may be readily turned back behind the edge of the Lens, to which they are contiguous, but do not adhere.

The Choroid Coat, with its dark Paint, ſerves to ſuffocate the rays of light which paſs through the Retina, and thereby to allow a diſtinct image to be formed upon the bottom of the Eye, and to prevent the rays from being reflected ſo as to form a ſecond image.

In theſe animals in which this Coat or its Paint is of a bright colour, it acts as a mirror to reflect light, and make the impreſſion ſtronger.

Optic Nerve and Retina.

The *Optic Nerve*, in its paſſage through the Orbit, is covered by a continuation of the Membranes which ſurround the Brain.

At the Foramen Opticum, the *Dura Mater* is divided into *two Laminæ*, one of which aſſiſts in forming the Perioſteum of the Orbit; the other, which is again divided into two Laminæ, furniſhes a ſheath to the Nerve, and accompanies it to the Tunica Sclerotica, to which it is ſo firmly connected by Cellular Subſtance, as to have induced ſome Authors to deſcribe the Sclerotica as a continuation of the Dura Mater.

The Body of the Nerve is ſtill more cloſely inveſted by the *Pia Mater*, which alſo forms ſheaths round the Nervous Faſciculi, and accompanies the Nerve into the Eye.

At the back-part of the Ball of the Eye, and a little removed from the Axis, towards the Noſe, the *Faſciculi* of the Optic Nerve paſs through a Cribriform part of the Sclerotic Coat.

The Nerve is contracted at its entrance through the Sclerotic Coat, but immediately after its ingreſs, it expands to form the Retina,—ſo called from its ſuppoſed Reticular appearance.

In the middle of the entrance of the Optic Nerve, the Artery is ſeen dividing into branches, which are diſperſed upon the inner Surface of the Retina.

The Retina advances between the Choroid Coat and Capſule of the Vitreous Humour, to the fore-part of the Eye, and terminates or diſappears upon the anterior part of the edge, or greateſt diameter of the Capſule of the Cryſtalline Lens.

The Retina is contiguous to the Choroid Coat and Capſule of the Vitreous Humour, but does not adhere to either, by Blood-veſſels or otherwiſe, till it reach the Corpus Ciliare.

Under the Corpus Ciliare, the Retina is ſo covered externally, with the Pigmentum Nigrum, and adheres internally ſo cloſely to the Capſule of the Vitreous Humour, as to be prevented from being ſeen till the black Paint be waſhed off, or till all the Coats be removed poſteriorly, and the Eye viewed through the medium of the Vitreous Humour.

The Retina is compoſed of a tender and Pulpy-like Subſtance, is ſemi-tranſparent, and of a light-grey colour, reſembling that of ground glaſs.

From the entrance of the Optic Nerve, to the edge of the Corpus Ciliare, the Retina is of an equal and uniform Subſtance, and is ſo eaſily torn and ſeparated from the edge of that body, as to be deſcribed by many Authors as terminating there.

Under the Striæ and Proceſſes of the Corpus Ciliare, the Retina is thinner than in the poſterior part of the Eye, and is ſo im-

preſſed by theſe bodies, as alſo to have the appearance of Striæ, which terminate in numerous minute Fibres, like Nerves in other parts of the Body.

The Retina is the ſeat of Viſion, and therefore the primary part of the Eye, to which all the other parts within the Orbit are ſubſervient.

HUMOURS.

Aqueous Humour.

The *Aqueous Humour* is lodged in the ſpace between the Cornea and Cryſtalline Lens.

This ſpace is divided into two Cavities, called *Chambers*, the anterior of which is ſituated between the Cornea and Iris, and is the larger of the two.

The poſterior is placed between the Iris and Cryſtalline Lens, and is ſo much ſmaller than the former, that its exiſtence has been denied by ſome Authors, though it is a diſtinct Cavity, demonſtrable, not only in the Adult, where the Pupil is open, but in the Fœtus before the Pupil is formed.

The Aqueous Humour is clear as the pureſt Water, but is ſomewhat heavier, poſſeſſes a ſmall degree of viſcidity, contains a little Salt, and is about five grains in weight.

In the Fœtus, and for the firſt month after birth, it is reddiſh and turbid.

When evacuated, it is quickly renewed; for within forty-eight hours after it has been let out by a puncture, the Cornea is obſerved to be again perfectly diſtended.

It is ſuppoſed to be ſecreted from the neighbouring Arteries, particularly from thoſe on the fore-part of the Iris and Ciliary Proceſſes.

It ſerves to keep the Cornea diſtended, and, by its roundiſh form and pellucidity, it collects and tranſmits the rays of light to the inner parts of the Eye. It likewiſe guards the Iris and Lens, and admits of the motions of the former.

Crystalline Lens.

The *Cryſtalline Lens*, which has its name from its reſemblance to Cryſtal, and from its Lenticular form,—though a ſolid body, which may be moulded into various ſhapes,—has always been claſſed among the Humours of the Eye.

It is ſituated behind the Aqueous Humour, oppoſite to the Pupil, and the whole of its poſterior part is received into a depreſſion on the fore-part of the Vitreous Humour.

Like a common Lens, or magnifying Glaſs, it has two convex Surfaces, the anterior of which is in general leſs convex than the poſterior, the two being formed of ſegments of ſpheres of an unequal ſize.

The anterior Surface, according to the experiments of PETIT, forms the ſegment of a ſphere, the diameter of which is between ſeven or eight lines, or twelfths of an inch; while the poſterior Surface is only equal to the ſegment of a ſphere of about five lines in diameter.

It has been obſerved by ZINN,—that the figure of the Lens varies at different periods, being in the Fœtus almoſt of a ſpherical form, but becoming gradually flatter on the anterior and poſterior Surfaces, till about the age of thirty, after which its form does not appear to vary.

As the figure, ſo alſo the colour and conſiſtency are found to change at different times of life.—In the Fœtus, not only the Capſule, but the Lens alſo is of a reddiſh colour; but, immediately after birth, they become perfectly tranſparent.—In a perſon conſiderably advanced in years, the Lens is obſerved to acquire a certain degree of yellowneſs, which appears firſt in the centre, and afterwards extends gradually to the circumference; and in extreme old age, this yellow tinge becomes ſo deep as to reſemble Amber.

An Aqueous Fluid is deſcribed as being ſituated between the Cryſtalline Lamellæ, which is ſuppoſed to decreaſe in quantity, and to become yellowiſh, the Lens at the ſame time increaſing in ſolidity as the perſon advances in life.—This difference however, of convexity, colour, and conſiſtence, according to the difference of age, is not uniformly met with.

The Lens becomes opaque ſoon after death, and acquires an additional opacity when put into ſpirit of wine.

It is compoſed of concentric Lamellæ, laid over each other like the coats of an Onion. Theſe Lamellæ are connected by a fine Cellular Subſtance, and are more cloſely compacted the nearer they are to the centre.

This lamellated ſtructure may be readily obſerved in the Eye of an Ox, or any other large animal, but is moſt evident when the Lens has been macerated in Water or Vinegar.

When the maceration is continued for ſome time, the Lamellæ put on a radiated appearance, the Radii running in a vertical manner, or iſſuing from the centre to the circumference, dividing the Surface into Iſoſcular Triangles.

The Lamellæ were diſcovered by LEUWENHOECK, to be of a Fibrous ſtructure. By a late writer, theſe Fibres have been conſidered as Muſcular,—but this opinion of the Muſcularity of the Lens, ſeems to have gained very few proſelytes.

The ſubſtance of the Lens ſomewhat reſembles half-melted Gum, is very ſoft and tender on the outſide, but becomes gradually firmer and tougher towards the centre, where it forms a Nucleus.

The Lens is ſurrounded by a very pellucid proper Capſule, called *Tunica Aranea*, or *Cryſtallina*, which is much thicker and

more elaſtic than the Capſule of the Vitreous Humour, but adheres ſo ſlightly, and is ſo eaſily lacerated, that after a ſmall puncture is made in it, the Lens ſtarts out, upon applying gentle preſſure to the Capſule.

The poſterior part of the Capſule is much thinner, ſofter, and weaker than the anterior; but is quite a *diſtinct Membrane* from the Tunica Vitrea; yet ſo firmly connected to it by Cellular Subſtance, that it is difficult to ſeparate them without lacerating both the Vitreous Coat and its Humour.

Some Authors deſcribe an *Aqueous Humour* as ſeated between the Lens and its Capſule; while others, of no ſmall reſpectability, deny the exiſtence of this Humour, as well as of that which is ſaid to be ſituated between the Lamellæ of the Lens.

The *Veſſels* of the Lens are not to be ſeen in the Eye of an Adult; but in that of a Fœtus, PETIT found Veſſels paſſing from the Corpus Ciliare, over the fore-part of the Capſule of the Lens.

WINSLOW afterwards obſerved, that in the Fœtus, and in new-born children, a fine injection ſucceeded ſo well as to diſcover the Veſſels of the Membrana Cryſtalina and Vitrea;—and in a Fœtus of about ſix months, the injected liquor ſeemed to him to have penetrated a part of the Cryſtalline and Vitreous Humours.

ALBINUS derives theſe veſſels from a double ſource.—In the Eye of a Whale, he demonſtrated Veſſels paſſing from the Ciliary Proceſſes to the Subſtance of the Lens;—and, at a later period, he injected in the human Eye, a ſmall branch ariſing from the Central Artery of the Retina, which proceeded in a ſtraight direction through the Vitreous Humour, and divided in the poſterior part of the Capſule into numerous branches, many twigs of which plunged into the Subſtance of the Lens.

This artery and its branches have been frequently and ſucceſsfully injected by ſucceeding Anatomiſts.

VITREOUS HUMOUR.

The *Vitreous Humour*, ſo called from its reſemblance to melted Glaſs, is ſituated in the back-part of the Cavity of the Eye, which it occupies from the inſertion of the Optic Nerve to the Surface of the Cryſtaline Lens.

It is round at the back-part and ſides, where it is covered by the Retina, but is concave before, where it forms a bed for the Cryſtalline Lens.

It is by much the largeſt of the three Humours, occupying upwards of nine-tenths of the whole Eye, and has a Gelatinous appearance,—or is ſomewhat like the glaire of an Egg.

In an Adult it is always very tranſparent, and in an Old Perſon it does not like the Lens, degenerate into a yellow, or any other colour.

In the Fœtus, like the Aqueous Humour, it is of a reddiſh colour.

The liquor with which the Vitreous Humour, is filled, is ſimilar to the Aqueous,—very fluid, tranſpires readily through the Capſule, though that Coat be entire, and, like the Aqueous Humour, is ſomewhat thicker, heavier, and more viſcid than Water.

When this Humour is evacuated by puncture, in the living Body, it is very ſeldom, though ſometimes renewed.

Upon the Surface of this Humour there is a Coat, termed *Vitrea*, as tranſparent as the Humour itſelf, and ſo thin and Cob-web-like, as to have the name of *Aranea*.

The *Tunica Vitrea* is remarkably ſmooth on its outer Surface; but within it ſends Proceſſes into the body of the Humour.

Some Authors, and among theſe WINSLOW, have deſcribed this Coat as conſiſting of two Laminæ, but SABATIER, and other late writers, ſeem ſufficiently ſatisfied that it is a ſingle Layer; and even this ſingle Layer cannot be raiſed but with difficulty, though it is demonſtrable by making a puncture to allow the Humour to eſcape, and by afterwards diſtending the part with air.

The ſtructure of the humour conſiſts in a ſet of delicate Cells, which contain the liquor within them, as may be ſeen by the aſſiſtance of Acids, or by boiling Water, or by Congelation.

The Cells of the Humour communicate freely with each other, as appears from the liquor oozing out by the ſmalleſt puncture made in the general Capſule.

Under the Corpus Ciliare, the Capſule of the Vitreous Humour ſends off an external Lamina, which accompanies the Retina, and is inſerted with it into the fore-part of the Capſule of the Lens, a little before its anterior edge. It is termed *Membranula Coronæ Ciliaris*, or *Zomula Ciliaris*, from its Striated appearance and Circular form, and aſſiſts in fixing the Lens to the Vitreous humour.

After ſending off the Ciliary Zone, the Coat of the Vitreous Humour goes behind the Capſule of the Lens, to which it firmly adheres.

Between the Ciliary Zone and part where the Capſule of the Vitreous Humour adheres to that of the Lens,—which is at the ſame diſtance behind the edge of the Lens with the diſtance of the inſertion of the Ciliary Zone before it,—a Paſſage is formed, named *Canalis Petitianus*, after PETIT, who diſcovered it.

The Membranes forming this Paſſage are pervaded by tranſverſe Fibres, in ſuch a manner, that when air is introduced, it goes freely round the edge of the Lens; but the Paſſage has a Cellular appearance, being contracted and dilated alternately.

The Canal of PETIT is nearly of the ſame breadth with the Corpus Ciliare, is always empty and has no communication with the Capſules of the Vitreous or Cryſtalline Humours.

No Veſſels are to be ſeen in the Vitreous Humour of an Adult, but in the Eye of a Fœtus, an artery is obſerved to ariſe from the central one of the Retina, which paſſes through the middle of the Vitreous Humour, ſending twigs to the Cellular Texture of this Humour while the principal Trunk is continued to the Capſule of the Cryſtalline Lens, as has been already obſerved.

The Vitreous Humour ſerves to give ſhape to the Eye, to keep the Coats properly expanded, to preſerve the due diſtance of the Lens, and direct the rays of light to the Retina.

MUSCLES OF THE BALL OF THE EYE.

The Ball of the Eye is moved by *ſix Muſcles*, which are divided, on account of their direction, into *four ſtraight* and *two oblique* Muſcles, obtaining their reſpective names from their ſize, ſituation, direction, or uſe.

Of the ſtraight Muſcles, one is ſituated above the Eye, another below it, and one on each ſide. Of the oblique, one is placed at the upper and inner, and the other at the under and outer part of the Eye.

The *Recti* Muſcles are not ſtraight, as the name implies; for, on account of the ſituation of the Eye and ſhape of the Orbit, the internal, or that next the Noſe, is the only one which runs in a ſtraight direction.

Neither are they all equally long, the internal being the ſhorteſt, the external the longeſt, and the other two nearly of the ſame length.

The four ſtraight Muſcles, which bear a ſtrong reſemblance to each other, ariſe by a narrow beginning, a little Tendinous and Fleſhy, from the edge of the Foramen Opticum, where they embrace the Optic Nerve at its entrance into the Orbit.

In their paſſage forwards, they form Fleſhy Bellies, which ſend off broad and very thin Tendons, to be inſerted into the Sclerotic Coat, under the Tunica Adnata, about a quarter of an inch behind the edge of the Cornea, and at equal diſtances from each other.

At the place of their inſertion they are ſo intimately connected with the Sclerotica, that they cannot be ſeparated from it, or be brought as far as the Cornea, without evident laceration.

The different Muſcles of the Ball, of the Eye, where they lie upon the Ball, are covered with a Cellular Sheath, which afterwards degenerates into that Cellular Subſtance which is interpoſed between the Sclerotica and Conjunctiva.

Levator Oculi;

Or *Rectus Attollens*, or *Superbus*.

Origin: From the upper part of the Foramen Opticum, below the Levator Palpebræ Superioris.

Insertion: Into the upper and fore-part of the Tunica Sclerotica.

Action: To raise the fore-part of the Ball of the Eye.

Depressor Oculi;

Or *Rectus Deprimens*, or *Humilis*.

Origin: From the inferior part of the Foramen Opticum.

Insertion: Opposite to the former.

Action: To pull the fore-part of the Eye downwards.

Adductor Oculi;

Or *Rectus Adducens*, or *Bibitorius*.

Origin: From the Foramen Opticum, between the Obliquus Superior and Depressor.

Insertion: Opposite to the inner angle.

Action: To turn the fore-part of the Eye towards the Nose.

Abductor Oculi;

Or *Rectus Abducens*, or *Indignabundus*.

Origin: From the Bony Partition between the Foramen Opticum and Lacerum.

Insertion: Into the Ball of the Eye, opposite to the outer Angle.

Action: To turn the fore-part of the Eye towards the Temple.

When two of the opposite Recti Muscles, or all of them act together, they draw the Eye into the Orbit.

When two of the adjacent Recti Muscles act, they turn the fore-part of the Eye obliquely in a direction towards their Origins.

Obliquus Superior;

Or *Obliquus Major*, or *Trochlearis*.

Origin: Like the straight Muscles, from the edge of the Foramen Opticum, between the Levator and Adductor Oculi. From thence it runs straight forward, sends off a long round Tendon, which passes through a Cartilaginous Pulley fixed behind the Internal Angular Process of the Os Frontis: from this it runs a little downwards, and returns backwards and outwards, passing under the Levator Oculi, to have its

Insertion: By a Broad thin Tendon, into the Tunica Sclerotica, about half-way between the insertion of the Levator Oculi and entrance of the Optic Nerve.

Action: To roll the Ball of the Eye, by turning the Pupil downwards and outwards.

Obliquus Inferior;

Or *Obliquus Minor.*

Origin: By a narrow beginning, from the anterior edge of the Orbitary Proceſs of the Superior Maxillary Bone, near the Lacrymal Groove, from which it paſſes obliquely outwards, backwards and upwards, round the Ball of the Eye.

Inſertion: By a broad thin Tendon, into the Sclerotic Coat, between the entrance of the Optic Nerve and inſertion of the Abductor Oculi, and oppoſite to the inſertion of the Superior Oblique Muſcle.

Action: To roll the Ball of the Eye, by turning the Pupil upwards, and inwards, and, with the aſſiſtance of the Superior Oblique Muſcle, to pull the Eye forwards, thereby becoming an antagoniſt to the Recti Muſcles.

The two Oblique Muſcles, on account of rolling the Eye, and aſſiſting it in the expreſſion of certain paſſions, have been called *Rotatores*, or *Amatores*.

VESSELS OF THE EYE.

The *Frontal*, *Faſcial*, and *Temporal Arteries*, which are branches of the External and Internal Carotids, ſupply the Palpebræ, and communicate with thoſe which are diſperſed within the Orbit.

Some ſmall branches of the *Internal Maxillary Artery* paſs through the Inferior Orbitar Fiſſure, to be diſperſed chiefly upon the Periofteum of the Orbit and Fat of the Eye.

The *Ocular Artery*, which is a branch of the Internal Carotid, paſſes though the Foramen Opticum, in company with the Optic Nerve, and ſupplies the Fat, Muſcles, and Ball of the Eye, and alſo the Lacrymal Gland and Tunica Conjunctiva.

The branches which belong to the Ball of the Eye, have the name of *Ciliares*:—They perforate the Sclerotica in different places, and are afterwards diſperſed chiefly upon the Choroid Coat and Iris.

One branch of the Ocular Artery, called *Centralis Retinæ*, perforates the Optic Nerve, and is diſperſed upon the Retina.

The *Veins* which correſpond with the Arteries of the Eye, communicate freely with each other, and paſs partly to the External Jugular Vein, by branches ſituated about the fore-part of the Orbit, and partly to the Internal Jugular Vein by the Cavernous Sinus.

NERVES OF THE EYE.

Beſides the *Optic Nerve*, already taken notice of, the Eye receives the Third and Fourth Pairs, and branches from the firſt

part of the Fifth Pair, together with the Sixth Pair, and branches from the Seventh.

The parts about the fore-side of the Orbit are supplied by branches from the Fifth and Seventh Pairs;—the Ball of the Eye by Nerves called *Ciliary*, which come from the Third and Fifth Pairs;—the fat, Muscles, Lacrymal Gland, &c. are supplied by the Third, Fourth, Fifth, and Sixth Pairs.

The *use* of the Eye is, to receive and collect the rays of light, in such a manner as to form upon the Retina the image or picture of the object which the Eye looks at; and the point where these different rays meet is called the *Focus*.

The object is painted upon the Retina in an *inverted* manner, the rays from above falling upon its under, and those from below upon its upper part; and it is supposed to be by habit, or rather by instinct, that we judge of the *real* situation of any object.

That the rays of light may terminate distinctly on the Retina, it is necessary that both the Cornea and Crystalline Lens should have a certain degree of convexity.

If either the one or the other be too prominent, the Focus will be formed before it reach the Retina, as is the case in short-sighted people, who require concave glasses to enable them to see objects distinctly, at the proper and ordinary distance.

If, on the contrary, the Cornea or Lens be too flat, or the refractive power of the Humours be in any way diminished, the Focus will then be imperfectly formed, till the object is viewed at a greater distance than ordinary, as is the case with persons advanced in life, to whom the assistance of convex glasses becomes necessary.

How an object, viewed with both Eyes, appears single, has been ascribed by the generality of Authors to custom and habit; and by others to instinct, which regulates the uniform motion of the Eye, and the accurate application of both to one point.

The Eye is enabled to judge of, or accommodate itself to objects at different distances, by the action of its Muscles increasing or diminishing the length of its Axis, and by the motions of the Iris allowing a greater or smaller quantity of light to be thrown into the Eye.

OF THE NOSE.

THE *Nose*, which is the Organ of Smell, and contributes to the general purpose of Respiration, is divided into the External Prominent Part, and the Internal Cavity, which is separated by the Septum Narium into two smaller Cavities;—or, it is divided into Hard and Soft parts.

The External part, or Nose, properly so called, is composed superiorly of Bones, inferiorly of Cartilages, and has a partial covering from the Muscles, and a general one from the common Integuments.

On the outside of the Nose are observed,—the *Radix*, or upper part;—the *Dorsum*, or middle prominence;—the *Apex*, or point;—the *Alæ*, or lateral moveable parts;—and *Columna*, or under part of the Partition next the Upper Lip.

The Osseous part of the Nose is formed by the *Ossa Nasi*, properly so called, the *Ossa Maxillaria* and *Os Frontis*, which constitute the upper and fore-part:

By the *Os Ethmoides* and *Ossa Unguis*, which form the upper, inner, and lateral parts:

And by the *Ossa Maxillaria Superioria*, *Ossa Palati*, *Os Sphenoides*, *Ossa Spongiosa Inferiora*, and *Vomer*, which form the under, inner, and back-part.

The *two Cavities*, or *Nostrils*, terminate anteriorly in the Face, and posteriorly in the Fauces, and are much enlarged by the different Sinuses which communicate with them.

The under and fore-part of the Nose consists of *five Cartilages*, of a somewhat regular figure, and of some smaller pieces, which are more irregular, and of an indeterminate number.

Of the five Cartilages, one is situated in the middle, and the other four laterally.

The middle Cartilage is the most considerable, and supports the rest: It constitutes the Cartilaginous part of the Septum Narium, and is joined to the anterior edge of the Nasal Lamella of the Ethmoid Bone, to the anterior edge of the Vomer, and to the fore-part of the Spinous Process of the Superior Maxillary Bones.

Of the lateral Cartilages, two are placed anteriorly, forming by their curved union the Tip of the Nose; and two posteriorly, which form the Alæ Nasi.

Between the anterior and poſterior Cartilages, are ſpaces filled with additional Cartilages, the number, ſize, and figure, varying in different bodies.

The elaſticity of the Cartilages contributes to the defence of the Noſe againſt external injuries.

The Noſe is covered by the common Integuments, and perforated at its under and outer-part by the Ducts of Sebaceous Glands, the contents of which may be readily ſqueezed out by the preſſure of the Fingers.

The Cartilages of the Noſe are moved in different directions, by the following Muſcles, which have been already deſcribed, viz. the *Compreſſor Narium*, the *Naſal* part of the *Frontal* Muſcle, the *Levator* and *Depreſſor Labii Superioris Alæqui Naſi*.—The Noſe may alſo be moved by the neighbouring Muſcles, which, in many inſtances, become aſſiſtants to the others.

The internal Nares or Cavities of the Noſe extend upwards to the Cribriform Plate of the Ethmoid, and to the Body of the Sphenoid Bone.

At the inner ſide they are bounded by the ſeptum Narium, which is formed by the Naſal Lamella of the Ethmoid Bone, by the Vomer, and by the middle Cartilage of the Noſe.

On the outſide, or that next the Cheek, the Oſſa Spongioſa project a conſiderable way into their Cavities, and increaſe the Surface of the Membrane of the Noſe, for enlarging the Organ of Smell.

In animals which ſmell acutely, the Oſſa Spongioſa are remarkably large and complex.

The bottom of the Noſtrils runs directly backwards, ſo that a ſtraight probe may be paſſed through either of them to the Throat.

In the fore-part of the Noſtrils there are ſtiff Hairs, called *Vibriſſæ*, which prevent the Mucus from conſtantly flowing out, and inſects, or other extraneous matter from entering.

The general Cavity of each Noſtril is divided by the Oſſa Spongioſa into *three Meatus*, or *Paſſages*, which run from before backwards, and are deſcribed by HALLER according to their ſituations, viz.

The *Meatus Narium Superior*, placed at the upper, inner, and back-part of the Superior Spongy Bone.

The *Meatus Medius*, ſituated between the Superior and Inferior Spongy Bones.

The *Meatus Inferior*, ſituated between the Inferior Spongy Bone and bottom of the Noſe.

The inſide of the Noſe is lined with a thick Spongy *Membrane*, termed *Mucoſa*, or *Pituitaria* of SCHNEIDER, or *Schneideriana*, which lines the whole internal Nares, and is alſo continued

to the different Sinuſes, to the Lacrymal Sacs and Palatine Ducts, to the Pharynx, Palate, and Euſtachian Tubes.

This Membrane is very *Vaſcular* and *Nervous*, and is the primary Organ of Smelling. It is conſtantly lubricated and preſerved in a proper degree of moiſture by the *Mucus* of the Noſe, which is diſcharged upon its Surface from numerous ſmall Follicles.

The different *Sinuſes* of the Bones of the Head, after having run obliquely backwards in a ſhort winding direction, terminate by ſmall openings in the Cavity of the Noſe.

The *Frontal Sinuſes* paſs downwards into the anterior Ethmoid Cells, which terminate in the upper part of the Noſe, behind the beginning of the Lacrymal Sacs.

Beſides the Paſſages common to the Frontal Sinuſes and anterior Ethmoid Cells, there are others proper to the Poſterior Ethmoid Cells, which terminate in the upper and back-part of the Noſe, near the openings of the Sphenoid Sinuſes.

The *Sphenoid Sinuſes* open, behind the Cells of the Ethmoid Bone, into the upper and back-part of the Noſe.

The *Maxillary Sinuſes* open at their upper and inner ſides, by one, and ſometimes two paſſages, into the middle of the ſpace between the Superior and Inferior Spongy Bones, nearly oppoſite to the under edge of the Orbits.

At the upper part of the Maxillary Sinuſes, *Appendices*, deſcribed by HALLER, are ſometimes found, which communicate with the Ethmoid Cells.

The Sides, or Walls of the Maxillary Sinuſes, are formed of thin Plates of Bone, excepting where the Proceſſes project and give them additional ſtrength. Below, they have only thin Plates between them and the Dentes Molares, the roots of which are ſometimes found to perforate the Septum.

The different Sinuſes are lined with a continuation of the *Membrana Schneideriana*; but in theſe it is thinner, leſs Vaſcular and Nervous, than that part of the Membrane which lines the general Cavity of the Noſe.

They are conſtantly moiſtened, but not filled with a fluid.

The Sinuſes increaſe and modulate the voice: Their hollow ſtructure renders the Bones lighter; but they do not appear to conſtitute part of the Organ of Smell

Their paſſages being directed backwards, prevent any kind of extraneous matter from getting into them.

The *Lacrymal Sac* is a Membranous Canal, ſituated in the Lacrymal Groove, formed by the Superior, Maxillary, Lacrymal, and Inferior Spongy Bones.

The *Oſſeous Duct*, in its deſcent, runs a little obliquely backwards to the lower and lateral part of the Cavity of the Noſe, where it terminates at the inner and fore-part of the Antrum Maxillare, under the Os Spongioſum Inferius, a little behind

the anterior extremity of that Bone, and in a direct line upwards from the second Dens Molaris.

The upper part of the Osseous Passage forms only a semi-canal, the under end a complete one.

The Lacrymal Sac is situated in the upper part of the Lacrymal Groove, behind the Tendon of the Orbicularis Muscle of the Eye-lids. About a fourth part of the Sac is situated above the Tendon, forming a kind of *Intestinum Cæcum*, and the rest is placed below.

Towards the inner angle of the Eye, behind the Tendon of the Orbicularis Muscle, the Sac is perforated by the Lacrymal Ducts.

The under part of the Sac becoming a little narrower, but without forming any Valve, passes into the Nose, under the name of *Lacrymal Duct*, *Canalis Nasalis*, or *Ductus ad Nasum*, and terminates at the inferior extremity of the Osseous Canal.

The substance of the Lacrymal Sac and Duct is similar to that of the *Membrana Schneideriana*, is defended with the same kind of Mucus with which this Membrane is lubricated, and is firmly connected to the Periosteum of the Osseous Canal.

The *use* of this passage is,—to convey the superfluous Tears to the Nose, so as to prevent them from passing over the Cheek.

The *Ductus Incisivus*, or *Nasalo Palatinus* of STENO, is a small Canal, which, as has been already observed in the description of the Bones, is only sometimes met with in the Human Body, though it is always to be found in the Ox, Horse, Sheep, &c.

When present, it takes its origin from a small Pit, formed in the fore-part of the bottom of the Nostril, under the termination of the Lacrymal Duct. It runs obliquely downwards and forwards, placed in such a manner as to receive and conduct Tears into the Mouth.

The *Arteries* of the Nose come chiefly from the external Carotids.

Those of the outer part of the Nose come from the Facial and Internal Maxillary Arteries;—those of the inner, from the Maxillares Internæ;—and a few twigs are furnished by the Ocular Arteries.

The *Veins* go to the External Jugulars;—they likewise communicate with the Ocular veins, and of course with the Lateral Sinuses and Internal Jugulars.

The *Nerves* with which the outer part of the Nose is chiefly supplied, come from the second branch of the Fifth, and from the Port o Dura of the Seventh Pair.

The inner part is principally supplied by the First, or Olfactory Nerves, and by some branches from the first and second portions of the Fifth Pair.

OF THE EAR.

THE EAR, or Organ of Hearing, is divided into the *External* and *Internal Ear*.

EXTERNAL EAR.

The *External Ear* comprehends the *Auricle*, or *Ear*, properly so called, and the *Meatus Auditorius Externus*.

It is again divided into the *Pinna*, or *Ala*, which constitutes by much the greater part of it;—and *Lobus*, which is placed at its under end.

The *Pinna* or *Ala*, is chiefly composed of Cartilage, and is divided, at its fore-part, into several *Eminences* and *Cavities*, which have obtained particular names, viz.

The *Helix*, or outer Bar, or Margin, so called from its winding direction. It arises behind at the Lobe of the Ear, surrounds its upper edge, and terminates below, nearly opposite to its origin, dividing the Concha into two parts.

The *Antihelix*, *Anthelix*, or inner Bar or Margin, which is situated within the former, and is composed superiorly of two Ridges, uniting together below.

The *Tragus*, so called from the Hairs which frequently grow from it having a resemblance to the beard of a Goat.

It is a small Eminence which lies over the Meatus Externus, and is connected to the under and fore-part of the Helix.

The *Antitragus*, so named from its being opposite to the Tragus, below the posterior extremity of the Antihelix.

The *Cavitas Innominata*, situated between the Helix and Antihelix.

The *Scapha*, or *Fossa Navicularis*,—compared in shape to that of a Boat,—situated between the two Limbs of the Antihelix.

The *Concha*, so called from its resemblance to a Fish-shell of that name. It is a large Cavity under the Antihelix, divided by the Helix into two parts, the inferior of which leads to the Meatus Auditorius.

The back part of the External Ear exhibits only one considerable *Eminence*, which is the convex Surface of the Concha.

The *Lobus*, which is the inferior soft part of the Ear, is composed of Cellular Substance, with a small quantity of Fat.

The Ear is covered by a continuation of the common Integuments, which is thinner here than on the reſt of the Body, and is perforated in many parts by the mouths of Sebaceous Ducts, which are placed immediately under the Skin.

The motions of the Ear, which are very limited, are regulated by ſeveral *Muſcles*, ſome of which are common to the Ear and Head, and others proper to the Ear itſelf. The common Muſcles have been already deſcribed. The Muſcles proper to the Ear lie cloſe upon the Cartilage, and, in the generality of ſubjects, are ſo thin, white, and indiſtinct, as to receive from ſome Authors the name of *Muſcular Membranes*.—They are as follow.

Helicis Major.

Origin: From the anterior acute part of the Helix, upon which it aſcends.

Inſertion: Into the Helix.

Action: To pull that part into which it is inſerted a little downwards and forwards.

Helicis Minor.

Origin: From the under and fore-part of the Helix.

Inſertion: Into the Helix, near the Fiſſure in the Cartilage oppoſite to the Concha.

Action: To contract the Fiſſure.

Tragicus.

Origin: From the middle and outer part of the Concha, at the root of the Tragus, along which it runs.

Inſertion: Into the point of the Tragus.

Action: To pull the point of the Tragus a little forwards.

Antitragicus.

Origin. From the internal part of the Antitragus, upon which it runs upwards.

Inſertion: Into the tip of the Antitragus, as far as the inferior part of the Antihelix, where there is a Fiſſure in the Cartilage.

Action: To turn the tip of the Antitragus a little outwards, and depreſs the extremity of the Antihelix towards it.

Transversus Auris.

Origin From the prominent part of the Concha, on the Dorſum, or back part of the Ear.

Inſertion: Into the outſide of the Antihelix.

Action: To draw the parts to which it is connected towards each other, and to ſtretch the Scapha and Concha.

The *uſe* of the External Ear is to collect the ſound, and convey it to the Meatus Externus,—the Muſcles giving tenſion to it, ſo as to render the ſounds more diſtinct.

The Cartilage of the External Ear is *connected* to the Temporal Bone by the common Integuments, and by its Muscles; and is furnished with Ligamentous Membranes, which fix it to the roots of the Zygoma and of the Mastoid Process.

The *Meatus Auditorious Externus* leads inwards, from the Concha, and in its course proceeds forwards and upwards, turning a little downwards at its farthest extremity, and terminating at the Membrana Tympani.—The turns, however, are so inconsiderable, that the bottom of the passage can be readily seen in a clear light, upon pulling the ear backwards.

It is somewhat of an *oval* form, a little contracted in the middle, and upwards of an inch in length.

Its outer end, which is a continuation of the Concha, is Cartilaginous, and has two or three *Interruptions* or *Fissures* in it.

On the upper and back-part of its circumference, there is a *Large Interruption* terminating in an oblique Margin, which is fixed to the rough edge, at the under part of the Osseous portion of the Meatus.

At the upper and back-part of the Meatus, the Cartilage has but little connection with the Bones, being there fixed by the Skin which lines the Canal.

The Osseus Canal is continued from the Cartilage of the Meatus, and is the longer of the two, particularly at the upper and back-part of the Passage.

The Meatus is lined with a continuation of the Skin, which fills up the interruptions in the Cartilage, but is thinner than on the rest of the Body.

Under the Skin of the Meatus, and near its outer end, there are numerous small glands, of a yellowish colour, placed in a Reticular Substance, formed of the Corpus Mucosum, and termed *Glandulæ Ceruminosæ*, which discharge the Wax of the Ear through small Excretory Ducts.

The *Arteries* of the External Ear come anteriorly from the Temporal, and posteriorly from the Occipital, both of which are branches of the External Carotid Artery.

The *Veins* pass partly to the External, and partly to the Internal Jugulars.

The fore-part of the Ear is supplied with *Nerves* from the third of the Fifth, and from the Portio Dura of the Seventh Pair; the under and back-part, by branches from the first and second Cervicles.

The Meatus Externus conveys the sound from the Outer towards the Inner Ear, and is supposed to do this to greater advantage, on account of the winding nature of the Passage.

The Wax lubricates the Passage, and defends it from the injuries of the air, and being of a viscid and bitter quality, assists in the exclusion of insects.

In the Fœtus, the Meatus is entirely Cartilaginous, and only adheres to an imperfect Bony Circle, in which the Membrana Tympani is fixed.

At the inner end of the Meatus Externus, the *Membrana Tympani* is situated, which has its name from covering the outer part of the *Tympanum* or *Drum* of the Ear.

It is firm, almoſt tranſparent, and of an oval form.

It is fixed in a *Groove* which divides the Meatus from the Tympanum.

It is very tenſe, but has a ſmall *depreſſion* in the middle next the Meatus, with a correſponding *convexity* towards the Tympanum, where the extremity of the Malleus is fixed to it.

Its ſituation is ſomewat oblique, the upper part being turned outwards, and the under inwards, ſo that the lower ſide of the Meatus is a little longer than the upper.

It forms a complete *Septum*, and has no hole in it, ſuch as has been deſcribed by ſome Authors.

It is formed partly of a continuation of the Lining of the Meatus, but chiefly of the Perioſteum.

The Membrana Tympani has numerous ſmall *Veſſels* from the Temporal and Stylo-maſtoid Arteries, which run in a radiated manner, and which are moſt abundant in the Fœtus.

It is the Conductor of Sound from the Outer to the Inner Ear.

In the Fœtus, this Membrane is fixed in an imperfect Ring of Bone, and, along with the Meatus, is covered with a Mucus Membrane, which defends the parts from the too ſtrong impulſe of Sound.

THE INTERNAL EAR.

The *Internal Ear* comprehends the *Tympanum*, *Labyrinth*, and certain *Paſſages* leading into theſe.

The *Tympanum*, or *Drum* of the Ear, is ſituated at the inner ſide of the Membrana Tympani, approaches to a hemiſpherical figure, and is about half an inch in width.

Btween the Tympanum and Cavity called Labyrinth, there is an *Oſſeous Septum*, which forms the bottom of the Tympanum, where there are *ſeveral Eminences*, viz.

The *Promontory*, which forms the beginning of the Scala Tympani, and divides the Tympanum into anterior and poſterior regions.

A *Protuberance* at the upper and back-part of the Tympanum, formed by the Aquæductus Fallopii.

A *Projection*, called *Eminentia Pyramidalis Tympani*, ſituated behind the Feneſtra Ovalis, in which is the Paſſage for the Stapedius Muſcle.

An *Eminence* at the upper and fore-part of the Tympanum, containing a ſemi canal, for lodging part of the Tenſor Tympani Muſcle.

In the Tympanum there are various *Paſſages*, which communicate with the neighbouring parts, viz.

The *Iter a Palato ad Aurem*, or *Euſtachian Tube*, which goes off from the upper and fore-part of the Tympanum, and runs obliquely forwards and inwards to the poſterior opening of the Noſtril, and terminates at its outer edge, above the arch of the Palate.

The poſterior part of the Tube is formed in the Pars Petroſa, at the upper and outer part of the Canal for the Carotid Artery,

The anterior portion is formed above, by the Spinous Proceſs, and root of the Pterygoid Proceſs of the Sphenoid Bone;—and below, by Cartilage and Membrane.

It is narrow next the Ear, where it can only admit the point of a Surgeon's probe; but becomes gradually wider towards the Noſe, where it terminates by an oblique opening with prominent ſides, ſufficiently large to admit a Gooſe-quill.

It is lined by a Membrane ſimilar to that of the Noſe, of which it appears to be a continuation; and on the edge of the Mouth of the Tube, it is ſo thick as to add conſiderably to its prominency.

The Euſtachian Tube preſerves the balance of Air between the Outer and Inner Ear, and prevents it from preſſing too forcibly upon the different Membranes placed in the ſides of the Tympanum.

It has been ſuppoſed to convey the ſound of a perſon's own Voice to the Inner Ear; but experiment does not favour this opinion, nor is it found to render Sound more diſtinct when the Mouth is open;—though perſons who are dull of hearing are obſerved frequently to liſten after this manner.

The *Cells of the Maſtoid Proceſs*, which open into the upper and back-part of the Tympanum, oppoſite to, but a little higher than the Euſtachian Tube.

They are very irregular, and have many windings and turnings, which communicate freely with each other, and are lined, like the Cells of other Bones, with the Perioſteum Internum.

They aſſiſt the Tympanum in reflecting the Sound.

In Quadrupeds which hear acutely, there are large Cavities connected with the Tympanum, which ſeem to ſupply the place of Maſtoid Cells.

Above the Promontory, a *Hole*, called *Feneſtra Ovalis*, the upper and under edges of which are convex upwards,—for lodging the Baſe of the Stapes.

The inner edges of this Hole are contracted by a narrow border, upon which the end of the Stapes reſts.

Below the Feneſtra Ovalis, and at the under and back-part of the Promontory, a *Hole*, ſmaller than the former, called *Feneſtra Rotunda*.

It is placed obliquely backwards, and outwards, leads to the Cochlea, but is ſhut up by a Membrane which aſſiſts in communicating Sound to the Labyrinth.

The *Sides*, or *Walls* of the Tympanum, which likewiſe aſſiſt in conveying Sound to the Labyrinth, are lined with Perioſteum, which is reflected into the different Paſſages leading from it.

The Cavity of the Tympanum contains four ſmall Bones, called *Officula Auditus*, which form a chain ſtretching acroſs from the Membrana Tympani to the Labyrinth.

The *Officula Auditus* are,—the *Malleus*, the *Incus*, the *Os Orbiculare*, and the *Stapes*;—theſe names being derived from ſubſtances which they are ſuppoſed to reſemble in ſhape.

The *Malleous*, or *Hammer*, conſiſts of a round Head, a ſmall Neck, a Manubrium or Handle, and two ſmall Proceſſes, one in the neck, long and very ſlender, and therefore called *Gracilis*; the other in the upper end of the Handle, called *Proceſſus brevis*.

The *Handle* is by ſome Authors conſidered as one of the Proceſſes, and is then called the longeſt of the three. It forms an angle with the Neck, becomes gradually ſmaller, and is bent, at its extremity, towards the Membrana Tympani.

In the natural ſituation, the *Head* is turned upwards and inwards, and the *Handle* down upon the Membrana Tympani, to which it adheres.

The *Incus*, compared in ſhape to an *Anvil*, but more reſembling one of the Dentes Molares, with its roots widely ſeparated, is ſituated behind the Malleus, and is formed of a *Body*, and *two Crura* of unequal lengths.

The *Body* has a *Cavity* and *two Eminences*, correſponding to that part of the Malleus with which it is articulated.

The *ſhort Crus* extends backwards, and is joined by a Ligament to the edge of the Maſtoid opening.

The *long Crus* is turned downwards, with the point a little flattened, and bent inwards.

The *Os Orbiculare* is the ſmalleſt Bone of the Body, being conſiderably leſs than a grain of Muſtard-ſeed.

It is articulated with the point of the long Proceſs of the Incus, and is ſo firmly fixed to it, that in ſeparating the ſmall Bones of the Ear from each other, it is apt to adhere to the Incus, and has on this account been frequently conſidered as a Proceſs of that Bone.

The *Stapes* is named from a ſtriking reſemblance it has to a *Stirrup*. It is divided into *Head*, *Crura*, and *Baſe*.

The *Head* is placed upon a ſmall flat neck, and is articulated with the Os Orbiculare.

The *Crura*, like thoſe of the Incus, are unequal in length, and have a groove within, which is occupied by a Membrane.

The *Baſe* is of an oval ſhape, and has no perforation in it. Its edges correſpond with thoſe of the Feneſtra Ovalis, with which it is articulated.

The Stapes is placed horizontally, being nearly at a right angle with the inferior Crus of the Incus.—Its two Crura are placed in the ſame plane,—the longeſt backwards.

The ſmall Bones of the Ear are *articulated* with each other by *Capſular Ligaments*, proportioned to their ſize, and are covered by the Periofteum, which likewiſe fixes them to the Membrana Tympani and Feneſtra Ovalis.

The ſmall Bones have the following *Muſcles* fixed to them, which ſerve for their different motions.

Tensor Tympani, or *Internus Auris*.

Origin: From the Cartilaginous extremity of the Euſtachian Tube, near the entry of the Artery of the Dura Mater. From thence, its Fleſhy Belly runs backwards in a Canal peculiar to it, at the upper and inner part of the Oſſeous Portion of the Tube, being covered only by a thin plate of Bone. It ſends off a ſlender Tendon, which makes a turn in the Tympanum, and paſſes outwards.

Inſertion: Into the poſterior part of the Handle of the Malleus, a little below the root of its long Proceſs.

Action: To pull the Malleus and Membrana Tympani inwards by which the Membrane is rendered more concave and tenſe, and better adapted for the impreſſion of weak ſounds.

Laxator Tympani.

Origin: By a very ſmall beginning, from the extremity of the Spinous Proceſs of the Sphenoid Bone, behind the entry of the Artery of the Dura Mater; after which it runs backwards and a little upwards, at the outſide of the Euſtachian Tube, in a Fiſſure of the Os Temporis, near the Foſſa which lodges the Condyle of the Lower Jaw

Inſertion: Into the long Proceſs of the Malleus, within the Tympanum.

Action: To draw the Malleus obliquely forwards and outwards, and thereby to render the Membrana Tympani leſs convex, or to relax it when Sounds are too ſtrong.—Haller denies the exiſtence of Muſcular Fibres in this Subſtance.—Sabatier deſcribes it, but doubts of its Muſcularity.

Stapedius.

Origin: By a ſmall Fleſhy Belly, from a little cavern in the Pars Petroſa, near the Cells of the Maſtoid Proceſs. Its Ten-

don passes forwards through a small Hole in that Cavern, and goes into the Tympanum.

Insertion: Into the posterior part of the Head of the Stapes.

Action: To draw the Head of the Stapes obliquely upwards and backwards, by which the posterior part of its Base is moved inwards, and the anterior part outwards, and the Membrana Tympani thereby put upon the stretch.

Labyrinth.

The *Labyrinth*, so called from its Sinuosities and windings, is situated at the inner-part of the Tympanum, and is formed of the *Vestible*, *Cochlea*, and *Semicircular Canals*, together with the *Canalis Fallopii* and *Meatus Auditorius Internus*.

The *Vestible*, named from its forming a porch or entry to the Cochlea and Semicircular Canals, is of an oval figure, nearly of the size and shape of a clean grain of Barley, and is situated at the inner side of the Base of the Stapes.

There are three contiguous *Cavities* in the Vestible, one of which, the *Semi-oval*, is situated above; another, the *Hemispherical*, below; and the third, or *Sulciform*, which is the orifice of the Aquæductus Vestibuli, is placed behind.

In the Vestible there are several Holes which communicate with the neighbouring parts, viz.

The *Fenestra Ovalis* situated at the outside, by which it communicates with the Tympanum.

A *round Hole*, situated at the fore and under-part, by which it communicates with one of the Canals of the Cochlea.

Five Similar Foramina behind, by which it communicates with the Semicircular Canals.

Next the Meatus Auditorius Internus, it has four or five *Cribriform Perforations*, for the transmission of Nerves.

The *Cochlea* is situated next the anterior extremity of the Os Petrosum, and at the fore-part of the Vestible, in such a manner as to have its Base towards the Meatus Auditorius Internus, and its Apex in the opposite direction,—or facing outwards.

It has two *Canals* or *Gyri*, called *Scalæ*, from a supposed resemblance to Stair-cases, the Gyri or turns of which are very close to each other, and run in a spiral direction, like the Shell of a Snail, from which the part has obtained its name.

The Cochlea forms *two Circumvolutions or Turns and a half*, the first of which is much larger and wider than the other Turn and a half, which become suddenly smaller.

The two Canals are upon the same level, the inner one next the Base, and the outer next the point of the Cochlea.

The *Gyri* go round a Nucleus, Axis, or central Pillar, which is nearly horizontal, and is formed of *two hollow Cones*, with their points turned to each other, the one termed *Modiolus*, from

its resemblance to the Spindle of a winding Stair-case, the other *Infundibulum*, or Funnel.

The *Modiolus* forms the inner and larger portion of the central Pillar, and is that Cavity seen in the under and fore-part of the Meatus Auditorius Internus.

It lodges that branch of the *Portio Mollis* of the Seventh Pair of Nerves, which goes to the Cochlea, and is Cribriform, or full of small Holes for the passage of the twigs of that branch.

The Modiolus consists of *two Plates*, with numerous *Cells* and *Passages* between them, and terminates in the middle of the second Gyrus of the Cochlea.

The *Infundibulum* is an imperfect Funnel, the Apex of which is common with that of the Modiolus, and the Base is covered by the Apex of the Cochlea, which is termed *Cupola*.

Between the Scalæ of the Cochlea there is a Partition, called *Lamina Spiralis*, or *Septum Scalæ*, the larger portion of which, next the Modiolus, is formed of Bone: The remainder, or that part next the opposite side of the Scalæ, is Membranous, and termed by VALSALVA *Zona Cochlæ*.—This drops out by maceration, so as afterwards to leave only a partial Septum.

The Osseous part of the Lamina Spiralis is composed of *two extremely thin Cribriform Plates*, which gradually approach each other at their opposite edges, where they are perforated by numerous Holes.

The termination of the Lamina Spiralis, and of the Scala Tympani, forms a *Hamulus*, or small Hook, which projects into the Infundibulum.

One of the Canals or Scalæ of the Cochlea, opens into the under and fore-part of the Vestible, and is termed *Scala Vestibuli*: The other, which is the smaller of the two, communicates with the Tympanum by the Fenestra Rotunda, and is called *Scala Tympani*.

The Partition between the two Gyri or Turns of the Cochlea, like the Osseous part of the Lamina Spiralis, is formed of *two Plates*, with a small *Cavity* between them.

The *Volute*, or Spiral of the Cochlea, begins below, runs forwards, and then round, so as to form, as has been already mentioned, two Circles or Turns and a half, the direction of the Gyri corresponding with those of the Shell of a Snail.

The Canals of the Cochlea are conical, becoming gradually smaller towards the Apex, where they communicate freely with each other, through the medium of the Infundibulum.—This communication is called by CASSEBOHM, who gives the fullest Treatise upon the Ear, *Canalis Scalarum Communis*.

The *Semicircular Canals* are three in number,—the *Superior* or *Vertical*,—the *Posterior* or *Oblique*,—and the *Exterior* or *Horizontal*.

The *Superior* is placed tranverſely, in the upper-part of the Pars Petroſo, with its convex ſide upwards.

The *Poſterior* is farther back than the former one, and is paralleſ to the length of the Pars Petroſa, with the convex ſide turned backwards.—One of its extremities is placed above, and the other below, the upper extremity joining with the internal one of the Vertical Canal, by which a common Canal is formed.

The *Exterior* is leſs than the other two, which are more of an equal ſize, is placed next the Tympanum, and has its extremities and curvatures nearly upon the ſame plane;—with the curve placed backwards.

Each of the Canals forms upwards of three-fourths of a circle, can admit the head of a ſmall Pin, and has an Enlargement, Ampulla, or Cavities Elliptica, at one end, the other extremity being nearly of the ſame ſize with the reſt of the Canal.

The *Orifices* are only five in number, two of the Canals having a common termination. Of theſe Orifices, three are ſituated at the inſide, and two at the outſide of the Veſtible, into the poſterior part of which they open.

In the bottom of the Meatus Auditorious Internus, which is ſituated in the poſterior Surface of the Pars Petroſa, there is a large under, and a ſmall upper *Foſſula*, ſeparated by a ſharp Ridge.

The fore-part of the inferior Foſſula leads towards the Cochlea, and is perforated with numberleſs *ſmall Holes*, through which branches of the Portio Mollis of the Seventh Pair of Nerves paſs to the Cochlea.

One Hole in the centre, larger than the reſt, tranſmits a branch of that Nerve to the Infundibulum.—This Hole, however, is frequently enlarged, in conſequence of the Bone, which is extremely thin, being broken while preparing it.

In the back-part of the inferior Foſſula, three or four *Cibriform Holes* appear, for the tranſmiſſion of branches of that part of the Portio Mollis deſtined for the Veſtible and Semicircular Canals.

In the upper Foſſula of the Meatus Internus, there are *two Paſſages*, one poſterior and ſmaller, tranſmitting Nerves into the Elliptical Cavity of the Veſtible.

The other, the anterior and largeſt, is termed *Canalis* or *Aquæductus Fallopii*,—from a reſemblance it bears to an Italian Aqueduct, and ſerves for a tranſmiſſion of the Portio Dura of the Seventh Pair of Nerves.

The *Canal* of *Fallopius* goes through the upper-part of the Pars Petroſa, paſſes downwards and backwards between the Foramen Ovale and external Semicircular Canal, and terminates in the Foramen Stylo-Maſtoideum.

In its paſſage through the Pars Petroſa, it communicates with the Foramen Innominatum, ſituated on the upper and fore-part of the Proceſs.

In Children, the Labyrinth is almoſt as large as in Adults, its Subſtance complete and hard, while the Bone which ſurrounds it is ſoft and ſpongy; on which account it is eaſily ſeparated from the reſt of the Pars Petroſa.

The different Cavities and Paſſages of the Labyrinth are lined with the Perioſteum, which in the Veſtible fills the Feneſtra Ovalis, and of conſequence covers the Baſe of the Stapes.

The Perioſtea of the two Canals of the Cochlea form, by their union, the Membranous portion of the Lamina Spiralis, which, together with the Oſſeous part, completes the Septum between the two Scalæ.

The Perioſteum of the Cochlea alſo aſſiſts that of the Tympanum, in forming the Membrane of the Feneſtra Rotunda, and which is ſometimes called *Membrana Tympani Secundarii*, from a reſemblance to the Membrana Tympani, and from being, like it, a little concave on the outer, and convex on the inner Surface, or where it faces the Scala to which it belongs.

Beſides the Perioſteum, the Veſtible, Cochlea, and Semicircular Canals contain a *Pulpy Membrane*, upon which the Portio Mollis is irregularly diſperied.

In the Veſtible, the Pulpy Membrane forms a *Sac*, in ſhape reſembling that of the Oſſeous Cavity which contains it, and which is deſcribed and beautifully deliniated by SCARPA.

When the Sac is laid open upon the upper and outer-part, a *Partition* appears, of the nature of the Sac, termed by Dr. MECKEL, *Septum Veſtibuli Nervoſo-membranaceum*.

In the Cochlea, the Pulpy Membrane is in contact with the Perioſteum, but can be ſeparated from that Membrane without much difficulty.

In the Semicircular Canals, it is at ſome diſtance from the Perioſteum of theſe Bones, and is conſiderably ſmaller, but, like them, it forms diſtinct Tubes, which communicate with the Veſtible. Like the Oſſeous Canals alſo, the Membranous Canals form Ampullæ, or Elliptic Cavities at one end.

The *Arteries* of the Labyrinth ariſe by one or two ſmall branches, chiefly from the Vertebral Artery, and paſs through the Cribr form Plate, at the bottom of the Meatus Externus which belongs to the Labyrinth.

From the Labyrinth one or two *Veins* return, and terminate in the end of the Lateral Sinus.

The Cavity of the Veſtible contains no Air, but is conſtantly filled with a *Watery Fluid*, ſuppoſed to be ſecreted from the Arteries of the Perioſteum, and which is found to reſemble the Aqueous Humour of the Eye.

The Aqueous Fluid fills the Veſtible and Scalæ of the Cochlea, and likewiſe ſurrounds the Membranous Semicircular Canals.

The *Aqua Labyrinthi* is conſidered as a medium by which ſounds are communicated from the Membrane filling the round and oval Holes, and from the Baſe of the Stapes to the Pulpy Membrane placed in it.

The ſuperfluous part of the Aqua Labyrinthi is ſuppoſed by COTUNNIUS to be carried off by two ſmall *Conical Ducts*, more particularly deſcribed by him than by ſome preceding Anatomiſts, who were partly acquainted with them, but conſidered them as Blood-veſſels.

One of the Aqueducts of COTUNNIUS, called *Aquæductus Cochleæ*, begins at the under-part of the Scala Tympani, near the Feneſtra Rotunda, and after paſſing through the Pars Petroſa, is ſeen, in the figures he gives of it, terminating by a wide triangular opening, upon the ſurface of the Dura Mater, between the paſſages of the Seventh and Eighth Pair of Nerves.

The other Duct, called *Aquæductus Veſtibuli*, begins under the termination of the common Canal, in the Veſtible, from which it deſcends, and terminates by a triangular opening between the Layers of the Dura Mater, behind the Meatus Internus, and half way between the upper edge of the Pars Petroſa and Diverticulum of the Internal Jugular Vein.

For a full account of theſe Ducts, and of the other parts of the Labyrinth, ſee *a Deſcription of them by* Dr. MECKEL *of Berlin.*

The *Nerves* of the Labyrinth are derived entirely from the Seventh Pair.

The *Auditory Nerve* is compoſed of two branches, one of which is called *Portio Dura*, and is harder than the other, termed *Portio Mollis*.

The Trunk of the Auditory Nerve paſſes into the Meatus Externus, covered by the inveſting Membrane of the Brain.

The *Portio Dura* goes through the Canalis Fallopii, ſending off, in its paſſage, branches through Perforations in its ſides, to the Stapedius Muſcle and Maſtoid Cells.

One *reflected branch* paſſing through the Foramen Innominatum, in the Pars Petroſa, forms a connection between the Portio Dura and the ſecond part of the Fifth Pair.

Another, called *Chorda Tympani*, paſſes acroſs the Cavity of the Tympanum, between the inferior Crus of the Incus and handle of the Malleus, and at the outſide of the Euſtachian Tube, to join the Lingual branch of the Fifth Pair. In its paſſage it ſupplies the Muſcles of the Malleus, and Membranes, &c. of the Tympanum.

The remainder of the Portio Dura is diſperſed upon the Face.

The *Portio Mollis* is divided into two principal parts,—one to the Cochlea, the other to the Veſtibie.

The branches of the Cochlea pafs through the Cribriform Plates of the Modiolus, to the Pulpy Membrane lying in the Scalæ.

The branches run between, and likewife on the out-fide of the Partitions which devide the Cochleæ into Gyri, and the Gyri into Scalæ, and are large and numerous in proportion to the part they fupply.

The largeft and moft numerous of thefe branches are difperfed upon the Lamina Spiralis, where they form an intricate Plexus, the Threads of which are at firft opaque, but are afterwards of the colour of the Retina of the Eye.

The branches terminate, and appear alfo to meet upon that part of the Pulpy Membrane, which is moft diftant from the Modiolus.

Through the Cribriform Plate, common to the Modiolus and Infundibulum, the laft branches of this portion of the Nerves pafs, to be fpread out upon the Membrane lying within the Infundibulum.—*For a particular defcription of that part of the Portio Mollis diftributed to the Cochlea and of the Cochlea itfelf, fee* Dr. MONRO's *Treatife on the Ear.*

Of that part of the Portio Mollis deftined for the Veftible and Semicircular Canals, one branch goes through the poiterior Hole in the upper-part of the Meatus Internus; the reft pafs through the holes in the under and back-part of the Meatus, already pointed out in the defcription of that Paffage.

After perforating the Foramina, the Nerves are feen firft in diftinct Plexus, but become afterwards tranfparent, and are loft upon the Sac contained in the Veftible and upon the Ampulla of the Membranous Semicircular Canals.

The *Portio Mollis* is the primary part of the Organ of Hearing, to which all the other parts are fubfervient, and may be regarded as being of the fame fervice to the Ear, as the *Retina* is to the Eye.

OF THE MOUTH, TONGUE, *AND THROAT.*

WITH THEIR APPENDAGES.

MOUTH.

THE *Osseous Parts* of the mouth are,—the *Ossa Maxillaria Superiora*, the *Ossa Palati*, the *Maxilla Inferior*, and the *Teeth*; —all of which have been already described.

The *Soft Parts* of the Mouth consist of the *Lips* and *Cheeks*, the *Gums*, the *Palate*, the *Velum Palati*, the *Uvula*, the *Tongue*, the *Membrane* lining the Mouth and the *Salivary Glands*.

The *Lips* and *Cheeks* are principally composed of Muscles, are covered on the outside by the common Integuments, and lined within by the Membrane of the Mouth, under which there are numerous Mucous Glands, which obtain their names from their situations.

The intervening space between the Masseter and Buccinator Muscles is occupied by a large quantity of Fat, which gives form to the Face.

The *Membrane* of the Mouth is covered with fine *Villi*; but these are most conspicuous upon the edges of the Lips, as may be readily seen after a fine injection, or after macerating the parts till the Cuticle can be separated.

From the edges of the Lips, the Common Integuments (now become extremely thin) are converted into the Membrane which is continued into the Cavity of the Mouth, and which, opposite to the Dentes Incisores of the Upper and Under Jaws, forms a small Doubling or *Frænum*, which fixes the Lips more firmly to the Jaws.

The Lips are serviceable in the general purposes of Speaking, Eating, Drinking, &c.

The *Gums* cover the sides of the Alveolar Border of both Jaws, pass in between the different Teeth, and surround and adhere firmly to the Collar of each.

The Substance of the Gums is of a dense nature, very Vascular, and the Vessels united by a compact Cellular Substance.

They may be said to consist of the Common Membrane of the Mouth and the Periosteum of the Jaws intimately connected.

They serve as a covering to the Jaws and assist in the security of the Teeth,

The *Arteries* of the Lips, Cheeks, and Gums, are from the Facial, Temporal, and Internal Maxillaries, which are derived from the External Carotids.

The *Veins* go chiefly to the External, and partly to the Internal Jugulars.

The *Nerves* come from the first and second branches of the Fifth Pair, and also from the Portio Dura of the Seventh Pair.

The *Palate* is divided into the *Palatum Dure* and *Palatum Molle*. The former is composed of the Palate-plates of the Upper Jaw, and is covered by the Periosteum and common Membrane of the Mouth, which prevent the Bones from being injured.

The Membrane which covers the Bones of the Palate forms numerous *Rugæ*, which assist in the division of the Food.

It is nearly of the same structure with that of the Gums, but perforated by the Ducts of the Palatine Glands, for the excretion of Mucus, which serves to lubricate the Palate, and assists in dissolving the Food.

The *Palatum Molle*, *Velum Pendulum Palati*, or *Soft Palate*, is that part which depends from the posterior edge of the Ossa Palati, and from the Pterygoid Processes of the Sphenoid Bone, and forms a Partition between the Nose and Mouth.

It is composed of the Membranes which line the Nose and Mouth, and of the expansions of the Circumflex and Levator Palati Muscles, and numerous Mucous Glands which serve to lubricate the Mouth and Throat, and facilitate deglutition.

The Palatum Molle conducts the Fluids of the Nose into the Mouth, and acts like a Valve in preventing what we swallow from passing into the nose.

In the middle of the posterior edge of the Velum Palati, the *Uvula* or *Pap* of the Throat, takes its origin, and hangs pendulous, from the Velum over the root of the Tongue.

It is of a Conical form, is covered by the Membrane of the Mouth, and has a small Muscle within it, by which it is elevated and shortened,—its other motions depending upon the Muscles of the Palate.

The *use* of the Uvula in Speaking and in Deglutition, is evident from the inconveniencies which result from its being destroyed by disease.

The *Arteries* of the Palate, &c. come from the Facial, and Internal Maxillary.

The *Veins* go the External and Internal Jugulars.

The *Nerves* are chiefly from the second of the Fifth, with some twigs from the Eighth Pair.

Tongue.

The *Tongue* is of an *Oval form*, and is divided into *Baſe*, *Body* and *Apex*.

The *Baſe*, or poſterior part of the Tongue, is connected to the Os Hyoides, and by the medium of this, to the adjacent Bones and Muſcles.

The *Body*, or middle part of the Tongue, terminates anteriorly in the looſe moveable point.

On the Dorſum or upper Surface, there is a *Linea Mediana*, or middle Groove, running longitudinally, and dividing it into two lateral convexities.

The inferior Surface, which reaches only from the middle of the Tongue to the point, is connected to the parts below it by the Sublingual Ligament, or *Frænum Linguæ*, which is a doubling of the Skin, or lining of the Mouth.

The ſides of the Tongue are fixed to the Lower Jaw and Styloid Proceſſes, and parts adjacent, by *Membranous Ligaments*.

The Tongue is chiefly *compoſed* of the Fibres of the Muſcles which ſerve for its motions.—Theſe Fibres are diſpoſed in various directions, and intermixed with a Medullary Fat.

The upper and lateral parts of the Tongue are compoſed of the Stylo-Gloſſi.—Its middle portion, between the two former Muſcles, is formed of the Linguales.—The lower part is chiefly formed of the Genio-Gloſſi;—and behind, the Stylo-Gloſſi enter into its compoſition.

The Tongue is covered by a continuation of the common Integuments, which are preſerved ſoft and moiſt by the Saliva.

The Cuticle forms Vaginæ for receiving the Subſtances called *Papillæ*.

The Corpus Mucoſum of the Tongue is thicker than in other parts of the Body, but more moiſt.

The third covering of the Tongue, the Cutis Vera, is remarkably Nervous.—The Papillæ, which take their origin from it are very Vaſcular, eſpecially near the Apex of the Tongue, but are awanting on its under ſurface.

The *Papillæ* are divided into three kinds, the *Maximæ*, *Mediæ*, and *Minimæ*.

The firſt claſs, called *Papillæ Maximæ*, *Lenticulares*, or *Capitatæ*, are by much the largeſt, and of a Lenticular form, having round Heads and ſhort Stems.

They are placed at the Baſe of the Tongue, in ſuperficial Foſſulæ, and are diſperſed in ſuch a manner as to form an angle with its point backwards.

They are Glands of the Salivary kind, and have each of them a ſmall Perforation in the middle of its convex Surface, for the excretion of Mucus.

Beſides the Papillæ Capitatæ, there are numerous *Mucous Follicles*, which cover the greater part of the Surface of the root of the Tongue.

At the root of the Tongue, and behind the angle formed by the Papillæ Maximæ, there is a Hole, called *Foramen Cæcum* of MORGAGNI, by whom it was firſt deſcribed.

It penetrates only a ſmall way into the Subſtance of the Tongue, and receives the Mouths of ſeveral Excretory Ducts which terminate in it.

The ſecond claſs called *Papillæ Mediæ*, or *Semi-lenticulares*, are much ſmaller than the former, and are ſcattered over the upper Surface of the Tongue, at ſome diſtance from each other.

They are of a Cyndrical form, and terminated by a round extremity.

The third claſs, termed *Papillæ Minimæ*, or *Conicæ*, or *Villoſæ*, are by much the moſt numerous, but very minute. They occupy almoſt the whole upper Surface of the Tongue, but are moſt abundant towards the Apex, where the ſenſation of Taſte is moſt acute.

This and the ſecond claſs have been ſuppoſed to be formed chiefly of the extremities of Nerves, and to conſtitute the real Organ of Taſte; though other parts, as the Palate, and even the Pharynx and Eſophagus, poſſeſs the faculty of Taſte in a certain degree.

The principal Blood-veſſels of the Tongue are large in proportion to the ſize of that Organ.

They are called *Linguales*, or *Raninæ*, on account of the dark-coloured branches which appear under the Tongue.

The *Arteries*, which are branches of the External Carotids, are not found to communicate ſo freely on the oppoſite ſides of the Tongue, as they do in other parts of the Body.

The *Veins* open chiefly into the External Jugulars.

The *Nerves* like the Arteries, are large and numerous, and have little connection on the oppoſite ſides.

They come from the Fifth, Eighth, and Ninth Pairs.

The firſt ſet ſupply the parts next the point of the Tongue, and are therefore conſidered as being principally concerned in conveying the ſenſation of Taſte.

The ſecond ſet ſupply the root and the third the middle of the Tongue, and are chiefly diſperſed upon its Muſcles.—There is a conſiderable intermixture, however, between the three ſets on the ſame ſide.

Beſides being the principal Organ of Taſte, the Tongue is the chief inſtrument of Speech, and of the articulation of the Voice, —It alſo aſſiſts in Manducation, Deglutition, Spitting, Sucking, &c.

The *Salivary Glands* conſiſt of three large Glands on each ſide of the Face, viz.—the *Parotid*, the *Submaxillary*, and the

Sublingual;—beſides many ſmall Glands, named from the parts to which they belong.

They are of a yellowiſh colour, and irregular on their Surface, being of the Conglomerate kind.

The *Parotid Gland*, which is the largeſt of the Salivary Glands, is named from its ſituation near the Ear.

It occupies the whole ſpace between the Ear, Maſtoid Proceſs, and the angle of the Lower Jaw.

It extends ſuperiorly to the Zygoma, and anteriorly to the Maſſeter Muſcle, part of which it covers.

The under end of it lies contiguous to the Submaxillary Gland.

From the different parts of the Gland, numerous ſmall branches ariſe, which join together to form a large Duct, ſometimes called STENO's *Salivary Duct*, or *Ductus Superior*, which paſſes from the upper and fore-part of the Gland.

The Parotid Duct is of a white colour and large ſize, but, from the thickneſs of its Coats, the Cavity is ſmall in proportion to the outſide of the Duct.

It paſſes anteriorly, in a tranſverſe direction, over the Tendon of the Maſſeter Muſcle, by which it is free from compreſſion, and deſcends a little to perforate the Buccinator Muſcle, oppoſite to the ſecond or third Dens Molaris of the Upper Jaw.

In croſſing the Maſſeter Muſcle, it receives ſometimes one, ſometimes two minute Ducts, from an equal number of ſmall Glands, called by HALLER, *Glandulæ Acceſſoriæ*.

The *Inferior Maxillary*, or *Submaxillary Gland*, is ſmaller and rounder than the Parotid, and is ſituated on the inſide of the angle of the Lower Jaw, between it and the Tendon of the Digaſtric Muſcle.

From the upper and fore-part of this Gland, a Duct ariſes, called by ſome Authors *Ductus* WHARTONII, or *Ductus Inferior*, which is much thinner in ſubſtance than the former Duct, but longer.

It paſſes forwards between the Mylo-Hyoideus and Genio-Gloſſus Muſcles, along the under and inner edge of the Sublingual Gland, to the ſide of the Frænum Linguæ, and terminates behind the Dentes Inciſores, by a ſmall orifice, in form of a Papilla.

The *Sublingual Gland* is ſmaller and ſofter than the Submaxillary, and is flat, and of an oval form.

It is ſituated under the anterior portion of the Tongue, above the Duct of the inferior Maxillary Gland near the Lower Jaw, between the Mylo-Hyoides and Genio-hyogloſſus Muſcles, the former of which ſuſtains it.

Its extremities are turned forwards and backwards, and the edges obliquely inwards and outwards.

It is covered by a continuation of the Skin of the under ſide of the Tongue, which fixes the Gland in its place.

It opens by several orifices arranged in a line near the Gums, a little to the outside of the Frænum.

In many Quadrupeds, there is a distinct duct belonging to this Gland, like that of the Submaxillary.

Sometimes this Gland sends off a Branch which communicates with that of the Submaxillary, but generally it is otherwise.

The smaller Glands of the Mouth are in great numbers, lying between the inner lining of the Mouth and its Muscles, and deriving their names from their situations.

They are small simple Glands, each sending a duct, which perforates the Skin of the Mouth, and opens into its Cavity.—They consist of—

The *Buccales*, which are placed all over the Cheek, but most plentifully near the termination of the Parotid Duct;

The *Labiales*, lying on the inside of the Lips;

The *Palatinæ*, upon the Palate; and

The *Linguales*, at the root of the Tongue.

The *Arteries* of the Salivary Glands are from different Branches of the External Carotids.

The Parotid is supplied from the Temporal, the Inferior Maxillary from the Facial, and the Sublingual from the Lingual Artery.

The *Veins* of these Glands go to the External Jugulars.

Their *Nerves* are chiefly from the third part of the Fifth, and from the Portio Dura of the Seventh Pair.

The Salivary Glands serve for the secretion of the Saliva, which they pour out in large quantity, and which is promoted by the motion of the Lower Jaw.—The Saliva assists in the solution of the food in the Mouth, in lubricating the throat for its passage downwards, and in the digestion of it in the Stomach.

THROAT.

The *Throat* consists of the *Arches of the Palate*, of the *Pharynx and Larynx*, with the *Muscles*, *Vessels*, *Nerves*, &c. which surround them.

The *Arches of the Palate* are two in number, in each side of the Throat, one of which is termed the *Anterior*, the other the *Posterior*.

They are formed of a Doubling of the Skin, with a few scattered Muscular Fibres.

The *Anterior* arises from the middle of the Velum Palati, at the side of the Uvula, and is fixed to the edge of the Base of the Tongue.

The *Poſterior* has its origin likewiſe from the ſide of the Uvula, and paſſes downwards, to be inſerted into the ſide of the Pharynx.

The Anterior Arch contains the Circumflex Muſcle of the Palate, and, with its fellow on the oppoſite ſide, forms the opening into the Throat, called *Iſthmus Foucium.*

The Poſterior Arch has within it the Levator Muſcle of the Palate.

Between the Anterior and Poſterior Arches, and cloſe by the ſides of the Baſe of the Tongue, the *Amygdalæ, Tonſils,* or *Almonds* of the Ears are ſituated.

They are of a reddiſh colour, of the figure of Almonds, full of Cells which communicate with each other, and have large irregular openings, which convey the Mucus into the Throat, the diſcharge of which is promoted by the motion of the ſurrounding parts.

Pharynx.

The *Pharynx,* ſo called from its conveying Food to the Stomach, and Air to the Lungs, is a large Muſcular Bag, in form of an irregular Funnel, with the Tube called *Eſophagus* deſcending from it, and forming the under end of that Funnel.

It is bounded above by the Cuneiform Proceſs of the Occipital Bone, the Pterygoid Proceſſes of the Sphenoid Bone, and back-part of the Jaws, with all of which it is intimately connected.

The anterior margins of its Fleſhy parts are connected to the edges of the Larynx, and its ſides are covered by the great Blood-veſſels of the Neck.

The fore-part of the Pharynx is formed by a Membrane common to it and to the back-part of the Larynx.

Behind, it lies flat upon the Cervical Vertebræ, and upon the Muſcles which cover the fore-parts of the ſides of theſe Vertebræ.

It has ſeveral *Openings* by which it communicates with neighbouring Cavities.

Two of theſe lead upwards and forwards by the poſterior Nares into the Noſe;—two go laterally by the Euſtachian Tubes to the Ears;—one paſſes forwards through the large opening, termed Fauces, or Top of the Throat, to the Mouth;—one goes downwards and forwards, through the Larynx and Trachea, to the Lungs:—and another directly downwards by the Eſophagus to the Stomach.

The Pharynx is ſurrounded by a looſe Cellular Subſtance, and conſiſts of different Layers of Muſcles, called *Conſtrictores Pharyngis,* which have been already deſcribed.

On the inner ſide, it is lined by the continuation of the Membrane of the Mouth, which is perforated by the Ducts of numerous Glands, for the ſecretion of Mucus.

The lower end of the Pharynx, oppoſite to the under edge of the Cricoid Cartilage, deſcribes a complete Circle, which forms the beginning of the Eſophagus.

The Pharynx is ſupplied with Blood by the Pharyngeal Branches, which come directly or indirectly from the External Carotids. It returns its blood to both Jugular Veins.—Its nerves are from the Eighth Pair.

The *Uſe* of the Pharynx is,—to receive the Aliments from the Mouth, and by the action of its Muſcles to convey them to the Eſophagus. It muſt likewiſe aſſiſt in the modification of the Voice.

Larynx.

The *Larynx*, ſo called from its being the principal Organ of Voice, is ſituated at the upper and fore-part of the Neck immediately under the Os Hyoides, which is placed at the root of the Tongue.

It is compoſed of Cartilages and Muſcles, Ligaments, Membranes, and Mucous Glands; and is connected above to the Tongue and Os Hyoides, and behind to the Pharynx.

The *Cartilages* of the Larynx are generally conſidered as being five in number, though, beſides theſe, ſome chooſe to enumerate ſmall Projections which are connected with them.

The *Five* Cartilages are,—the *Thyroid*, the *Cricoid*, the *Two Arytenoid*, and the *Epiglottis*.

The *Thyroid*, *Scutiform*, or *Shield-like Cartilage*, is placed at the upper and fore-part of the Larynx, and is the largeſt of the whole.

When ſpread out, it is of an oblong ſhape, but, in the natural ſituation, it conſiſts of two lateral Wings or Portions, of a quadrangular form, uniting before in a longitudinal angle, which can be readily felt in the fore-part of the Throat, and which, from its projecting more in Men than in Women, has obtained the name of *Pomum Adami*.

The upper part of the angle is formed into a Notch, from which, and from the upper edge of the Cartilage in general, a *broad Ligament* aſcends, to fix it to the under-part of the Os Hyoides.

From the poſterior corners four proceſſes project, called *Cornua*, two of which termed *Superior*, are long, and aſcend to be joined by round Ligaments to the extremities of the Cornua of the Os Hyoides.

In the middle of theſe Ligaments, one or two ſmall Cartilaginous, or even Oſſeous Subſtances, are frequently found.

The other two Cornua, called *Inferior*, are ſhorter than the Superior, and curved backwards, to be fixed to the ſides of the Cricoid Cartilage.

The Thyroid Cartilage ſerves for the protection of the other Cartilages, and, along with the Os Hyoides, preſerves the Paſſage open, for the tranſmiſſion of the Food to the Stomach.

The *Cricoid*, or *Annular*, or *Ring-like, Cartilage*, is placed below, and likewiſe behind the Thyroid, and like it, may be readily felt in the fore-part of the Throat.

It is narrow before, where it lies under the Thyroid Cartilage, and thick, broad and ſtrong poſteriorly, where it is placed behind that Cartilage.

Its Poſterior Surface is divided by a *Ridge* into *two lateral Cavities*, for the reception of the poſterior Cricoarytenoid Muſcles.

Its under edge is horizontal, and fixed to the beginning, or firſt Cartilage of the Trachea.

The upper edge ſlants conſiderably, and has its anterior narrow part fixed to the under edge of the Thyroid Cartilage.

It has four ſmall Articular Surfaces, with diſtinct Capſular Ligaments, of which two are placed above, for the articulation of the Arytenoid Cartilages, and two at the under and lateral parts, for the connection of the inferior Cornua of the Thyroid Cartilage.

The Cricoid Cartilage forms part of the general Tube of the Trachea, conſtitutes the Baſe of the Larynx, and gives a firm ſupport to the Arytenoid Cartilages.

The *two Arytenoid Cartilages*, named from a ſuppoſed reſemblance to an Ewer, or Drinking-cup of the Ancients, are much ſmaller than the other Cartilages, and are placed upon the upper poſterior, and lateral parts of the Cricoid Cartilage, at a ſmall diſtance from each other.

They are of a *triangular* form, and a little twiſted, and are bent back, ſo as to have a broad concave Surface behind.

Their upper extremities are turned towards each other, and are conſidered by ſome Authors as diſtinct Cartilages.

Their Baſes are *broad* and *hollow*, where they are articulated by Capſular Ligaments with the Cricoid Cartilage, upon which they are moved in different directions, by the action of various Muſcles.

They are connected to each other, and to the adjacent Cartilages, by different Muſcles and Ligaments.

The Arytenoid Cartilages form a part of the opening called *Glottis*, and give attachment to its Ligaments.

The *Epiglottis*, obtaining its name from its ſituation above the Glottis, is of an oval form when ſurrounded by its Ligaments and Membranes, but, when diveſted of theſe, it is found to be narrow below, broad above, and rounded at its upper extremity.

It is convex towards the Tongue, and concave towards the Glottis, with its point reflected a little forwards.

It is placed behind the upper part of the Thyroid Cartilage, is ſituated obliquely over the Glottis, and may be ſeen and examined by preſſing down the root of the Tongue.

Its under end is fixed by a broad and ſhort Ligament to the middle Notch of the Thyroid Cartilage, and by two lateral Ligaments to the whole length of the Arytenoid Cartilages.

It is fixed to the roots of the Os Hyoides and Tongue by another Ligament, which is a doubling of the inner Membrane running along the middle of its anterior Surface, and forming the *Frænum Epiglottidis*.

It is very elaſtic, and is much more pliable than the other Cartilages, being of a Cartilago-ligamentous nature.

It is found to have a number of *Fiſſures*, in which *Lacunæ* are placed, and to be perforated by numerous *Foramina*, which are the Mouths of ſo many Mucous Follicles, and which are in a great meaſure concealed by the Membrane which covers it.

It breaks the current of the Air coming from the Mouth and Noſe, and prevents it from ruſhing too forcibly into the Cavity of the Lungs.—Preſſed and drawn down by the Tongue and by ſmall Muſcles, it defends the Glottis, and ſhuts it completely in the time of ſwallowing.—After the action of ſwallowing, it is raiſed by its own elaſticity, and by the root of the Tongue to which it is fixed, returning to its former poſition.

Ligaments of the Glottis.—From the fore-part of the body of each of the Arytenoid Cartilages, a *Ligamentous Cord* paſſes horizontally forwards, to be fixed by its other extremity to the inſide of the anterior angle of the Thyroid Cartilage.

The *opening* formed between theſe Ligaments is called *Glottis*, from the Greek: It is alſo called *Mouth of the Larynx*, and *Rima Glottidis*, and is of a triangular figure, the Ligaments being at a greater diſtance behind than at their anterior extremity.

Under theſe two Ligaments there are two others, larger and more diſtinct than the former and which are commonly conſidered as the *proper Ligaments of the Glottis*. They ariſe from the Baſe of the Arytenoid Cartilages, and run in the ſame direction with the former, to be fixed alſo to the Thyroid Cartilage.

In the Interſtice of the Superior and Inferior Ligaments, on each ſide there is a *Fiſſure*, which leads to a ſmall Membranous Cavity or Depreſſion, with its bottom turned outwards.

Theſe are the *Ventricles of the Larynx* of GALEN.—They are chiefly formed by the inner Membrane of the Larynx.

They differ in ſize in different people, have Mucous Follicles opening into them, and are found to be ſerviceable in the modulation of the Voice.

On the anterior Surface of the Arytenoid Cartilages, there is a ſmall Depreſſion filled by a *Glandular Body*, which not only covers the fore-part of theſe Cartilages, but is continued over the poſterior extremity of the Ligaments of the Glottis.

The *Arytenoid Glands* are larger in ſome ſubjects than in others. They were diſcovered, and are particularly deſcribed and delineated, by MORGAGNI.

The Ligaments which connect the Epiglottis to the Notch of the Thyroid Cartilage, and to the under ſide of the Os Hyoides, and one which ties the Baſe of the Os Hyoides, form a *triangular ſpace*, which is alſo occupied by Cellular Subſtance and by Mucous Glands.

The Cavity of the Larynx is lined by a membrane which is extremely irritable, and is every where perforated by the Mouths of ſmall Mucous Glands, for the purpoſe of moiſtening it.

The Larynx has a number of Muſcles, for its different motions; all of which have been already deſcribed.

The *Arteries* of the Larynx are the two ſuperior Laryngeals, which come from the External Carotids, and the two inferior Laryngeals, which are ſent off from the Subclavian Arteries.

The *Veins* return to the External Jugulars.

The *Nerves* are chiefly the ſuperior and inferior Laryngeals, which are branches of the Eighth Pair.

The Larynx ſerves the purpoſe of Reſpiration, forms and modulates the Voice, and is alſo uſeful in Deglutition.

It is the principal Organ of Voice;—for, if a hole be made in the Trachea, and the paſſage of the Larynx ſtopped, the Air eſcapes by that opening without producing Voice.

Voice is formed by the Air, in its paſſage through the Glottis, acting upon the Ligaments of the Glottis and Cartilages of the Larynx and Trachea, and thus producing a Tremour;—and is different in different perſons, according to the Form and Structure of the Larynx.

The ſtrength of Voice is in proportion to the quantity of Air expired, and the narrowneſs of the Glottis.

A Tone is acute in proportion to the tenſion of the parts of the Larynx and Trachea in general, and of the Ligaments of the Glottis in particular.

A Tone is grave in proportion to the reverſe of the above.

Speech is performed chiefly by the different parts of the Mouth, aſſiſted by the Cavity of the Noſe,—the Larynx moving only in a ſmall degree.

When the Air paſſes through the Larynx without producing a Tremour it occaſions a Whiſper.

When a perſon ſpeaks during inſpiration, the voice is thereby very materially altered; and, by practice, may be made to appear as coming from other places than the mouth of the ſpeaker; as is the caſe with thoſe who call themſelves *Ventriloquiſts*.

OF THE THORAX.

THE *Thorax*, or *Breaſt*, extends from the neck to the Diaphragm, and is divided into *External* and *Internal* Parts.

EXTERNAL PARTS OF THE THORAX.

The *External* Parts of the Thorax, beſides the common Integuments and Mammæ, are,

The *Muſcles*, conſiſting of the *Pectorales*, *Subclavii*, and under end of the *Platyſma Myoides* on each ſide, which are ſituated anteriorly.

The *Serati Magni*, which are placed laterally.

The *Trapezii*, *Latiſſimi Dorſi*, and numerous other Muſcles on the Back, which are placed poſteriorly.

The *Intercoſtales* and *Sterno-Coſtales*, which are ſituated, the former between, and the latter on the inner ſide of the Ribs.

The *Bones*, conſiſting of *Sternum*, *Ribs*, *and Dorſal Vertebræ*. —All theſe Parts, excepting the Mammæ, have been already deſcribed.

MAMMÆ.

The *Mammæ* are two Glandular Bodies, of a circular form, ſituated on the anterior, and a little towards the lateral parts of the Thorax, adhering looſely by Cellular Subſtance to the Surface of the large Pectoral Muſcles.

The term *Mammæ* is peculiar to the Breaſts of Women.—In Men theſe parts are called *Mammillæ*;—and in the Brute-kind, *Uberæ*.

In the *Ape*, and a few other animals, they are placed, as in the Human body, upon the Thorax;—but, in the generality of Quadrupeds, they are ſituated under the Abdomen.

The common number of the Mammæ, in the Human ſpecies, is well known to be two.—BARTHOLINE, however, mentions the caſe of a Woman, who had two Mammæ on the left ſide, and one on the right; and another, where there were two on each ſide.

Dr. VAUGHAN narrates the caſe of a Woman he has examined, who has a ſupernumerary Nipple, at the under ſide of the right Mamma, from which milk flowed when the central one was preſſed, and *vice verſa*.

The Mammæ vary in size in different Women, and in the same Women at different periods of life.

In Girls, previous to the age of Puberty, they are remarkably small.

About the age of fourteen, at which time the Menses, in this climate, most commonly begin to appear, they evolve and become prominent.

During Gestation they increase in size, and soon after Delivery they arrive at their greatest extent.

After the age of forty-five, or from that to fifty,—the period when the Menses generally disappear, they decrease in size, and become soft, pendulous, and flaccid.

Under the Skin, there is a large quantity of *Fat* which constitutes a considerable portion of the bulk of the Mamma, and defends the Glandular Part, and is not found to pass into, or communicate with, the Lactiferous Ducts.

The *Glandular* Part of the Mamma is of a whitish colour of the Conglomerate kind, and therefore irregular in its Substance.

It is composed of a number of smaller Masses or Glands, which are also separated by Fat; and these again are divided into still smaller parts, in which the Milk is originally secreted or formed.

Near the centre of the Mamma, is the *Papilla* or *Nipple*, which is of a Cylindrical form, and of a redder colour than the rest of the Skin of the Breast.

It is of different sizes in different ages and constitutions, and is always larger in the time of Gestation, or of Nursing.

It is capable of distention from titillation, or when influenced by the passions of the Mind.

It is composed of a *tough Cellular* or *Ligamentous Substance*, which incloses the Lactiferous Tubes, and which is so elastic, that after the part is drawn out or distended, it readily recovers its former dimension, when the cause of distension has ceased to act.

Upon the Apex of the Nipple, the *Orifices* of the Lactiferous Ducts appear and are of the same number with those which enter its Base.

Around the Nipple, there is a *Circle* or *Disk*, called *Areola*, —of a different colour from the rest of the Skin of the Breast.

This Disk, however, varies in colour at different times of life, being florid in young Girls, of a pale-brown in Women a little more advanced in life, and in old age, of a livid and dull colour.

During Pregnancy, it is of a darker colour than at other times, in consequence of a change which takes place in the Corpus Mucosum which forms it.

Under the Skin of the Areola, there are numerous *Sebaceous Glands*, or *Follicles*, the Orifices of which discharge an oily Mucus, to defend the Nipple and Areola around it.

The *Arteries* of the Mamma are partly from the Internal, and partly from the External Mammaries or Thoracics, the former of which are sent off from the Subclavian, and the latter from the Axillary Artery,—the Branches entering the Mamma at many different places.

The *Veins* accompany the Arteries, and are distinguished by the same names.

The *Absorbents* of the Mamma are also numerous, the greater part of which pass through the Axillary Glands, others penetrate the Interstices of the Ribs, near the Sternum, and enter the Glands which belong to the Internal Mammary Vessels.

The *Nerves* are chiefly from the Axillary Plexus, a few Branches being also sent off from the Intercostals.

From the extremities of the Arteries in the Substance of the Mamma, numberless Tubes arise, called *Ductus* or *Tubuli Lactiferi*, which gradually unite into Trunks, and run in a radiated manner towards the root of the Nipple.

They become greatly enlarged in the time of Suckling, and serve as Reservoirs in which the Milk is contained.

The Lactiferous Ducts are accompanied, in the Substance of the Mamma, by a *tough white elastic Substance*, which follows them to the Nipple.

At the root of the Nipple, they become contracted, and are there from *Twelve* to *Eighteen* in number.

Either from the want of uniformity, however, with respect to their number in different subjects, or from the difficulty of perceiving them, they have been variously estimated by different Authors.

Near the root of the Nipple, they have been supposed by Dr. MECKEL, to form a circle of communication;—but this has been ascribed by still later Anatomists, to a laceration of Vessels; and numerous preparations and experiments,—particularly that of throwing in an injection at one Duct, and finding that it fills one part only of the Mamma, without returning by any other Duct,—seem sufficiently to indicate, that there is no such circular communication.

In the Substance of the Nipple, the Lactiferous Tubes are at a little distance from each other, and are coiled up in such a manner, that the spontaneous flow of the Milk is prevented, unless it be accumulated in a large quantity.

But when the Nipple is drawn out and extended,—as by the application of the Child's Mouth,—the Ducts become straight and parallel to each other, so as to allow an uninterrupted flow of the Milk.

After the action of Sucking, the Nipple, and of consequence its Ducts, immediately recover their former situation.

Sometimes one or more of the Lactiferous Ducts terminate upon the Surface of the Areola, from which, MORGAGNI supposed, that the Glands there were of the Lactiferous kind.

In Children of both sexes, the Mammæ are merely Cutaneous Tubercles, and at the time of birth contain a *Milky-like Fluid*, which can be readily squeezed out.

This Fluid commonly disappears a short time after Birth;—but there are various examples on record, where Milk has been brought to the Breasts, both of young Girls and old Women, by the frequent application of a Child to the Nipples, and where there was no cause for suspicion of Impregnation being present. Nor are instances awanting of Milk being brought to the Mammillæ of Men, by the same application.

The Mammæ add much to the ornament of the person, but serve in particular for furnishing nourishment to the Child, which is conveyed to it through the medium of the Nipple.

The Secretion begins soon after Delivery, and continues to flow for many months, and even for some years, if the Woman suckle her Child; and the more frequently the Milk is extracted, the greater is the quantity received in a given time.

The operation of Sucking depends upon the principles of the Air-pump.—The child embraces the Nipple closely with its Lips, which prevents the external Air from entering, draws the Ducts to a straight line, and prepares a space for the Milk, which is forced from the Breast by the pressure of the Atmosphere, and flows to the Mouth in the manner a Fluid follows the Piston of a common Pump or Syringe.

INTERNAL PARTS OF THE THORAX.

The Mammæ and Muscles, covering the fore and lateral parts of the Thorax, being turned aside, and the Ribs afterwards cut from the Sternum and turned back, the *Internal Parts* of the Thorax are brought into view.

They consist of the *Pleura*, which lines the Thorax;—the *Mediastinum*, which divides it into right and left Cavities, and contains several Vessels, Nerves, &c. between its Layers;—the *Pericardium* and *Heart*, which occupy the middle,—and the *Lungs*, which surround the Heart, and fill the greater part of the Thorax.

THE PLEURA.

The *Pleura* is a Membrane of considerable strength, which lines the inner side of the Thorax, and covers the most of its contents.

Its External Surface is *Cellular*, and adheres closely to the parts which surround it.

Its Internal Surface is *ſmooth* and *poliſhed*, being moiſtened by a Serous Fluid, which exſudes from its Arteries.

It is divided into *two lateral Sacs* or *Pleuræ*, the form of which correſponds exactly with that of the ſurrounding Bones of the Thorax.

The Pleuræ adhere to the Perioſteum of the Ribs, line the Intercoſtal and Sterno Coſtal Muſcles, the Sternum, and Dorſal Vertebræ, and cover the Pericardium, Lungs, and Lateral or Fleſhy parts of the Diaphragm.

Behind the Sternum, the Pleuræ are contiguous to each other, and form a *Partition* called *Mediaſtinum*, which extends between the Sternum and Vertebræ, but is intercepted by the Heart and Root of the Lungs, and divides the Thorax into two diſtinct Cavities, which have no communication with each other.

The *Arteries* of the Pleura are from thoſe of the adjacent parts, viz. from the Intercoſtal, Mammaries, Diaphragmatics, Bronchial, and Eſophageal.

The *Veins*, which return the Blood, accompany the Arteries, and are diſtinguiſhed by the ſame names.

The *Nerves* are from the Intercoſtals and Diaphragmatics, but too ſmall to be traced without difficulty; and the Membrane itſelf is not obſerved to poſſeſs much ſenſibility in the ſound uninflamed ſtate.

The Pleura ſerves to render the inſide of the Thorax ſmooth, for the eaſy motion of the contiguous parts, to divide it into Cavities, and to ſtrengthen the containing and contained parts of the Thorax.

Mediastinum.

The *Mediaſtinum*, ſo named from its ſituation in the middle of the Thorax, is formed by a reflection of the Pleura, and is of courſe double.—It contains between its Layers a conſiderable quantity of Cellular Subſtance, by which they are united.

It is divided into *Anterior* and *Poſterior* Mediaſtinum, the former of which is ſituated at the fore, and the latter at the back-part of the Thorax.

The *Anterior Mediaſtinum* is connected before, to the Sternum; and behind, to the Pericardium and large Veſſels of the Heart.

The two Layers of the Anterior Mediaſtinum are cloſely applied to each other, excepting at the upper-part of the Thorax, where they are ſeparated by the remains of the *Thymus Gland*.

At the upper-part of the Thorax, it lies exactly behind the middle of the Sternum; but in its deſcent, it inclines gradually to the left edge of that Bone.

In conſequence of its obliquity, a pointed inſtrument, puſhed through the centre of the Sternum, is generally found to paſs into the right Cavity of the Thorax.

Frequent deviations, however, from this general rule, have been met with.—In particular, LIEUTAUD and SABATIER relate several instances where the Anterior Mediastinum was found to descend along the middle of the Sternum; and others, though rare, where it descended even to the right side of this Bone.

The *Posterior Mediastinum* reaches from the root of the Lungs and back-part of the Heart, to the Dorsal Vertebræ.

Between the Layers of the Posterior Mediastinum, a *triangular Space* is formed, in which are situated the under end of the Trachea, the Esophagus, the Aorta Descendens, the Vena Azygos, and Thoracic Duct, with the Eighth Pair of Nerves.

The *Blood-vessels* of the Mediastinum are from those of the neighbouring parts:—The Anterior Mediastinum is supplied by Branches from the Subclavian, Internal Mammaries, and Diaphragmatics,—and the Posterior Mediastinum, by Branches from the Intercostals and Esophageals.

The *Veins* accompany the Arteries, and have the same names.

The Mediastinum divides the Thorax into two Cavities, supports its general Contents, hinders one Lung from pressing upon the other, when the person lies on his side, and prevents Fluids,—which, in consequence of accident or disease, may be contained in the Cavity of the Thorax,—from passing from one side to the other.

PERICARDIUM.

The *Pericardium*, *Sac*, or *Capsule* of the Heart, is one of the strongest Membranes of the Body, and its size such as to be properly adapted to that of the Heart, which it contains.

It is formed of *two Layers*, the *External* of which is a continuation of the Anterior Mediastinum, which afterwards passes to the Lungs and lateral parts of the Diaphragm.

The *Internal Layer* is smooth, tendinous-like, and polished on its inner Surface, and is stronger than the other.

It adheres so firmly to the Tendinous part of the Diaphragm, as not to be separated from it without much difficulty.

The Pericardium extends a considerable way beyond the Base of the Heart, and includes the large Blood-vessels, as far as the roots of their first principal Branches, in consequence of which it forms several angles, which have been termed *Cornua* of the Pericardium.

While the External Layer is reflected to cover the parts which surround it, the inner one is also reflected, first over the roots of the large Blood-vessels, and then over the Heart, to form its proper covering, in the same manner the Tunica Conjunctiva is reflected from the Eye-lids to cover the fore-part of the Eye.

From the ends of the Extreme Arteries, upon its Surface, a Fluid, called *Liquor Pericardii*, is discharged, by which it is lubricated, and the effects of Friction diminished.

The Liquor Pericardii is commonly found, after death, in the quantity of a few drachms, though not unfrequently of one or two ounces.

Its colour is redder in a young ſubject, than in a perſon advanced in life, in whom it becomes paler, or more of a ſtraw-colour.

The *Arteries* of the fore-part of the Pericardium are from the Internal Mammaries and Diaphragmaties; thoſe of its fore-part from the Bronchial and Eſophageal.

The *Veins* correſpond with the Arteries, and have the ſame name.

The *Uſe* of the Pericardium is, to preſerve the Heart in ſitu, to defend it from being injured by the parts which ſurround it, and to reſtrain its inordinate motions.

OF THE HEART.

The *Heart* is a hollow Muſcle, divided into different Cavities, and incloſed in the Pericardium.

It is ſituated in the Cavity of the Thorax, behind the Sternum, between the Right and Left Lungs.

It is of a *Conical* figure, flattened at one ſide, and is divided into *Baſe*, *Body*, and *Apex*, with a *Superior* and *Inferior Surface*, and a *Right* and *Left Margin*.

The *Baſe* is placed backwards next the Spine, while the Body and Apex are turned forwards, and obliquely over to the left ſide.

In Quadrupeds, the Heart is placed upon a line with the Sternum, the point only touching the Diaphragm:—In the Human Body, the Apex, or Point of the Heart, is but little lower than the Baſe, and projects between the two lobes of the left Lung, behind the Cartilages of the Fifth and Sixth True Ribs of the left Side, or a little below the left Nipple, where the Pulſation may be felt.—The ſituation, however, varies a little, according to the poſition of the Body, and ſtate of Reſpiration.

Though this be the common ſituation of the Heart, a few rare and ſingular inſtances have occurred, where it has been found to occupy the right ſide of the Thorax; and a diſplacement has ſometimes happened, in conſequence of different kinds of tumours in the left ſide of the Thorax.

The *Superior* or *Anterior Surface* of the Heart is convex, and is oppoſed to the Poſterior Surface of the Sternum, the anterior edges of the Lungs intervening.

The *Inferior* or *Poſterior Surface* is flat, and reſts upon the Tendon of the Diaphragm, which ſupports it; the Heart is not

much affected, however, by the motions of that Muſcle in time of Reſpiration, its Tendon moving only in a ſmall degree.

The right ſide of the Body of the Heart is ſharp, and is called *Margo Acutus*.

The left ſide of the Body of the Heart is round, and is termed *Margo Obtuſus*.

The Baſe is formed of a right and left *Auricle*, and the Body of a right and left *Ventricle*.

When the Heart is diſtended, the right Auricle, and part of the correſponding Ventricle, occupy the right, and the reſt of the Heart the left Cavity of the Thorax.

The Heart is connected above and behind to the upper and back-part of the Thorax, through the medium of the *great Veſſels* which go into, or paſs out from it.

The other parts of the Heart are free, being merely contiguous to the inſide of the Pericardium.

The External Surface of the Heart is covered with a thin ſmooth *Membranous Coat*, which is a reflection of the inner Layer of the Pericardium, and which gives additional ſtrength to its Fleſhy Fibres.

Between the Coat and Subſtance of the Heart, there is commonly a conſiderable quantity of *Fat*, which lubricates it, and facilitates its motions.

The Subſtance of the Heart conſiſts of *Muſcular Fibres*, firm and more cloſely connected than the generality of Fibres of Muſcles in other parts of the Body.

The Fibres run in different directions, longitudinal and tranſverſe, but moſt of them oblique.

Many of them run over the Point of the Heart from one Surface to the other, and the whole ſo much twiſted and folded, and ſo variouſly intermixed, as to be difficult to be unravelled or deſcribed:—In general, however, their courſe is ſuch as to leſſen the Cavities of the Heart in all their dimenſions.

The *Cavities* of the Heart are lined with a Membrane extremely thin, but denſe and ſtrong, to defend them againſt the preſſure of the Blood.

The Heart is formed of an *anterior* or *right* and a *poſterior* or *left* ſide, or of a *right* and *left Heart*, joined together by a *Partition*, which prevents the two ſides from having any direct communication with each other.—The terms Right and Left, however, are more applicable to the Heart of the Quadruped, and thoſe of Anterior and Poſterior to the Human Heart.

Each ſide of the Heart is furniſhed with a ſet of *Veins*, with an *Auricle*, a *Ventricle*, and an *Artery*, and alſo with two ſets of *Valves*,—one between the Auricle and Ventricle, the other between the Ventricle and Artery.

At the right ſide of the Heart are two Veins, called from their large ſize *Venæ Cavæ*, the one *Superior*, the other *Inferior*.

The *Superior Vena Cava*, called alſo *Vena Cava Deſcendens*, returns the Blood from the upper parts of the Body; and the *Inferior Vena Cava*, termed likewiſe *Aſcendens*, returns it from the lower parts; and both terminate in the right Auricle. It is prevented from returning by the fullneſs of the Veins, and by the preſſure of the Blood *a tergo*.

The Auricle is ſituated upon the right, and partly upon the back-part of the Heart, and is divided into the right *Sinus Venoſus* and *proper Auricle*.

The *Sinus Venoſus* is formed by the union of the two Venæ Cavæ, which ſweil out towards the anterior and left ſide. It is notched at its anterior edge, is a Muſcular Bag of conſiderable ſtrength, and is uniform and ſmooth, both upon its outer and inner Surface.

At the upper and left ſide of the Sinus, is the projection or *Appendix*, termed *Proper Auricle*, from its ſuppoſed reſemblance to the Ear of a Quadruped:—It is formed by a blind Sac, which is ſerrated and notched on its poſterior edge, and convex or rounded on the other, and terminates obliquely in an obtuſe point.

The Sinus and proper Auricle form one common Cavity, have no Valve between them, and are therefore filled and emptied at the ſame time.

Where the two Cavities meet in the Hearts of Quadrupeds, there is a Projection ſeen in the Sinus Venoſus, called *Tuberculum* LOWERI, which is ſuppoſed to prevent the Blood of the one Cava from ruſhing upon that of the other, and to direct it into the Auricle.

At the meeting of the two Cavæ in the Human Heart, an angle is formed, which alſo has frequently got the name of Tuberculum LOWERI:—That ſubſtance, however, is peculiar to the Hearts of Brute-Animals.

Under this Angle, or joining of the Venæ Cavæ, there is the Veſtige of the *Foramen Ovale*, which, in the Fœtus, forms a communication between the right and left Auricles; but, in the Adult, is filled up by its Membrane, and forms the *Foſſa Ovalis*.

The *Foſſa Ovalis* has thick and ſtrong ſides, called *Columnæ Foraminis Ovalis*, *Iſthmus* VIEUSSENII, or *Annulus Foſſæ Ovalis*.

At the left ſide of the Mouth of the Inferior Cava, where it joins the Sinus, is the *Valve* of EUSTACHIUS.

It is in form of a Creſcent, with the convex edge fixed to the union of the Sinus and Cava, and the concave edge turned obliquely upwards, reaching about half way over the Mouth of the Cava.—Its ſize and appearance, however, vary much in different Subjects.

Its poſterior Cornu is continued with the left ſide of the Iſthmus of the Foramen Ovale; the other end vaniſhes in the oppoſite ſide of the Sinus.

It is equally diſtinct in the Adult as in the Fœtus; but in the former it is frequently found reticulated, or Cribriform, which appearance is ſeldom, though ſometimes, met with in the latter.

In the Adult, it is ſuppoſed to prevent the Blood of the Auricle from paſſing into the Inferior Cava; and in the Fœtus, to direct the Blood of the Inferior Cava to the Foramen Ovale.

Upon the left ſide of the Valve of EUSTACHIUS, in the under part of the Auricle, is the *Orifice* or *Termination* of the great Coronary Vein of the Heart.

Over the Orifice of this Vein, there is a Semilunar Valve, to prevent the Blood in the Auricle from paſſing into the Vein.

The inner ſide of the proper Auricle is readily diſtinguiſhed from the Sinus, by having a number of *Columnæ Carneæ*, or *Fleſhy Pillars* in it, which, from their ſuppoſed reſemblance to the Teeth of a Comb, ſometimes obtain the name of *Muſculi Auriculæ Pectinati*.

The Muſculi Pectinati have ſmaller Columns running in different directions, giving the whole a reticulated appearance.

Between the Columnæ Carneæ, are *Depreſſions* or *Furrows*, in which the ſides of the Auricle are thin, and ſemi-tranſparent, being chiefly formed by the outer and inner Membrane of the Auricle.

At the under and left ſide of the Sinus Venoſus, and oppoſite to a *Groove*, ſituated externally between the Auricle and Ventricle, there is a *Hole*, above an inch in diameter, which opens into the upper and right part of the correſponding Ventricle.

The right Auricle receives the Blood from the Venæ Cavæ and Coronary Veins, and, by its Muſcular contraction, diſcharges it into the correſponding Ventricle, out of which it is prevented from returning by a Valve, called *Tricuſpid*, placed within the Ventricle.

The *Right* or *Pulmonary Ventricle*, is ſituated on the fore-ſide of the Heart, is of a triangular form, and much thicker and ſtronger than the correſponding Auricle.

It has many ſtrong Eminences, Columns, Lacertuli, or Cords, called *Columnæ Carneæ*.

The *Columnæ* run in different directions, but the ſtrongeſt of them longitudinally, and are of various ſizes, forming ſo many diſtinct Muſcles, which are extremely compact in their ſtructure, and compoſe a beautiful, intricate, and irregular Network.

In general, they adhere through their whole length to each other, or to the ſides of the Ventricle; but many of them are looſe in their middle, and may be raiſed by a probe put under them.

They aſſiſt the Ventricle in its *Syſtole* or contraction, and prevent it from being overſtretched in its *Dyaſtole* or dilatation, and agitate the Blood in its paſſage through the Ventricle.

They are ſuppoſed to bring the oppoſite ſides of the Ventricle completely together, during its contraction.

Between the Columnæ are many deep Grooves, Pits, or Foveæ, into all of which the Blood readily enters.

Around the Paſſage, between the Auricle and Ventricle, there is a *Tendinous Margin* or *Ring*, from the whole edge of which a circular Membrane is ſent off, called *Valvula Tricuſpis*, or *Triglochin*, from its having three principal points or diviſions.

From the edge of the Tricuſpid Valve, many ſmall round *Tendinous Cords* are ſent off, of unequal ſize.

The *Chordæ Tendineæ* deſcend obliquely within the Ventricle, in the ſame direction with the Valve from which they ariſe.

They are fixed to the extremities of a few ſtrong Papillæ or Columnæ Carneæ, which are joined by their other extremites to the correſponding ſides of the Ventricle.

The Tricuſpid Valve prevents the reflux of the Blood to the Auricle, during the contraction of the Ventricle.

The Tendons allow the Valve to be puſhed back by the Blood, until a Septum or Partition is formed by it at the Mouth of the Ventricle, during the contraction of the latter.—The Papillæ, by their contraction, prevent the Valve from going into the Auricle.

The Valve is opened and preſſed back by the Blood in its paſſage from the Auricle to the Ventricle.

The upper and left ſide of the Ventricle becomes ſmooth and uniform, and leads to a large Opening, about an inch in diameter, which is the Mouth of the Pulmonary Artery.

The right Ventricle, by its dilatation, receives the Blood from the Auricle, and ſends it, by a ſtrong and ſudden convulſive contraction, to the Pulmonary Artery, from whence it is prevented from returning, by three Valves placed in the Mouth of the Artery.

The Valves at the Mouth of the Pulmonary Artery are called *Valvulæ Semilunares*, or *Sigmoideæ*, from the reſemblance of their edges to thoſe of a Creſcent.—Two of them are placed in the fore, and one in the back-part of the Artery.

Each of them forms a *ſmall Sac*, one edge of which adheres to a third part of the circumference of the inſide of the Artery; the other edge is looſe in the Cavity of that Veſſel, and is ſomewhat thicker and ſtronger than the reſt of the Valve,—the thickened edges ſerving as Ligaments to it.

The looſe edge has a *general Curve*, divided into *two ſmaller ones*, which meet in a *point* in the middle.

The Valves are chiefly formed of a doubling or extenſion of the inner Coat of the Artery.

In the middle point or loose edge of each of the Valves, there is a small hard *triangular Granula,* of a somewhat redder colour than the rest of the Valve, called, from its reputed discoveries, *Corpusculum* AURANTII, or *Corpusculum* MORGAGNI; or from its resemblance in shape to the Sesamum seed, *Corpusculum Sesamoideum.*

The Corpuscles complete the Valves at the centre of the Artery, and enable them to make a stronger resistance against the Blood, while the Artery is in action.

The Semilunar Valves are *concave* towards the Artery, *convex* towards the Ventricle, and, when shut, their loose edges are opposed to each other, so as to enable them to form a complete *Partition* between the Ventricle and Artery.

Opposite to the Semilunar Valves, the Artery bulges out, and forms *three Projections,* which have corresponding Pitts or Depressions within, and are called, from their discoverer, *Sinus* VALSALVÆ.

The *Sinuses* of VALSALVA are of the same nature with those Dilatations which are found in the Veins and Lymphatics, between their sides and Valves; and, like them, are partly formed by the pressure of the Fluids upon the sides of the Vessels.

The Pulmonary Artery receives the Blood from the right Ventricle, and by its contractile power, assists the Ventricle in driving it through the Lungs.

The Semilunar Valves, pressed back by the Blood in the Artery, prevent its return into the Ventricle.

The Valves are opened again by being driven towards the sides of the Artery by the current of the Blood, upon the next contraction or stroke of the Ventricle.

The Pulmonary Artery passes behind the Sternum, and separates into *right* and *left Branches,* which go to the corresponding parts of the Lungs.

The two Branches of the Pulmonary Artery, like those of the Arteries of the Viscera in other parts of the large Cavities, suddenly divide into still smaller Branches.

From the extreme Arteries of the Lungs, corresponding Veins arise, and are merely the continuation or reflection of the Arteries, without any intermediate Cells or Dilatations.

The Pulmonary Veins, in the Substance of the Lungs, gradually unite, and form *four principal Trunks,* which terminate in, and carry the Blood to the left Auricle.

Of the Pulmonary Veins, *two* come from the right, and *two* from the left lung, and terminate in the corresponding sides of the left Auricle.

The *left Auricle* is considerably thicker and stronger than the right, and, like it, is divided into Sinus Venosus and proper Auricle, which from one common Cavity without the intervention of any Valve.

The *left Sinus Venosus*, called also *Sinus Pulmonalis*, is turned towards the Spine, is more of a cubic form than the right one; but resembles it in the uniformity and smoothness of its outer and inner Surfaces.

From the fore and left part of the Sinus, the *Proper Auricle* projects, and forms a distinct flat *Appendix*, or *Bag*, with different Curvatures or Indentations upon its edges.

The inner part of the Proper Auricle is *longer*, but *narrower* than that on the right side, like it, however, it is formed of Columnæ Carneæ, with Furrows between them.

The Proper Auricle is somewhat less capacious than that on the right side; but the Sinus is as much larger as to render the two common Cavities of the right and left Auricles nearly equal.

The two Auricles have a *Fleshy Septum* between them, in which, as has been already mentioned, there is the *Foramen Ovale* in the Fœtus;—but in the adult the Partition is generally perfect.

From the under part of the Sinus Venosus, a *Passage* leads down to the Cavity of the Left Ventricle, and is opposite to a *Grove* seen externally between the Auricle and Ventricle, similar to that on the right side.

The Left Auricle receives the Blood from the Pulmonary Veins, and by its Muscular contraction, drives it into the Left Ventricle, from which it is prevented from returning, by a Valve in the Ventricle, called *Mitralis*.

The *Left Ventricle* is situated in the posterior and left part of the Heart.

Its sides are about *three times thicker* and *stronger* than those of the Right Ventricle, being in proportion to the force required to propel the Blood to the most remote parts of the Body.

It is *narrower* and *rounder*, but considerably *longer*, both on its External Surface and in its Internal Cavity, than the Right Ventricle, and generally descends someway below the other, and forms the Apex cordis, or Point of the Heart.

The Cavity is commonly described as being less than that of the Right Ventricle;—But the apparent difference, which takes place after death, is accounted for with seeming propriety by some Authors,—from the left Ventricle being then for the most part found empty, and the Right one full, and from the greater degree of contractility in the former.

That the capacity of the Cavity of the right and left Sides of the Heart is more nearly equal during life than after death, or than it is generally supposed to be, is evident from the appearance of the Heart of the Human and also of the Brute kind, and from injections into the two sides of the Heart, where the force applied is in proportion to the relative strength of each side.

The inner Surface of the Left Ventricle has the same general appearance with the Ventricle of the right side, and only differs

from it in having its Columnæ Carneæ larger, firmer and ſtronger.

In the Paſſage of communication between the Auricle and Ventricle, there is a *Ring*, from which a *Circular Valve* goes off, with all its apparatus ſimilar to that between the right Auricle and Ventricle, and differing in no reſpect from it in ſtructure and uſe, excepting in being ſtronger, and in being divided into two principal portions only.

This Valve has been ſuppoſed to bear ſome reſemblance to a *Biſhop's Mitre*, from which it has been called *Valvula Mitralis*.

One of the portions of this Valve is larger than the other, lies over the Mouth of the Aorta, and is ſuppoſed to cover it while the Ventricle is a filling.

The *Valvula Mitralis* prevents the reflux of the Blood during the contraction of the Ventricle.

After the contraction is over, the Valve returns to its former ſituation by the impulſe of a freſh current of Blood from the Auricle.

Between the Right and Left Ventricle, there is a thick ſtrong impervious *Partition*, which forms a ſhare of the general Septum Cordis, and is compoſed partly by the wall of the Right, but chiefly by that of the Left Ventricle, the Right being united to the Left, almoſt in the form of an Appendix.

The Partition prevents any direct communication between the two Ventricles.

Oppoſite to the outer edge of the Septum, both upon the upper and under Surfaces of the Heart, there is a *Groove* in which ſome of the principal Trunks of the Coronary Veſſels are ſituated.

At the fore and right ſide of the Valvula Mitralis, and behind the beginning of the Pulmonary Artery, there is a *round Opening* which is the Mouth of the Aorta, and which is nearly of the ſame ſize with that of the Pulmonary Artery.

Under this opening, the Surface of the Ventricle becomes *ſmooth*, and *equal*, having none of the Columnæ Carneæ which are ſeen on the other parts of its Cavity.

The Left Ventricle receives the Blood ſent to it from the Auricle, and by a contraction ſimilar to, but much ſtronger than that of the Right Ventricle, propels it to the Aorta.

At the Mouth of the Aorta, there are *three Semilunar Valves*, with their *Corpuſcula* AURANTII, perfectly ſimilar to thoſe of the Pulmonary Artery;—but a little ſtronger.

On the outſide of the Semilunar Valves, are the *Sinuſes* of VALSALVA, like thoſe of the Pulmonary Artery,—but a little more prominent.

The Semilunar Valves are preſſed back by the Blood, and prevent its reflux during the contraction of the Aorta.—They are

returned towards the ſides of the Aorta, in the ſame manner, and from the ſame cauſe, as in the Pulmonary Artery.

The *Aorta* paſſes upwards from the top of the Left Ventricle, and is ſituated firſt behind, and then on the right ſide of the Pulmonary Artery, and betwen it and the Superior Cava.

It bears nearly the ſame proportion in thickneſs and ſtrength to the Pulmonary Artery, which the ſides of the Left Ventricle do to thoſe of the Right.

When the Aorta is about to ſend off the firſt of its large Branches at the top of the Thorax, it is of great ſize, and is ſometimes called the *Large Sinus* of VALSALVA.

The Aorta receives the Blood from the Left Ventricle, and by its Muſcular contraction re-acts upon it, and aſſiſts the Ventricle in ſending it by numberleſs Branches through the different parts of the Body, from whence it is returned by the Veins to the Right Auricle.

Beſides the Blood-veſſels already taken notice of, and which are common to the Heart and the reſt of the Body, the Heart is furniſhed with Veſſels peculiar to itſelf, termed *Coronary* from a *Corona* which they form upon its ſurface.

The Coronary Veſſels conſiſt of *two Arteries* and *one principal Vein*.

The *Coronary Arteries* ariſe from the Sinuſes, at the Mouth of the Aorta, oppoſite to two of the Semilunar Valves.

One runs in a Groove between the Right Auricle and Ventricle, and ſupplies chiefly the right ſide of the Heart.

The other paſſes partly between the Left Auricle and Ventricle, and partly in the Groove between the Ventricles, on the foreſide of the Heart,—ſupplying the left ſide of the Heart, and communicating with the Branches of the other Artery on its upper and under Surfaces.

The Coronary Arteries are entirely diſperſed upon the ſubſtance of the Heart, and upon the roots of the great Veſſels, forming upon theſe ſome of the minute Branches, termed *Vaſa Vaſorum*.

The Coronary Arteries, from their ſituation oppoſite to the Valves, have been ſuppoſed to be filled at a different time from that of the reſt of the Arterious Syſtem;—but from experiment, it ſeems now ſufficiently evident, that the Coronary Veſſels have their pulſation at the ſame inſtant with the other Arteries.

The *Coronary Veins* return the Blood from their correſponding Arteries: The greater part of them join into a Trunk, called the *Great Coronary Vein*, which, after making a turn from the left ſide, and running between the Left Auricle and Ventricle, terminates in the under part of the Right Auricle, where it is covered by its Semilunar Valve.

Other Coronary Veins, much ſmaller than the former, terminate in different parts of the right ſide of the Heart.

The *Abſorbents* of the Heart go to the neighbouring Lymphatic Glands.

The *Nerves* are from the great Sympathetics and Eighth Pair.

With reſpect to the Circulation in general :—The Veins return the Blood from all the different parts of the Body by a ſlow and equal motion, and without pulſation, to the Auricles, which on account of the quantity and ſtimulating quality of the Blood, contract ſuddenly and at the ſame time, and ſend it to the Ventricles.

The Ventricles, from the ſame cauſe which ſtimulates the Auricles, and from the ſtroke they receive from them, contract convulſively, with a force proportioned to the thickneſs of their ſides; and ſend the Blood to the Arteries; and, during their contraction, they are thrown by the dilatating Auricles againſt the Ribs, where the ſtroke occaſioned by the Pulſe of the Heart may be felt.

The Arteries, by their contractile power and elaſticity, ſend the Blood ſuddenly to the Veins, through which, by the united force of the Ventricles and Arteries, and likewiſe, as is ſuppoſed by ſome, by a contractile power of the Veins and preſſure of the ſurrounding parts, it is driven again to the Auricles.

In its courſe the Blood performs a double Circulation,—one called the Leſſer or that through the Lungs;—the other called the Greater, or that through the Body.

In the former it paſſes from the Right Ventricle to the Lungs, and returns to the Left Auricle.—In the latter, it goes from the left Ventricle to the different parts of the Body, and returns to the Right Auricle.

During this Circulation, the Auricles and Arteries, and the Ventricles and Veins, act in concert, contracting and dilating at the ſame time.

Uſe of the Heart.——The Heart is the centre of the Vaſcular Syſtem, and the principal agent in the Circulation of the Blood.

The right ſide of the Heart receives the Blood, which is contaminated in paſſing through the Body, and ſends it to the Lungs, where it is purified through the medium of the Air.

From the Lungs, the Blood, now purified, is returned to the left ſide of the Heart to be circulated through all the other parts of the Body, thereby imparting Nouriſhment, Growth, and Strength to the general Syſtem; being found alſo to be the ſource of Senſibility, Irritability, and Motion, and likewiſe of the Animal Heat.

OF THE LUNGS.

THE *Lungs* are two ſoft ſpongy bodies, which occupy by much the greater part of the Cavity of the Thorax.

They completely fill the two bags of the Pleura, and are every where in contact with the parts adjacent; no Air intervening between them and the Thorax.

In *figure*, they have been compared to that of the Foot of an Ox, with the back part turned forwards;—or, their ſhape correſponds exactly with the inſide of the Thorax, being rounded next the Ribs, hollow towards the Diaphragm, and irregularly flattened and depreſſed next the Mediaſtinum and Heart.

They are of a reddiſh or pink colour in Children, of a light blue or greyiſh colour in Adults, and more of a purple and livid colour in Old Age, at which period they are alſo obſerved to be tinged with black ſpots, proceeding from a matter ſecreted in their Subſtance.

They are joined to the Neck, by the Trachea; to the Spine, by the two Layers of the Mediaſtinum, which ſerve them as Ligaments; and to the Heart, by the Pulmonary Veſſels;—the reſt of them being free and unconnected, unleſs an adheſion has taken place in conſequence of inflammation.

They are divided into *Right* and *Left Portions*, or *Lungs*, which are ſeparated from each other by the Heart and Mediaſtinum and which have no communication, excepting through the Medium of the Trachea.

Each of the Lungs is again divided into large portions, called *Lobes*, which facilitates their motion and the dilatations of their Cells.

Of theſe Lobes, *three* belong to the Right Lung, correſponding with the larger Bag of the Pleura, and *two* to the left, between which there is a Notch or Sinus, occupied by the Point of the Heart.

Each of the Lobes is ſubdivided into many ſmaller parts, termed *Lobules*, which are of different ſizes, and of an irregular angular form.

The Lobules diminiſh in ſize, and degenerate at laſt into ſmall *Veſicles* or *Cells*, which conſtitute a large ſhare of the Lungs, and which are merely viſible to the naked Eye.

The Cells of the Lungs are purely Membranous, of an irregular figure, compreſſed and cloſely connected, and have a free communication with each other.

Between the different Lobes, Lobules, and Cells, a large quantity of common Cellular Subſtance, deſtitute of Fat, is in-

terposed, which unites and strengthens them, and allows the Blood-vessels to be minutely dispersed over them.

The Cells of the Lungs have no communication with this common Cellular Substance; for when Air is blown into it, the Lobules are compressed; but when the Air is blown in through a Branch of the Trachea, the Cells are again distended, and the Lobules recover their former dimensions.

In the Fœtus, the Cells are empty and in a collapsed state; —but as soon as Respiration begins, they become distended, and continue so during life, and in every state of Respiration, and even in the recently dead Body:—But if an opening be made into the Cavity of the Thorax, whether in the living or dead Body,—and the Air in this or in any other way admitted, they immediately collapse by their own weight and elasticity, the pressure of the air being then the same on the outer Surface of the Lungs, and inner Surface of the Trachea.

The Lungs are covered by *two Coats*, an External or Common, and an Internal or Proper one.

The *External* or *Common Coat* is a continuation or reflection of the Pleura, is extremely thin, but dense, and, like the other parts of the Pleura, is found to possess little Sensibility. It forms a general covering to the Lungs, but does not enter between their different Lobules.

The *Internal* or *Proper Coat* adheres so firmly to the former, as to appear to constitute part of its Substance. It not only covers the Lungs, but insinuates itself between their Lobules, and is intimately connected with their Cellular Substance.

Besides the Cells, various kinds of Vessels, viz. the *Air-vessels* or *Branches of the Trachea*, *Blood-vessels* and *Absorbents*, together with small Branches of *Nerves*, enter into the composition of the Lungs.

Trachea.

The *Trachea*, or *Aspera Arteria*, so called from the inequality of its Surface, and from its conveying Air, begins at the under part of the Cricoid Cartilage, and descends in the fore part of the Neck, between and behind the Sterno-hyoid and Sterno-thyroid Muscles.

From the Neck, it passes into the Thorax, where it is situated between the Layers of the upper-part of the posterior Mediastinum.

Behind the Curvature of the Aorta, and opposite to the third Vertebra of the Thorax, the Trachea divides into two Lateral Branches, termed *Bronchi*, from the Greek, one of which goes to the Right, and the other, which is the longer of the two, to the Left Lung.

The Bronchi are divided into Branches, which by degrees become ſmaller, and at laſt terminate in the Cells of the Lungs, which communicate ſo freely with each other, that, upon introducing Air into any of theſe Branches, a large portion of the Lungs may be inflated.

The Trachea conſiſts of *Cartilaginous Rings*, about ſixteen or eighteen in number, which give ſtrength and firmneſs to it, and preſerve it conſtantly open for the tranſmiſſion of Air. They are incomplete behind, where the Trachea is formed of a *ſoft Fleſhy Subſtance*, which yields to the Eſophagus in the time of Deglutition.

Each Cartilage forms a large ſegment of a circle, about a line, or one-twelfth of an inch in breadth, and one-fourth of a line in thickneſs.

The Cartilages are ſituated horizontally, with their edges oppoſed to each other, ſmall ſpaces intervening between them.

They are united to each other, by a Ligamentous Subſtance, which is ſo elaſtic, that when the Lungs are taken out of the Body, it draws the Cartilages cloſely together.

At the upper end of the Trachea, two or three of the Cartilages are frequently joined by an union of Subſtance; but below this, they are perfectly diſtinct from each other.

The beginnings of the Bronchi have the ſame kind of Cartilages with the Trachea; but after they enter the Lungs, they are broken into two or three pieces, which go completely round the Bronchi, and are ſo connected to each other, as to keep the Paſſage open and free from compreſſion.

The Trachea has ſeveral *Coats* entering into its compoſition, ſome for ſtrengthening it, others for giving it a certain degree of motion, viz.

A *Cellular Coat*, which, in the Thorax, is covered by the Mediaſtinum.

An *Elaſtic Ligamentous Coat*, which paſſes along the Trachea, and alſo upon the different Branches in the ſubſtance of the Lungs, adding much to the elaſticity of theſe.

A *Muſcular Coat*, placed between the Cartilages, and in the back-part of the Trachea, and compoſed of Circular Fibres without, and Longitudinal Fibres within;—the former for ſtraitening, the other for ſhortening the general Paſſage.

The Longitudinal Fibres are collected into bundles, which are diſtinctly ſeen through the inner Coat, and may be traced conſiderably farther, in the Subſtance of the Lungs, than the Cartilages.

The inner ſide of the Trachea is lined with a very *Vaſcular and Irritable Membrane*, continued from the Mouth, and forming at laſt the extreme Branches of the Trachea, which terminate in the Cells of the Lungs.

The inner Membrane of the Trachea is every where perforated by the *Ducts* of *Mucous Glands*, and by the *Mouths* of the *Exhalent Arteries*, the former pouring out Mucus to lubricate the Lungs, the other the Vapour which is thrown off in Perspiration.

Three different kinds of Glands are connected with the Trachea,—the *Thyroid*, the *Tracheal*, and the *Bronchial*.

The *Thyroid Gland* has its name from its connection with the Thyroid Cartilage, though more immediately connected with the Trachea.

It is a large reddish mass, situated at the under and fore-part of the Larynx, behind the Sterno-hyoid and Sterno-thyroid Muscles.

It has two Lobes placed at the under and lateral parts of the Larynx, descending a certain way upon the Trachea and Esophagus.

The Lobes are joined by an intermediate portion, which lies across the upper and fore-part of the Trachea.

Sometimes a Process from the middle portion ascends between the Sterno-hyoid Muscles, and is lost behind the Base of the Os Hyoides.

This Gland has a Grandulous appearance within, and a viscid Liquor is sometimes observed in it, which has been supposed by SABATIER and others, to lubricate the parts in the neighbourhood.

It is supplied with large Blood-vessels, and with several Nerves, from those of the Larynx; it is likewise furnished with numerous Lymphatics,—but no Excretory Duct has yet been observed to come from it; nor is its office yet understood.

The *Tracheal Glands* are small, but numerous, and of different sizes, surrounding the Muscular Coat of the Trachea, and its Branches in the Lungs; the largest of them are placed in the Fleshy Substance behind.

From each of these Glands a small Duct issues, and throws out a Mucus, to defend the inner Surface of the Trachea from being injured by the Air, or by the extraneous particles which it carries along with it.

The *Bronchial Glands* are placed in the Cellular Substance round the under end of the Trachea and roots of the Bronchi, where these penetrate into the Substance of the Lungs.

They are of various sizes, from that of the point of the Little Finger to that of a Millet-seed, and have a bluish or black colour, corresponding in a great measure with the colour of the darkest parts of the Lungs.

They were formerly considered by many Authors as sending Fluids to the Trachea, but are now sufficiently known to be entire-

ly of the Lymphatic kind,—the Abſorbents of the Lungs paſſing through them in their way to the Thoracic Duct.

The Trachea is furniſhed with *Blood-veſſels* from the Inferior Laryngeals, and *Nerves* from the Recurrents and great Sympathetic Pair.

The Trachea ſerves to convey Air into, or out from the Cells of the Lungs, during Reſpiration, and to carry off the Perſpirable Matter from their Arteries in time of Expiration.

The *Blood-Veſſels* of the Lungs conſiſt of the *Pulmonary* and *Bronchial Veſſels*; the one for the general Circulation, the other proper to the Lungs.

The Pulmonary Artery ariſes from the top of the Right Ventricle, divides, like the Trachea, into Right and Left Branches, which are diſperſed through the ſubſtance of the Lungs.

The minute Branches running in the common Cellular Subſtance, form at laſt a *Plexus* upon the proper Cells, ſometimes called *Rete Mirabile*, and *Rete Vaſculoſum* MALPIGHII, from which that Halitus is derived which is expelled by the Lungs in Expiration.

The *Pulmonary Veins* are commonly obſerved to be ſmaller in proportion to the correſponding Arteries, than Veins are to Arteries in other parts of the Body, which has been ſuppoſed to be owing to the large quantity of Fluids expired.—They join into four principal Trunks, which terminate in the Left Auricle.

The *Bronchial Arteries* ariſe by three or four ſmall Branches, one of which is from the right Superior Intercoſtal, the reſt from the Trunk of the Aorta.

They are diſperſed upon the Bronchi and Bronchial Glands, and ſubſtance of the Lungs in general, and are found to communicate with the Pulmonary Artery.

The Bronchial Arteries are ſuppoſed to ſerve for the nouriſhment of the Lungs and ſecretion of the Mucus.

The *Veins* return the Blood to the Vena Azygos, and left ſuperior Intercoſtal Vein.

The *Lymphatics* form a Plexus upon the Surface of the Lungs; —They communicate freely with the deep-ſeated Abſorbents, and paſs through the Bronchial Glands.

The Nerves of the Lungs are partly from the great Sympathetics, but chiefly from the Eighth Pair, and are rather ſmall in proportion to the bulk of the organ on which they are diſperſed.

The Lungs ſerve the general purpoſe of *Reſpiration*, which conſiſts of *Inſpiration* and *Expiration*, or the paſſage of the Air into or out from the Lungs by the alternate dilatation and contraction of the Thorax.

Inſpiration is performed in conſequence of the Thorax being dilated by the action chiefly of the Diaphragm and Intercoſtal Muſcles; the Lungs, which are paſſive, and in contact with

the Thorax, following it, and the Air rushing into the Trachea by its own gravity.

Expiration is performed in consequence of a relaxation of the Muscles which dilate the Thorax,—of the action of the Abdominal and a few other Muscles,—of the elastic ty of the Cartilages of the Ribs, and likewise of the Lungs, by which the Cavity of the Thorax is diminished, and the Air is expelled from the Lungs.

Upon the alternate states of Inspiration and Expiration, depend the formation of the Voice, the sensation of Smell, and all the other functions of the Body: but the great and principal office of the Lungs, which was formerly supposed to be that of cooling the Blood over-heated by friction, is, during Inspiration, to receive from the Atmosphere pure Air, upon which the principle of heat and life depends; and, during Expiration, to carry off an impure Air, which is noxious to Animal Life.

According to late experiments, it appears, that the Venous Blood passing to the Lungs, of a dark red or purple colour, is charged with Carbon or Charcoal, and Hydrogen, or Inflammable Air;—that while circulating upon the Bronchial Cells, one part of the Oxygen, or Vital Air, contained in the common Air which has been inspired, unites with the Carbon and Hydrogen, and forms Fixed Air and a Watery Halitus, which are carried off by Expiration;—that another part of the Oxygen is imbibed by the Blood, which, in consequence of these changes, returns from the Lungs, of a florid red colour, and full of heat in a latent state, which becomes sensible in the course of the general Circulation, and is diffused over the different parts of the Body; and,— hat the Blood thus changed also affords a Stimulus to the Arteries, and promotes the different Secretions.

Esophagus.

The Esophagus, called also *Gula* or *Gullet*, derives its name from carrying what is eaten into the Stomach.

It is a Fleshy Canal, which begins from the inferior part of the Pharynx, descends along the Neck, and through the Thorax, following nearly the direction of the Spine.

It is situated between the Trachea and Vertebræ; and in the Thorax, it proceeds behind the Base of the Heart, and between the Layers of the Posterior Mediastinum, from which it receives a lateral covering.

Soon after entering the Thorax, it makes a slight turn to the right, and passes down upon the fore and right side of the Aorta, by which they are prevented from injuring each other.

In its progress, it inclines more forwards and to the left side; and about the Ninth Vertebra of the Thorax, it perforates the Muscular part of the Diaphragm, and terminates in the upper Orifice of the Stomach.

It has several *Coats* proper to it, the first of which is *Cellular*, and connects it to the adjacent parts.

The second Coat is *Muscular*, and is sometimes termed *Vaginalis Gulæ*.—It consists of two Layers; the external of which has thick, strong, longitudinal Fibres; the internal is formed of circular and transverse Fibres, and is thinner than the former. —The outer Layer is fitted for shortening and relaxing, and the inner for contracting the Canal, during Deglutition.

The third Coat is termed *Nervous*, but is properly Cellular, being formed of loose Cellular Substance, which connects the Muscular to the Inner Coat.

The *Inner Coat* is continued from the Lining of the Mouth: It consists of many longitudinal *Plicæ* or Folds, which are scarcely visible when the Œsophagus is dilated, and is furnished with numerous *Foramina*, which discharge a Mucus for lubricating the passage, and facilitating Deglutition.

The *Arteries* of the Œsophagus are Branches of the Inferior Laryngeals, which supply the Cervical part of it, and Œsophageals and Branches of the Bronchials, which are derived from the Aorta Descendens, and supply the Thoracic part of it.

The *Veins* go to the Inferior Laryngeals, to the Vena Azygos, and left Superior Intercostal Vein.

The Absorbents are numerous, and intermix with those of the Heart and Lungs.

The *Nerves* are chiefly from the Eighth Pair.

The *use* of the Œsophagus is, to receive the Aliments from the Pharynx, and convey them to the Stomach.

Thoracic Duct.

The Thoracic Duct is a small Membranous-like Canal, situated in the back part of the Thorax, and is the principal Trunk of the Absorbent System.

It begins upon the third Vertebra of the Loins, and passes behind the Aorta, crossing obliquely from left to right, till it gets to the right side of the Artery.

Upon the first Lumbar Vertebra, it forms an *Oval Sac*, termed *Receptaculum Chyli*, which is placed behind the Right Crus of the Diaphragm, and a little higher than the Right Renal Artery.

The Duct afterwards passes between the Crura of the Diaphragm, and ascends in the Thorax, on the anterior part of the Spine, between the Layers of the Posterior Mediastinum, on the right side of the Aorta, and between it and the Vena Azygos.

It crosses behind the upper part of the descending Aorta, and emerges from the Thorax, to reach the under part of the Neck.

In the Neck, it passes behind the Internal Jugular Vein, and a little higher than the Subclavian.

It then turns downwards, forming an Arch, which terminates in the upper part of the Angle, between the Internal Jugular and Subclavian of the Left Side.

The Thoracic Duct receives the Chyle from the Lacteals, and Lymph from the Lymphatics, and discharges these into the red Veins.

OF THE ABDOMEN.

The *Abdomen* or *Belly* extends from the Thorax to the under part of the Trunk.

It is bounded above, by the Diaphragm, and the Bones to which that Muscle is fixed; below, by the Pelvis; behind, by the Lumbar Vertebræ and Muscles of the Loins; anteriorly, by its Proper Muscles; and laterally, by the False Ribs, Ossa Ilii, and Muscles connected with these;—all of which have been described in their places.

It is distinguished into *three Divisions* or *Regions*, termed *Upper*, *Middle*, and *Under* Region; each of which is subdivided into three others.

The *Upper Region* begins opposite to the Cartilago Ensiformis, at a small depression called *Scrobiculus Cordis*, or Pit of the Stomach, and extends to about a hand-breadth from the Umbilicus or Navel.

The middle of this Region is termed *Epigastrium*, or under part of the Belly, and the two lateral parts *Hypochondria*, from their lying under the Cartilages of the False Ribs.

The *Middle Region* occupies an equal distance above and below the Umbilicus.—The middle part of it is called the *Umbilical* and its lateral parts the *Lumbar Regions* or *Loins*.

The *Under Region* begins where the middle one terminates, or at a line drawn between the superior anterior Spinous Processes of the Ossa Ilii, and forms in the middle, the *Hypogastrium* or bottom of the Belly; and at the sides, the *Iliac Regions*.

The Abdomen is covered on the outside by the *common Integuments*, and lined within by the *Peritoneum*, in the manner the Thorax is lined by the Pleura, but without being divided by the intervention of a Partition.

The Abdomen contains the *Chylopoetic* and *Assistant Chylopoetic Viscera* or *Organs of Digestion*,—the *Organs of Urine*, and *part of*

thoſe of Generation, with the *Veſſels* and *Nerves* which belong, ſome of them to theſe Viſcera, and others to the lower parts of the Body.

The *Chylopoetic Viſcera* comprehend the Stomach, which is ſituated in the Upper and left part of the Abdomen,—the *Inteſtines*, which fill the greater part of it,—and the Membranes, termed *Omenta* and *Meſentery*, which are connected with theſe.

The *Aſſiſtant Chylopoetic Viſcera* conſiſt of the *Liver*, which is placed in the upper and right; of the *Spleen*, which is ſituated in the upper and left ſide of the Abdomen;—and of the *Pancreas*, which lies under the Stomach.

Of the *Organs of Urine*, the *Kidneys* are placed in the back-part of the Abdomen, and the *Bladder*, with ſome of the *Organs of Generation* in the Pelvis.

Peritoneum.

The *Peritoneum*, named from its being ſtretched or ſpread around the Bowels, is a firm but ſimple Membrane, by which the Abdominal Viſcera are ſurrounded, and partly ſupported.

Its External Surface is rough and Cellular, and cloſely connected with the parts to which it belongs.

The Internal Surface is remarkably ſmooth, and lubricated by a Liquor which is exhaled from its own Veſſels.

It is very elaſtic, and admits of great extenſion, as happens in Geſtation, Corpulency, or Aſcites; but, upon the cauſes of extenſion being removed, it returns to its former dimenſions.

It lines the Diaphragm, paſſes downwards, adhering firmly to the Abdominal Muſcles,—lines the containing, and covers the contained parts of the Pelvis, from which it is reflected in the back-part of the Abdomen, lining its Muſcles, and, by its reduplications, covering the Bowels and great Blood-veſſels of that Cavity;—though, ſtrictly ſpeaking, the Abdominal Viſcera may be ſaid to lie on the outſide of it.

In its paſſage from one Bowel to another, it forms doublings which ſerve as Ligaments to fix them to each other, and likewiſe to the Body.

It gives a general covering to moſt of the Bowels, a partial one to a few, and to thoſe which are deep-ſeated, and project leaſt, a ſtill more partial covering.

It forms a large Sac, the poſterior part of which adheres firmly to the different Viſcera, and the anterior to the Abdominal Muſcles;—the part lining the Abdomen being merely in contact with its contents, and allowing a ſmall degree of motion.

The Cellular Subſtance, on the External Surface of this Membrane, is not every where of equal thickneſs, being in ſome parts, as upon the Bowels, remarkably thin; in others, as over the Kidneys, filled with a conſiderable quantity of Fat.

The Cellular Subſtance forms various Proceſſes or productions, ſome of which, as thoſe on the Spermatic Cords, paſs through Foramina, to be connected with the neighbouring parts; and the Proceſſes are ſent off, without affecting the Internal Membrane, the one not accompanying the other.

The *Veſſels* and *Nerves* of the Peritoneum are from thoſe which ſupply the contiguous parts; its Veſſels, however, are not very numerous; neither does it poſſeſs much Senſibility when free from diſeaſe.

The *Arteries* come from the Internal Mammary, Epigaſtric, Inferior Intercoſtal, Lumbar, Sacral, and Ileo lumbar Arteries, and from thoſe which ſupply the Abdominal Viſcera.

The *Veins* have the ſame courſe, bear the ſame names, and in general paſs to the Inferior Cava.

The *Abſorbents* are numerous, and run chiefly to the Iliac and Lumbar Plexus.

The *Nerves*, which are few in number and ſmall, are from the Inferior Dorſal, the Lumbar, the Great Sympathetic and Sacral Nerves.

The *uſe* of the Peritoneum is to line and ſtrengthen the Cavity of the Abdomen; to incloſe and aſſiſt in ſupporting its different Viſcera; to furniſh moſt of them with an External Coat; to connect them to the Body, and, by its ſmoothneſs and ſlipperineſs, to prevent the effects of Friction.

Upon the outſide of the Peritoneum are *Four White Lines*, or ſmall Cords, three of which are Veſſels in the Fœtus,—one of them a Vein, and two of them Arteries; the fourth is the Urachus.—In the Adult, they are ſhrivelled up, and ſerve as Ligaments, the Vein forming the round Ligament of the Liver, the three other Cords, forming Ligaments of the Bladder.

STOMACH.

The *Stomach* is a large Bag or Reſervoir, ſituated obliquely acroſs the upper and left part of the Abdomen, in the left Hypochondriac and Epigaſtric Regions.

It is turned downwards and forwards, ſo as to form an angle with the Eſophagus, the angle becoming more conſpicuous, according to the diſtenſion of the Stomach.

The right part of the Stomach is ſituated under the left part of the Liver, the reſt of it is placed immediately under the Diaphragm, its extremity being in contact with the Spleen.

The Stomach is long, round, and tapering, and has been compared in ſhape to the Bag of a Bagpipe.

The ſize is in proportion to the quantity of Aliment it has been accuſtomed to receive, and therefore is commonly larger in Men than in Women.

It has a *Large* and *Small Extremity*, an *Upper* and *Under Surface*, a *Great* and *Small Curvature*, a *Left* and *Right Orifice*, and conſiſts of ſeveral *Layers* or *Coats*.

The *Large*, called alſo the *Left Extremity*, is ſituated in the left ſide of the Abdomen, and is conſiderably higher than the Right.

The *Upper Surface* is turned towards the Diaphragm, the *Under* towards the Inteſtines;——but when the Abdomen is laid open,—unleſs the Stomach be conſiderably diſtended,—the Superior Surface becomes anterior, and the Inferior Surface poſterior.

The *Large Curvature* is turned obliquely forwards and downwards towards the Abdominal Muſcles, and extends from one Orifice to the other.

The *Small Curvature* is oppoſed to the other, and turned backwards and upwards, towards the Spine, extending alſo between the two Orifices.

The *Orifices* are next the Small Curvature. The left is termed *Cardia*, or *Os Ventriculi*, or *Upper Orifice* of the Stomach.—It is oppoſed to the Spine, at a little diſtance from it, and is formed by the termination of the Eſophagus.—It allows a free Paſſage for the Food into the Stomach, the return of which is prevented by the Angle formed by this part of the Stomach, and by the Fleſhy Parts of the Cardia, and of the Diaphragm in which it is ſituated.

The *Right*, or *Inferior Orifice*, is commonly termed *Pylorus* from its office as a *Porter*.

It is ſituated under the ſmall Lobe of the Liver, a little to the right ſide of the Spine,—is turned more forwards than the Cardia, and is conſiderably lower, but riſes in proportion to the diſtenſion of the Stomach.

The Stomach is connected by the Cardia to the Eſophagus,—by the Pylorus to the beginning of the Inteſtines,—by the Peritoneum and Blood-veſſels to the Spleen,—and by a reflection of the Peritoneum to the root of the Liver and to the great Inteſtines.

The *Structure* of the Stomach is in general ſimilar to that of the Eſophagus, of which it is a kind of Expanſion.

The *Coats* of the Stomach are *four* in number.

The firſt or *External Coat*, called alſo *Peritoneal*, is a Reflection of that part of the Peritoneum which comes from the root of the Liver.

It ſtrengthens the Stomach; by its ſmoothneſs it diminiſhes the effect of Friction, and poſſeſſing few Nerves or Blood-veſſels, it is not very ſuſceptible of pain or inflammation.

The Cellular Subſtance under the Peritoneal Covering, is deſcribed by ſome Authors as a diſtinct Coat, called *Tunica Celluloſa Ruyſchiana*;—but ought not to be numbered among the Coats of the Stomach.

The Second or *Muſcular Coat* is compoſed chiefly of two Planes of Fibres variouſly diſpoſed.

The External Plane is longitudinal, extends from the longitudinal Fibres of the Eſophagus, and follows the ſame general courſe with that of the Stomach from the Great to the Small Extremity.

Upon each ſide of the Small Curvature, the longitudinal Fibres form a thick, ſtrong, Muſcular Band.

The ſecond Plane is chiefly tranſverſe or circular, and conſiderably thicker and ſtronger than the other.

Its Fibres are interſected by many ſmall, white, Tendinous-like Lines;—theſe, however, are in a great meaſure formed of that Cellular Subſtance by which the two Coats are united.

The Muſcular Coat aſſiſts in the Digeſtion of the Food, by giving a gentle motion to the Stomach, according to the direction of its Fibres, the one ſet ſhortening, the other rendering it narrower.

The Pylorus is formed by a doubling of the two inner Coats, which project into the Paſſage between the Stomach and Inteſtine, and contain a *Ring* of Muſcular Fibres, which form a Sphincter, called *Sphincter Pylori*.

This ſubſtance, by contracting, prevents the groſſer indigeſted parts of the Aliment from eſcaping, and, by dilating, allows the Pulpy digeſted part to paſs to the Inteſtines.

The *Third Coat*, commonly called *Nervous*, but properly *Cellular*, conſiſts of a large quantity of fine Cellular Subſtance, without Fat, and is intermixed with, and ſupported by ſmall Aponeurotic like Filaments, which croſs each other obliquely, but which are alſo of a Cellular nature.

This Coat ſtrengthens the Stomach, and allows the Veſſels to be diſtributed to the Inner Coat, with which it is intimately connected.

The *Fourth* or *Inner Coat*, called alſo *Villous*, from its reſemblance to Velvet, is continued from the Inner Coat of the Eſophagus, but is much more Villous.—It is formed of fine, ſhort, prominent Villi, which are crowded with Small Veſſels, ſome for furniſhing a Mucous Liquor to the Stomach, others for abſorbing a portion of the thinner part of the Food.

The two laſt Coats are more extenſive than the reſt, and form, upon the inner part of the Stomach, many doublings, termed *Rugæ*, the greater number of which run in a waving tranſverſe direction, and are afterwards divided into a ſort of *Net-work*.

Near the Orifices, however especially towards the upper one, they run more in a longitudinal direction, and have a radiated appearance at the Cardia.

The Rugæ, like the Plicæ of the Esophagus, are most distinct when the Stomach is empty;—when full, they are much less evident.

They admit of distention without endangering the Vessels and Nerves dispersed in them, and assist a little in detaining the Aliment till properly digested.

From the Inner Surface of the Stomach a Liquor issues, which is found to approach to the nature of Saliva, and is termed *Gastric Juice*.—This was formerly supposed to come from Glands seated in the Third Coat, but is now more frequently considered as a Secretion from the Arteries of the Stomach, no Glands being evident there, at least in the sound state of this Viscus.

The Arteries of the Stomach are derived from the Cœliac Artery. They consist of the Superior Gastric, which supplies the place next the small Curvature; the Right Inferior Gastric, which is a branch of the Hepatic; the Pyloric Arteries, which are small branches from the Gastrics and from the Hepatic; and of the Left Gastric and Arteriæ breves, which are branches of the Splenic Artery.

The *Veins* have the same names, and nearly the same course with the Arteries. The whole of them terminate in the Vena Portæ.

The *Absorbents* of the Stomach are numerous and large. They pass through small Glands situated upon the Curvatures, and go afterwards to the Thoracic Duct.

They appear to carry Lymph only, no Chyle having been detected in them, even in cases where the Lacteals were found full of it.

The *Nerves* are chiefly from the Eighth Pair, and partly from the Great Sympathetics, and are most numerous upon the Cardia.

The Stomach receives the Food from the Esophagus, and afterwards prepares it, by digestion, for the Intestines.

The digestion of the Food in the Stomach is found to be effected,—by Triture, which is performed by the motions of the Stomach and surrounding Muscles,—by dilution,—by a partial fermentation,—but chiefly by the action of the Gastric Juice serving as a Menstruum.

INTESTINES.

The *Inteſtines* conſiſt of a long Cylindrical Canal, which begins at the Inferior Orifice of the Stomach, and, after winding in various directions, terminates in the Anus.

In general they are about ſix times the length of the Body to which they belong; though, in a perſon of ſhort ſtature, the proportional length of the Inteſtines is greater, and *vice verſa*.

They occupy a large part of the Abdomen, and are connected to the Body through their whole extent, by a doubling of the Peritoneum.

On account of the inequalities of their ſize, they are divided into *Small* and *Large* Inteſtines, and each of theſe is ſubdivided into others.

Small Intestines.

The *Small Inteſtines* are ſmooth on their outer Surface, and of a tapering form, becoming gradually leſs in their diameter from their upper to their under extremity, and are divided into the *Duodenum*, *Jejunum*, and *Ilium*.

The *Duodenum*, ſo called from its being about twelve fingers-breadth in length, begins at the Pylorus, and makes a ſhort turn upwards and backwards, by the Neck of the Gall-bladder, to which it is contiguous, having the Anterior Layer of the Omentum fixed to its inferior part, and the Omentum Minus to its oppoſite ſide.

It then paſſes obliquely downwards and to the right ſide, before the great Veſſels which go into the Liver, and likewiſe before the Renal Artery and Vein, included in the Cellular Subſtance of the Meſocolon.

Oppoſite to the under part of the Kidney, it makes a turn to the left ſide, where it is lodged in the common root of the Meſocolon and Meſentery, and receives into its back-part the ends of the Biliary and Pancreatic Ducts, and goes over the Aorta and Vena Cava, oppoſite the laſt Vertebra of the Back.

In paſſing acroſs theſe Veſſels, it is involved in the root of the Meſentery, and aſcends a little till it gets to the left ſide of the Spine, where it perforates the common root of the Meſentery and Meſocolon, and makes a turn forwards, where it obtains the name of *Jejunum*.

The *Jejunum* ſo named from its being commonly more empty than the other Inteſtines, in conſequence of the thinner parts of its Contents being ſooner abſorbed, begins at the laſt turn of the Duodenum, and forms numerous Convolutions, which run in all directions, and are ſituated in the upper part of the Umbilical Region.

The *Ilium*, named from its numerous Turns, begins where the Jejunum terminates, or where the Internal Plicæ become leſs conſpicuous, and is diſtinguiſhed externally from that Gut, by being ſmaller, thinner in its Coats, and paler, and from its forming about three-fifths of the length of the two Inteſtines.

The Ilium, like the Jejunum, forms many Convolutions, which are ſituated on the under part of the Umbilical Region, and extend as far as the Hypogaſtric and Iliac Regions, and not unfrequently, eſpecially in Women, into the Cavity of the Pelvis.

It ſurrounds the lateral parts of the Jejunum, and is ſupported by the Oſſa Ilia; and, the laſt turn of the Gut paſſing acroſs towards the upper edge of the Right Os Ilium, it terminates by a Valve in the left ſide of the beginning of the Colon.

Through the whole of this courſe, the Jejunum and Ilium are fixed to the Spine by a continuation of the Meſentery.

Great Inteſtines.

The *Great Inteſtines*, like the Small, form one continued Canal, which tapers from its upper to near its under extremity; but differ from them in being conſiderably larger, ſhorter, and ſtraighter, and in being irregular in their Outer Surface, and tacked up into Cells, having beſides many Proceſſes depending from them, termed *Appendiculæ Pinguidenoſæ*.

Like the Small Inteſtines, alſo, they are divided into three parts, termed *Cæcum*, *Colon*, and *Rectum*.

The *Inteſtinum Cæcum*, or *Blind Gut*, forms a round ſhort Bag, only about three or four Fingers-breadth in length, and nearly the ſame in diameter. The Cæcum, properly ſo called, is that part of the Inteſtine which lies under the Inſertion of the Ilium, through frequently the dilated beginning of the Colon is diſtinguiſhed by the ſame name.

It is ſituated in the Right Iliac Region, reſting on the Cavity of the correſponding Os Ilium, at the under end of the Right Kidney, and is concealed by the laſt Convolutions of the Ilium.

The bottom of it is turned downwards, and forms a ſhut Sac, the mouth of which is turned towards the Colon, and may be conſidered as forming the *Cæcum Caput Coli*.

At the poſterior and left ſide of the Cæcum, there is a *ſmall Proceſs*, about the ſame length with the Cæcum itſelf, but the diameter not larger than that of a Gooſe-quill,—termed *Appendix Vermiformis*, from its reſemblance to an Earth-worm, and *Appendix Cæci*, from its connection with the Cæcum.

It is convoluted, and fixed by its ſides to the Cæcum.

It has two extremities, one of which is impervious, the other opens obliquely into the back-part of the Cæcum.

The *Colon*, ſo called from the Greek, is by much the longeſt of the Large Inteſtines. It encircles the Small Guts, and is contiguous to moſt of the Abdominal Viſcera.

It is a continuation of the Cæcum, beginning at the termination of the Ilium.

It aſcends in the Right Lumbar Region, over the Kidney of that ſide to which it is connected.

From the Kidney, it paſſes forwards, and croſſes the Abdomen in the Epigaſtric and Hypochondriac Regions, connected to the Duodenum, under the name of *Great Arch of the Colon*.

The right portion of the Great Arch is ſituated under the Liver and Gall-bladder, which, after death, commonly tinges part of it and of the Duodenum with Bile.

The left portion is ſituated under the Stomach; and immediately below the Arch are the Convolutions of the Jejunum.

In the Left Hypochondrium, it turns backwards under the Spleen, and deſcends in the left Lumbar Region, on the foreſide of the Kidney, to which alſo it is cloſely connected.

In the Left Iliac Region, it forms two Convolutions, compared in ſhape to the Greek *Sigma*, and hence called *Sigmoid Flexure* of the Colon, which afterwards conſtitutes the Rectum.

The *Sigmoid Flexure* varies conſiderably in length in different perſons, extending frequently into the Hypogaſtric Region, and in ſome inſtances, as far as the Inteſtinum Cæcum.

The Colon, through its whole extent is fixed to the Body by means of the Meſocolon.

The *Rectum* begins at the laſt Lumbar Vertebra, and has its name from appearing ſtraight when viewed anteriorly.

It deſcends upon the fore-ſide of the Os Sacrum and Os Coccygis, and terminates in the Anus, a little beyond the extremity of the laſt named Bone.

In its courſe, it follows the direction of the Bones over which it paſſes, turning firſt downwards, then a little backwards, then forwards, and is fixed to them by the Meſorectum.

The Rectum differs from the other Inteſtines, in becoming wider in its progreſs downwards, and forming below a Reſervoir for the Fæces.

At the Anus, it contracts into a narrow Orifice, the ſides of which are diſpoſed in cloſe longitudinal folds.

Upon the Outer Surface of the Great Inteſtines, but more eſpecially upon the Colon, are the *Appendiculæ Pinguedinoſæ*, ſituated at different diſtances from each other,—thin at their roots, becoming thicker in their bodies, and projecting from the Inteſtines like ſo many pendulous Papillæ.

They are covered by the Peritoneum, and are of the ſame ſtructure and uſe with the Omentum.

Beſides the Appendiculæ, there are on both ſides of the adheſions of the Meſocolon, *Adipoſe Strata*, which are of the ſame nature with the others.

The Colon is divided, longitudinally, into three parts, by as many *Ligamentous-like Bands*, which run upon its Surface.

One of them goes along each ſide of the Colon; and that moſt expoſed to view when the Omentum is ſeparated, is the largeſt: The third, which is the ſmalleſt, and which was diſcovered by MORGAGNI, is concealed by the attachment of the Meſo-colon.

They begin at the root of the Appendix Vermiformis, and, after running along the Cæcum and Colon, unite into two, and then terminate on the Rectum.

MESENTERY.

THE *Meſentery* is formed by a doubling of the Peritoneum, which is detached forwards, and includes the Inteſtines as in a Sling.

It is named from its ſituation in the middle of the Inteſtines, and is divided into two parts, one connecting the Small Inteſtines, and retaining the name of *Meſentery*; the other, the Great Inteſtines, and termed *Meſocolon*.

The Meſentery begins at the laſt turn of the Duodenum, and runs obliquely downwards and towards the right ſide, along the Vertebræ of the Loins, to the firſt, ſecond, and third of which it is chiefly connected.

Between the two Layers of the Meſentery, are incloſed a conſiderable quantity of Cellular Subſtance and Fat, the numerous Blood-veſſels and Nerves, with the Lacteals and Glands of the Jejunum and Ilium.

Its anterior edge is much more extenſive than the poſterior, being plaited and folded,—the Plaits correſponding with the Convolutions of the Inteſtines to which it is fixed.

The *Meſo-colon* is the continuation of the Meſentery, which, after reaching the lower extremity of the Ilium, contracts, and obtains this name.

It follows the courſe of the Great Inteſtines, and fixes them in their place.

Under the Right Kidney, it is narrow and firm, and forms the Right Ligament of the Colon.

Oppoſite to that Kidney, it appears to be loſt by the immediate adheſion of the Colon to the Kidney and Duodenum.

It then turns acroſs, and forms a broad expanſion, which incloſes the Arch of the Colon at its anterior edge; and behind, it ſeparates and incloſes the anterior part of the Duodenum, and is fixed to the Spine.

It adheres a little to the under part of the left extremity of the Stomach, and afterwards deſcends over the left Kidney, at the under end of which it forms the left Ligament of the Colon.

It afterwards expands, adheres to the large Pſoas Muſcle, and forms a looſe fold, which retains the Sigmoid Flexure of the Colon.

At the laſt Vertebra of the Loins, it forms the *Meſorectum*, which by degrees becomes narrower, and diſappears towards the

under part of the Pelvis, the Rectum being then immediately connected to the Os Sacrum.

Between the Layers of the Mesocolon are placed the Arteries, Veins, and Nerves, with the Absorbents and Glands of the Colon.

The *use* of the Mesentery, in general, is to suspend, connect, and retain the Intestines in their places,—to furnish them with an external Coat,—to receive their Glands, Vessels, and Nerves, and to allow the two last to be properly distributed.

Omentum.

The *Omentum* or *Caul*, formerly called *Epiploon*, from its seeming to float upon the Intestines, is a fine Membranous Bag, intermixed with much Fat, and covering a large portion of the Anterior Surface of the Abdominal Viscera.

It is divided into *Omentum Gastro-colicum*, and *Omentum Colicum*, the former common to the Stomach and Colon, the latter proper to the Colon: They are, however, a continuation of one and the same substance.

The *Omentum Gastro-colicum* consists of an anterior and posterior part, each of which is formed of two Membranes intimately united.

In young subjects, the Omentum forms a distinct Bag, but in old people, the layers of which it is composed become more or less incorporated, and Cribriform or Reticular.

The Anterior Layer is a continuation of the Peritoneal Coats, produced from the upper and under Surfaces of the Stomach.

This Production arises from the whole length of the large Arch of the Stomach, and beginning of the Duodenum;—its origin extending as far as the Spleen, and descending to a little below the Umbilicus, especially in fat people,—but without adhering to the Abdominal Muscles behind which it is situated.

Its under edge is reflected, to form the Posterior Layer, which ascends without adhering to the Small Intestines over which it is spread, till it reaches the Arch of the Colon, to the greater part of which Arch, and to the Vessels of the Spleen, it is connected.

The *Omentum Colicum* arises from the right part of the Arch of the Colon, in the manner the other part of the Omentum arises from the Stomach, and sends downwards and to the right side a Cuneiform Process, to be connected to the Cæcum.

Besides the Omentum, there is a Membrane much smaller than the former, situated between the Liver and Stomach, termed *Omentum Hepato-gastricum*, or *Omentum minus* of Winslow, or *Membrana Macilentior* of Haller from its having little Fat in it.

It passes from the fore-part of the Sinus of the Porta, to the under and back-part of the Liver, to be connected to the whole

edge of the small Curvature of the Stomach, and to the beginning of the Duodenum.

Like the other Omentum, it is composed of two Layers, but is thinner, less Fat, and more uniform in its structure, and also differs from it in having no reflection upwards.

After the Omentum Minus reaches the Stomach, its two Layers separate from each other, include that Viscus, and form its External Coat.

At the great Curvature of the Stomach, they rejoin, and form the Anterior, then the reflected or posterior part of the Omentum Majus.

The posterior part separates again into two Layers, which include the Colon, and form its External Coat.

At the opposite side of the Colon, the Layers re-unite, and form the Meso colon.

By the Membrane thus continued, a large irregular Bag is formed, of which the Omentum Minus, Stomach, and anterior portion of the Omentum Majus, constitute the anterior, and the reflection of the Large Omentum, the Colon, and Meso-colon, the posterior part.

At the upper and right side of the Sac, there is a Passage large enough to admit a Finger, termed *Foramen* WINSLOWI.

It is situated immediately behind the Cord of the great Vessels which lead to the Liver, and is of a Semicircular form.

It is composed of the Peritoneum, under the appearance of two Ligaments which connect the surrounding parts to each other.

The Foramen of WINSLOW maintains a communication between the Large Sac of the Omentum and common Cavity of the Abdomen, from which circumstance, Fluids generated by disease may readily pass from one of these Cavities to the other.

The Omentum, by its Fatty nature, serves to lubricate the Viscera, and prevent them from being injured by friction.

STRUCTURE OF THE SMALL INTESTINES IN GENERAL.

The *Structure* of the Small Intestines is nearly similar to that of the Stomach, and the number of their *Coats* the same.

The *External Coat*, excepting in a portion of the Duodenum, is a continuation of that part of the Peritoneum which forms the Mesentery. It closely surrounds the Intestines, adhering to them by fine Cellular Substance.

The *Second*, or *Muscular Coat*, as in the Stomach, is composed of two Planes of Fibres, the External or Longitudinal of which are more minute than the Internal.

The *Circular Fibres* are distinct and numerous: They consist of Segments of Circles, which unite at different distances, so as to surround the Canal.

The *Longitudinal Fibres* shorten, and the *Circular* contract the Intestines; and upon the alternate relaxation and contraction of

these Fibres, depends that Vermicular motion, called *Peristaltic*, by which the Contents are pushed through the Canal.

The *Third* commonly called *Nervous Coat*, like that in the Stomach, is white and firm and composed of Cellular Substance, without Fat;—its firmness giving strength to the Intestines.

The *Fourth*, or *Villous Coat*, differs from that of the Stomach, in forming, with the Cellular Coat, numerous transverse Folds, termed *Valvulæ Conniventes*, from their serving, as a kind of Valves, to retard the motion of the Food.

One edge of these Valves is fixed to the Intestine, the other is loose.—They are much deeper than the Rugæ of the Stomach, and placed opposite to the Interstices of each other, and are of different lengths, not forming entire Circles.

The *Villi* of the Inner Coat are much more conspicuous than in the Stomach, being composed not only of the extremities of Arteries, Veins, and Nerves, but particularly of the Mouths of Lacteal Vessels, the Origins of which are extremely small, and have a fungous appearance.

Numerous *Ducts* of *Simple* and *Compound Glands* terminate on this Coat, for the secretion of Mucus.

The former are called *Solitary*, and the latter *Congregate*;—and, form their describers, *Glandulæ* PEYERI, and *Glandulæ* BRUNNERI.

They are in the form of Papillæ, but so minute as seldom to be seen, excepting in the diseased state,—though they are supposed to be dispersed over the whole of the Canal.

STRUCTURE OF THE SMALL INTESTINES IN PARTICULAR.

The *Duodenum* is the laxest and straightest of the Small Intestines, and so large as to have been considered as a *Ventriculus Succenturiatus*, or *Secondary Stomach*.

It is of a redder colour than the rest, has a thicker Muscular Coat, receives only a partial covering from the Peritoneum, and is fixed more closely to the Body, without floating like the other Intestines.

It is perforated at the distance of three or four fingers-breadth from the Pylorus, by the ends of the Biliary and Pancreatic Ducts, for the reception of Bile and Pancreatic Juice.

In the Duodenum, the Lacteal Vessels begin to make their appearance, and numerous Mucous Glands are found in it especially near the Pylorus

The *use* of the Duodenum is to receive the Food from the Stomach, and detain it till mixed with the Bile and Pancreatic Duct.

The *Jejunum* differs from the Duodenum in deriving its common Coat wholly from the Peritoneum, in being smaller,—in having a weaker Muscular Coat, the external Fibres of which are extremely minute,—in the Valvulæ Conniventes being larger

and more numerous,—and in the Villi and Lacteals which proceed from them being much more conspicuous.

The *Ilium* differs from the former in being less in diameter, and its Coats thinner and of a paler colour, and in having fewer and smaller Lacteal Vessels.—In this Intestine the Valvulæ Conniventes gradually decrease in size and number, and at length entirely disappear.—At its under end, the Mucous Glands are distinct and numerous.

The *use* of the Small Intestines in general is,—to promote the formation of the Chyle,—to allow it to be absorbed, and—to propel the remains of the Food into the Large Intestines.

Structure of the Great Intestines in General.

The Great have the same number of Coats with the Small Intestines, but differ from them in being thicker and stronger.—The Valvulæ Conniventes are deep, and placed opposite to each other, and, as in the Small Intestines, diminish in number and in size towards the under extremity.—The Villous appearance is much less distinct.—The Mucous Glands are larger, but simpler than those of the Small Intestines.

Structure of the Great Intestines in Particular.

The *Intestinum Cæcum* is of the same general structure with the rest of the Great Intestines. Its Villi are very short; and it has a number of solitary Mucous Glands, broader than those of the Small Intestines, which, when diseased, sometimes appear like small-pox, with a perforation in each.

The *Appendix Vermiformis* is of the same structure with the other Intestines, contains no Fæces, but is furnished with numerous Glands similar to those of the Duodenum, the contents of which pass into the Cæcum, a little below the Valve of the Colon, and assist in lubricating that Intestine, and in facilitating the expulsion of the Fæculent Matter.

In the Cæcum, and beginning of the Colon, the Food coming from the Ilium is retained for some time, and, in consequence of absorption, acquires a greater degree of consistency, and receives a fœtid smell.

The *Valvula Coli*, sometimes called *Valvula Ilei*, or *Valvula* Baughini, from its supposed discoverer, and *Valvula* Tulpii from the Author who gives a particular description of it, is situated at the beginning of the Colon, and is placed transversely in the posterior and left part of that Intestine.

It is formed of a projection of the Villous and Nervous Coats, and Circular Muscular Fibres of the Ilium, Cæcum, and Colon, and has two Folds or Lips, with an aperture in form of a Mouth or Chink between them.

At the ends of the Valves are two cords, termed *Retinacula*, or

Fræna MORGAGNII, which retain the Valve in its proper situation.

The Valve of the Colon allows a free passage for the Contents of the Small into the Large Intestines, but completely prevents their return.

The *Colon* is of a similar structure with the Cæcum.—The Longitudinal Muscular Fibres are collected upon it into three Fasciculi or Bands, which arise at the root of the Vermiform Process, and are continued along the Colon to the Rectum.

The Longitudinal Bands are shorter than the inner parts of the Colon, and of consequence assist in contracting it, and forming it into Plicæ, which lie across the Gut, answering to the Valvulæ Conniventes; only they are at a greater distance from each other, and much larger, dividing the Colon into little apartments, called *Cells*.

The *Cells of the Colon*, with their Partitions, have a threefold order, the Intestine being almost quite smooth or plain, opposite to the Longitudinal Bands.

The Cells assist in preventing the too quick descent of the Fæces.

The *use* of the Colon is,—to receive the Excrementitious parts of the Aliment,—to retain them,—to change them into Fæces, and then, by the peristaltic motion of the Intestines and power of Respiration, to push them, by slow degrees, to the Rectum.

The *Rectum* differs from the Colon in being covered only anteriorly and laterally by the Peritoneum :—Its Muscular Fibres are stronger and thicker, and spread uniformly over the Intestine. —The Circular Fibres are so thick at the end of the Rectum, as to have been named *Internal Sphincter*.

It has no Cells like the Colon; but the Cellular and Inner Coat are so much larger here than they are higher up, as to fall into transverse folds, which, however, disappear in proportion to the distention of the Intestine.

The middle and under end of the Rectum has numerous large Mucous Glands or Follicles.

The extremity of the Rectum forms a firm Circle, which acts as a Valve, and assists the proper Sphincter in preventing the involuntary discharge of the Fæces.

The Verge of the Anus is surrounded with deep Follicles, the contents of which prevent the tender Skin of the Anus from being excoriated by hard or acrid Fæces.

The Anus is also surrounded with a great deal of Fat, which admits of the dilatation of the Rectum, and facilitates the discharge of the Fæces.

The Rectum receives the Fæces from the Colon, retains them for a certain time, till, by their weight and Acrid nature, it is stimulated to discharge them; which it does by the power of its

Muſcular Coat, and of the Levator Ani, aſſiſted by the action of the Diaphragmatic and Abdominal-Muſcles.

The *Blood-veſſels* of the Inteſtines are large and numerous, and are derived from different ſources.

The Duodenum receives Branches from the Splenic and Hepatic Arteries.

The Jejunum, Ilium, and right half of the Colon, are ſupplied by the Superior Meſentric Artery; and the left half of the Colon with the Rectum, by the Inferior Meſentric Artery.

The *Veins* of all the Inteſtines ſend their Blood to the Vena Portæ.

The *Abſorbents* of the Inteſtines are large and numerous.—They ariſe from the inner Surface of the Inteſtines, run in the Meſentery and Meſo-colon, paſſing through their numerous Glands.—The Abſorbents of the Small Inteſtines terminate in the receptacle of the Chyle; thoſe of the Large Inteſtines, which are ſmaller than the former, go partly to the Thoracic Duct, and partly to the Lymphatics of the Loins.

The *Nerves* of the Inteſtines are ſmall, but numerous, and are derived partly from the Eighth Pair, but chiefly from the Great Sympathetics.

The Veſſels and Nerves of the Omenta are Branches of thoſe which ſupply the Stomach, and have the name of *Gaſtro-Epiploic*.

LIVER.

THE *Liver* is a large ſolid Maſs, of a duſky red colour, ſituated immediately under the Diaphragm, extending downwards to the margin of the Thorax, but not going beyond it.

It is placed partly in the Right Hypochondrium, which it in a great meaſure fills, and partly in the Epigaſtrium, reaching over a little way into the Left Hypochondrium.

It is *convex* and very *ſmooth* on the upper Surface, where it is oppoſed to the Diaphragm, though a little flattened on the upper part of its left ſide, where it is placed oppoſite to the Heart.

It is *irregularly concave* on the under ſide, where it reſts upon the Stomach and Inteſtines, and is perforated by ſeveral large Blood-veſſels.

It is *thick* on its right and poſterior part, and becomes gradually *thinner* towards the left ſide; is *obtuſe* or *blunt* on its poſterior, and *acute* or *ſharp* on its anterior edge,—and conſiderably *broader* from one ſide to the other, than from before backwards.

It is divided into *Prominences* or *Lobes*, two of which, called *Great* and *Small*, or *Right* and *Left Lobes*, are so considerable as to form the Body and whole upper part of the Liver—The others are small, and are placed upon the under side of the former.

The *Great Lobe* is placed obliquely in the Right Hypochondriac Region, following the Curve of the Diaphragm, and rests upon the Pylorus, Colon, and top of the Right Kidney.

The *Small Lobe*, distinguished from the Great one by a broad Ligament, is placed almost horizontally, chiefly in the Hepeastic, and reaching only a little way into the Hypochondriac Region.

—The other Lobes are,—

The *Lobules Spigelii*, which is small when compared with the two former Lobes, but is the principal one below.

It is situated near the Spine, upon the left side of the Great Lobe, and is of a Pyramidal form, projecting like a Nipple, at the small Curvature of the Stomach.

The *Lobulus Caudatus*, which is merely the root, or one of the angles of the Lobulus Spigelii, advancing towards the middle of the lower side of the Great Lobe.

The *Lobulus Anonymus*, or *Quadratus*, which is placed between the passage of the round Ligament and the Gall-bladder, and is less prominent, but broader than the former Lobule.

From the Lobulus Anonymus, a bridge called *Pons*, or *Isthmus Hepatis*, runs across the Passage for the Round Ligament, to be joined to the Left Lobe :—It is sometimes awanting.

Upon the under side of the Liver, there are several *Fissures*, of which the following are the principal.

The *Great Fissure*, called *Fossa Umbilicalis*, between the Right and Left Lobes, at the under and fore part of the Liver.

This is terminated by a *Notch* at the fore-part of the Liver,—of different depths in different bodies,—and behind, it is commonly covered with the Bridge above mentioned.

The *Principal Fissure*, termed *Sulcus Transversus*, or *Sinus Portarum*, extending from right to left, between the Great and Small Lobes, and bounded by these Lobes at its extremities, and by the Lobulus Anonymus before, and by the Lobulus Spigelii behind, the two latter forming parts compared by the Ancients to a Gate, and therefore called *Porta*.

The *Depression* between the Great Lobe and Lobulus Spigelii, for the passage of the Inferior Vena Cava, which has frequently a bridge over it, forming it into a Canal.

A *Small Depression*, called *Fossa Ductus Venosi*, between the Left Lobe and Lobulus Spigelii, running a little obliquely from right to left side, and receiving a Ligament,—which is a Branch of the Umbilical Vein in the Fœtus.

The Liver is connected to the Body by different *Proceſſes*, termed its *Ligaments*, all of which, excepting one, are formed by doublings of the Peritoneum, viz.

The *Ligamentum Latum*, or *Suſpenſorium Hepatis*, placed between the Right and Left Lobes above, and extending below into the Foſſa Umbilicalis.

It is fixed obliquely to the Diaphragm and tip of the Enſiform Cartilage, and then deſcends in the ſame oblique direction, adhering to the inner part of the Vagina of the Right Rectus Abdominis Muſcle, as far as the Umbilicus.

The *Ligamentum Rotundum*,—which is the Umbilical Vein in the Fœtus, placed in a doubling at the under part of the Ligamentum Latum, and fixed to the Umbilicus.

Theſe two Ligaments have been ſuppoſed to reſemble a *Falx*, with the edge turned uppermoſt, from which circumſtance the Ligamentum Latum is ſometimes alſo called *Falciforme*.

The *Ligamentum Dextrum*, or *Right Lateral Ligament*, which is ſhort, and connects the back-part of the right extremity of the Great Lobe to the Diaphragm.

The *Ligamentum Siniſtrum*, or *Left Lateral Ligament*, which is longer than the former, and connects the left extremity of the Small Lobe to the Diaphragm.

The *Ligamentum Coronarium*, conſidered by ſome as merely Cellular Subſtance, and by others as a reflection of the Peritoneum, or both.—It unites the root of the Liver to the Tendinous Portion of the Diaphragm.

Beſides the Ligaments already mentioned, two others are deſcribed by HALLER; one called *Hepatico-colicum*, which paſſes from the Gall-bladder and contiguous Sinus Portarum, acroſs the Duodenum, to the Colon; another called *Hepatico-renale*, which deſcends from the root of the Liver to the Kidney.—Theſe, as well as the other Ligaments of the Liver in general, are productions of the Peritoneum.

The Ligaments of the Liver preſerve it in its proper ſituation, and of courſe prevent it from inclining too much in any direction. The Stomach and Inteſtines ſupport it when the Body is upright and the Diaphragm, when the Body is inverted.

The Liver has a ſimple Coat adhering cloſely to it which it derives from the Peritoneum, and is every where covered by this Membrane, excepting behind, where it adheres to the Diaphragm by Cellular Subſtance.

The Subſtance of the Liver is compoſed of ſeveral kinds of Veſſels, the extreme Branches of which are intermixed in ſuch a manner, as to form numberleſs Pulpy Corpuſcles, named *Acini*, from a reſemblance to ſmall Stones or Kernels of Fruit, which when minutely examined, are obſerved to be compoſed of Veſſels in the form of radiated *Villi* or *Penicilli*.

The *Veſſels* of the Liver are, the *Hepatic Artery*, *Vena Portarum*, *Venæ Hepaticæ*, *Abſorbents*, and *Biliary Ducts*.—It has likewiſe numerous *Nerves*.

The trunks of the Hepatic Artery, Vena Portæ, Biliary Ducts, and Nerves, with the Abſorbents and Lymphatic Glands of the Liver, form a large *Cord* at its under part.

The Artery is ſituated in the left part of the Cord, the Vein in the right, with the Trunk of the Biliary Ducts before it;—the Nerves and Lymphatics ſurrounding the great Veſſels.

The Cord of Veſſels and Nerves is intermixed with much Cellular Subſtance and covered externally by a reflection of the Peritoneum, which has obtained the name of *Capſule of* GLISSON.

The Branches of Veſſels and Nerves accompany each other through the ſubſtance of the Liver, forming ſmall Faſciculi, in a manner ſomewhat ſimilar to that by which the Cord is formed by their Trunks.

In their courſe through the Liver, the Branches of the different Veſſels and Nerves, but particularly thoſe of the Vena Portæ, are incloſed in a large portion of Cellular Subſtance, which is alſo frequently called *Capſule of* GLISSON, from that Author ſuppoſing it to be a continuation of the Capſule which covers the Veſſels before they enter the Liver.

The *Hepatic Artery* is derived from the Cæliac, and is diſperſed throughout the whole ſubſtance of the Liver, and alſo upon the Coat which covers it, and is ſo ſmall when compared with the bulk of the Liver, as to have been generally ſuppoſed to be deſtined for the nouriſhment merely of that Viſcus; but from injections paſſing from the Artery to the Biliary Ducts, and from other cauſes, it has been ſuppoſed by ſome Anatomiſts, that the Hepatic Artery is not only intended to nouriſh the Liver, but is capable of ſecreting part of the Bile;—and this ſuppoſition is farther confirmed from the Vena Portæ having, in a recent caſe, been found awanting, while, at the ſame time, the Hepatic Artery was larger than uſual, and the Veins which commonly form the Vena Portæ, terminated in the Vena Cava.

The *Vena Portæ* is named from its ſituation with reſpect to the Porta of the Liver.

It partakes of the nature of an Artery and a Vein:—Like the former it carries the Blood from the Trunk to the Branches, and, like the latter, it carries it to the Heart;—or it is peculiar in the Blood, in one part flowing from the Branches to the Trunk, and in another from the Trunk to the Branches.

It is formed by the Veins of the Stomach and Inteſtines, joined to thoſe of the Spleen, Omentum, and Pancreas, and approaches to the nature of an artery in the thickneſs of its Coats, though it has no pulſation.

It paſſes to the Porta, where, from its great ſize, it is named *Sinus* of the Vena Portæ, and divides into Branches which ac-

company thoſe of the Artery in their courſe through the ſubſtance of the Liver, terminating at laſt in the Pulpy Corpuſcles.

The *Vena Portæ* ſerves to carry Venous Blood to the Liver, for the ſecretion of the Bile.

The *Venæ Hepaticæ* are numerous. They are reflected partly from the extremities of the Artery, and partly from thoſe of the Vena Portæ. They unite by degrees, and accompany the other two ſets of Veſſels; but at the root of the Liver they form two or three large Trunks which terminate in the Vena Cava, where it is about to perforate the Diaphragm.—They likewiſe ſend off ſome ſmall Branches which terminate in the Cava, where that Vein lies behind the Liver.

The Venæ Hepaticæ receive the Blood from the Hepatic Artery and Vena Portæ, after the Bile has been ſecreted, and return it to the Vena Cava, to be conveyed by it to the Heart.

The *Lymphatics* of the Liver are ſo numerous as to cover almoſt the whole of its outer Surface. They diſcharge their contents, partly into the beginning of the Thoracic Duct, and partly to a Plexus ſituated in the fore-part of the Thorax.

The *Nerves* of the Liver are alſo numerous. They ariſe from the Great Sympathetics and Eighth Pair, and accompany the Blood-veſſels.

The *Biliary Ducts* ariſe by extremely minute Branches, termed *Pori Bilarii* or *Tubuli Biliferi*, chiefly from the extremities of the Vena Portæ, in the Subſtance of the Corpuſcles, through the whole of the Liver.

The Pori Bilarii run in company with the Branches of the Artery and Veins, and unite into larger and larger Branches, which afterwards go into two, and theſe again into a ſingle Trunk in the Sinus Portarum, called *Ductus Hepaticus*.

The *Ductus Hepaticus* ſerves to carry the Gall or Bile, which is of a yellow green colour, from the Liver,—and to convey it by the power of the Heart, Hepatic Artery, and Vena Portæ, aſſiſted by the preſſure of the ſurrounding Muſcles, to the Duodenum, and partly to the Veſicula Fellis.

The *Veſicula*, or *Cyſtis Fellis*, or *Gall-bladder*, is a ſmall oblong, Pyriform Bag, conſiſting of a Bottom, Body, and Neck, ſituated upon the concave ſide of the Great Lobe of the Liver, and placed in a tranſverſe direction from behind forwards.

It extends from the Sinus Portarum, where the Neck is ſituated, to the anterior edge of the Liver, and when full advances beyond the edge of the Liver, ſo as ſometimes to have its Fundus oppoſed to the ſoft parts of the Abdomen, under the edge of the Falſe Ribs.

The bottom is a little lower than the Neck, when the Body is in the erect poſture. It inclines alſo a little to the right ſide, and reſts upon the Colon at the beginning of the Duodenum.

It is compoſed of ſeveral *Coats*, the *external* of which is a continuation of the Membrane of the Liver: This however, is only a partial Coat covering that part of the Gall-bladder, which projects beyond the Surface of the Liver.—It ſerves to give ſtrength to the Gall-bladder, and to fix it to the Liver.

Under the former Coat, a few pale ſcattered Fibres, running in various directions, are ſometimes obſerved, which have been conſidered as a *Muſcular Coat*; and under this is a ſmall quantity of Cellular Subſtance, which has obtained the name of *Nervous Coat*.

The *Inner Coat*, ſometimes called *Villous*, is full of ſmall Reticular Rugæ or Folds, which become extremely minute towards the Cervex, where they run in a longitudinal direction.

The Surface of this Coat is every where perforated by the Ducts of ſmall Follicles, which diſcharge a viſcid Mucus, to defend the Surface of the Inner Coat from the Stimulant nature of the Bile.

The Gall-Bladder is connected through its whole length to the Liver by Cellular Subſtance, Blood-veſſels, and Abſorbents, among which the *Hepato-cyſtic Duct*, ſimilar to thoſe found in many Animals, were in former times deſcribed, and ſuppoſed to carry the Bile found in the Gall-bladder immediately from the Liver. It is now ſufficiently aſcertained,—that no ſuch Ducts exiſt in the Human Body.

The Gall-Bladder has Blood-veſſels, abſorbents, and Nerves, in common with thoſe of the Liver.—Its Veins paſs into the Vena Portæ.

The Neck of the Gall-bladder is twiſted and folded againſt itſelf, and afterwards contracts and ſends out a Duct called *Cyſticus*, which runs near the *Ductus Hepaticus*, and then joins it, to form the *Ductus Communis Choledochus*.

The *Ductus Ciſticus* is ſmaller than the *Ductus Hepaticus*, and differs from it alſo in having a number of imperfect Partitions or *Plicæ*, running in a ſomewhat ſpiral direction, and forming it into Cells which retard the flow of the Bile.

The Gall-bladder ſerves as a receptacle for the Bile, when the Stomach and Inteſtines are empty and have no need of it, and retains it till wanted for the purpoſe of digeſtion.—It is afterwards diſcharged from the Gall-bladder, when the Stomach is full into the Ductus Communis, and from that to the Duodenum, chiefly by the preſſure of the ſurrounding Viſcera, and partly as ſome Anatomiſts ſuppoſe, by a contractile power in the Gall-bladder itſelf.

The whole of the Bile contained in the Gall-bladder is found, by experiment, to paſs from the Liver through the Hepatic Duct to the Ductus Communis, and from that by the Cyſtic Duct into the Gall-bladder.

The Bile returning from the Gall-bladder is obſerved, from the thinner parts being abſorbed, to be thicker, more acrid and

bitter, and of a deeper colour, than that which flows from the Liver.

The *Ductus Communis Choledochus*, called *Choledochus* from its conveying Bile, is about the size of a Goose-quill, and is considerably larger than either of the Ducts which open into it.

It descends at the posterior and left part of the Duodenum, and passes for some way obliquely between the Muscular and Inner Coats of that Gut,—the obliquity answering the purpose of a Valve.

It terminates in the left, posterior, and near to the under part of the second Turn of the Intestine, by a projecting Orifice, which is rounded above, and pointed below.

The Structure of the Ductus Choledochus, and of the Biliary Ducts in general, is of the same nature being entirely Membranous: The Inner Surface of the Ducts also agree in being perforated by numberless pores, which are the Mouths of Mucous Follicles, similar to those upon the inside of the Gall-Bladder.

The Bile serves to mix the different parts of the Food properly together, for the formation of the Chyle,—to correct too great a disposition to acidity,—and to excite the Peristalic motion of the Intestines.

SPLEEN.

The *Spleen* is a soft and very Vascular Substance, and of a purple colour.

It is somewhat depressed, is of a long oval form, and of a considerable size, but varying in this respect in different subjects.

It is situated in the Left Hypochondriac Region, between the large extremity of the Stomach and corresponding False Ribs;—Its under end lying behind the Colon, and over the top of the Left Kidney.

The situation of the Spleen varies a little, according to the state of Respiration, and to the fullness or emptiness of the Stomach;—rising or falling as the Lungs are less or more dilated, and becoming more oblique in its situation,—with its inferior extremity turned more forwards,—in proportion as the Stomach becomes more distended.

Its *External Surface* is convex and uniform, like that of the Ribs, &c. to which it is opposed.

Its *Internal Surface*, or that next the Spine, is irregularly concave; and is divided into an Anterior and Posterior Plane, by a longitudinal Groove or Fissure, where the Vessels and Nerves enter.

The Anterior Plane is more concave than the Posterior, corresponding to the contiguous convexity of the Stomach.

The Spleen has frequently deep *Fissures* upon its edges;—sometimes it has small *Appendages* attached to it, and not unfrequently there is one or more *Small Spleens* connected with it.

At the under ſide, it is fixed to the Omentum, and, by means of that and Blood-veſſels, to the Stomach and Pancreas.—Behind, it is connected to the Diaphragm; and below, to the Left Kidney and Colon, by reflections of the Peritoneum, and by Cellular Subſtance.

It is covered by a *double Membrane*, one Layer of which is a production of the Peritoneum, the other proper to the Spleen itſelf; but ſo cloſely connected to the common Coat, that they appear to be one and the ſame Membrane.

The ſubſtance of the Spleen is remarkably ſoft, and is by much the moſt tender of the Abdominal Viſcera.

It conſiſts of a Congeries of Blood-veſſels, Lymphatics, and Nerves, joined together and ſupported by a large quantity of Cellular Subſtance.

The extreme Branches of the Blood-veſſels put on the appearance of *Penicilli*, or ſmall *Bruſhes*, which have been miſtaken for Glands.

Theſe Veſſels are ſo tender, that when an injection is forcibly thrown into either Artery or Vein, it burſts into the common Cellular Subſtance, and gives the appearance of Follicles or Cells.

The *Blood-veſſels* of the Spleen are among the largeſt of the Body, in proportion to the Viſcus on which they are diſperſed.

The *Artery* is a principal Branch of the Cæliac.—It runs in a ſerpentine direction, and, after ſending Branches to the Pancreas, &c. and the *Arteriæ Breves* to the left end of the Stomach, it goes into the ſubſtance of the Spleen, where it is ſubdivided into Branches, which are crowded together, and run in every direction, forming at length Plexus and Penicilli, which terminate in the Branches of the correſponding Vein.

The Vein, like that in moſt other Viſcera, is larger than the Artery:—It receives the Blood immediately from the terminations of the Artery, without the intervention of Cells.

The Splenic Vein receives the *Venæ Breves* of the Stomach, the Pancreatic Veins, &c. and forms one of the principal Branches of the Vena Portæ.

The *Lymphatics* from the ſuperficial parts of the Spleen join the deep ſeated Abſorbents at the Fiſſure where the Blood-veſſels enter, and afterwards paſs through ſeveral Conglobate Glands lying over the Splenic Artery.

They intermix with Lymphatics belonging to ſeveral other Viſcera, and terminate in the Thoracic Duct.

The *Nerves* of the Spleen, which are ſmall, but conſiderable in number, are Branches of the Great Sympathetic and Eighth Pair, and form an irregular Plexus which ſurrounds the Veſſels.

No Excretory Duct has been found to proceed from the Spleen, in conſequence of which very various opinions have been entertained with reſpect to the uſe of that Organ.

Many of the ancients were of opinion,—that beſides the Bile of the Liver, there was an *Atra Bilis*, or *Black Bile*, and that the Spleen was the recepticle of the latter.

Others have thought a particular *Menſtruum* was ſecreted in it, and conveyed to the Stomach for the purpoſe of digeſtion.

Others again,—that the Blood of the Spleen promotes the ſluggiſh circulation of the Blood of the Vena Portæ.

The late Mr. HEWSON, who has written particularly on the Spleen, was of opinion it concurred with the Thymus and Lymphatic Glands, in forming the red Globules of the Blood, and that theſe Globules were rendered complete in the Spleen.

It has been alſo ſuppoſed,—that as the Stomach becomes full, the Spleen is compreſſed by it, in conſequence of which a greater quantity of Blood is ſent to the Pancreas, for the Secretion of the Pancreatic Juice.

But the preſent moſt prevalent opinion is,—that the Blood undergoes ſome change in it, which renders it uſeful in the ſecretion of the Bile;—and the opinion is ſupported from the great quantity of blood with which this Organ is known to be ſupplied, and from its Vein, not only in Man, but in other animals, paſſing to the Vena Portæ.

PANCREAS.

THE *Pancreas*, i. e. *All Fleſh*, or the *Sweat Bread*, is a long flat Gland of the Conglomorate kind, and of the ſame nature with the Salivary Glands, of which it may be reckoned the largeſt.

It is ſituated in the Epigaſtric Region, and is placed tranſverſely in the back-part of the Abdomen, between the Stomach and Spine.

It has a large or Right Extremity, and a ſmall or Left one, an Anterior and Poſterior Surfaee, and an Upper and Under Edge.

The Right Extremity is attached to the left ſide of the ſecond Turn of the Duodenum, or to that part where the Inteſtine is about to go acroſs the Spine.

From the under part of the Right Extremity, the Pancreas ſends down an Elongation or Proceſs, which adheres cloſely to the Duodenum.

This Proceſs was diſcovered by WINSLOW, and termed by him *Pancreas Minus*.—It is alſo called *Head of the Pancreas*.

The Body of the Pancreas paſſes before the upper part of the tranſverſe portion of the Duodenum, and over the Aorta, Vena Cava, and part of the Splenic Veſſels, to all of which it is attached.

The ſmall extremity, which is rounded, is fixed to the Spleen, through the medium of the large Omentum.

The Pancreas is covered anteriorly by the two Layers of the root of the Meſo-colon;—poſteriorly, it is only covered with Cellular Subſtance, which connects it to the Vertebræ.

It is compoſed of Acini, which form ſmall Glands or Lobes; and theſe are connected looſely by Cellular Subſtance, in ſuch a manner as to give an appearance of uniformity and ſmoothneſs to the External Surface.

The *Arteries* of the Pancreas are derived, partly from the Hepatic, but chiefly from the Splenic, by ſeveral ſmall Branches, which paſs at various places into its Subſtance, in a tranſverſe direction.

The *Veins* correſpond in name and courſe with the Arteries, and aſſiſt in forming the Vena Portæ.

The *Lymphatics* run to the Splenic Plexus, and terminate in the Thoracic Duct.

The *Nerves* of the Pancreas are ſmall: Like thoſe of the other Viſcera of the Abdomen, they are derived from the Great Sympathetic and Eighth Pair.

From the different Acini of the Pancreas, ſmall Ducts ariſe, which join into larger ones running tranſverſely in the Subſtance of the Pancreas, and forming a common Duct, called *Ductus Pancreaticus*.

The *Pancreatic Duct*, termed alſo *Ductus* WIRTSUNGI, after the diſcoverer of it in the Human Body, is remarkably thin, of a white colour, and ſemi-tranſparent.

It begins at the Left Extremity of the Pancreas, runs in the ſubſtance of the Gland, a little below its middle height, and becomes gradually larger in conſequence of receiving the different Branches which compoſe it,—and is at laſt about the ſize of a Raven's-quill.

At the Right Extremity of the Pancreas, it receives the Principal Duct of the Pancreas Minus, and terminates obliquely in the Duodenum along with the Ductus Communis Choledochus. —In ſome rare caſes, however, it terminates at a little diſtance from the Biliary Duct; and ſometimes alſo, the Duct of the Pancreas Minus ends ſeparately in the Duodenum.

The Pancreas ſecretes a *Liquid* or *Juice*, reſembling Saliva in quality and appearance, and diſcharges it by its Excretory Duct into the Duodenum.

The *Pancreatic Juice* incorporates the Bile with the Alimentary Maſs, and may be ſaid alſo to anſwer the ſame purpoſe to the contents of the Inteſtines, which the Gaſtric Juice does to thoſe of the Stomach;—or, it finiſhes that digeſtive Proceſs in the Inteſtines which was begun in the Stomach.

OF THE

ORGANS OF URINE AND GENERATION

IN THE MALE.

KIDNEYS.

THE *Kidneys* are two Glandular bodies, of a pale red colour, ſituated in the upper and back-part of the Abdomen, in the Lumbar Region.

They are placed one on each ſide of the Spine, extending from the Eleventh Pair of Ribs to near the Oſſa Ilia; and reſt upon the Diaphragm, large Pſoæ, Quadrati Lumborum, and Tranſverſales Abdominis Muſcles.

The Right Kidney is ſituated at the under and back-part of the large Lobe of the Liver, behind the Colon, and is commonly a very little lower than the left.

The left Kidney is placed at the under and back-part of the Spleen, and behind the left parts of the Stomach, Pancreas, and Colon.

The Kidney is about five or ſix fingers-breadth in length, but conſiderably leſs from the outer to the inner ſide, and leſs than that ſtill from before backwards; or, it is compared in ſhape to a *French* or *Kidney bean*.

It is rounded anteriorly, flattened poſteriorly, convex and uniform at its outer margin, and has a deep depreſſion or Sinus towards the Vertebræ, ſurrounded with unequal edges, where the Renal Veſſels and Nerves enter.

It is a little broader behind than before, and a little broader and more curved above than below, from which circumſtance, but more particularly from the diſpoſition of the Veſſels to be afterwards mentioned, it is eaſy to diſtinguiſh the Right from the Left Kidney when taken out of the Body.

The Right Kidney is connected to the Liver and Duodenum, the Left to the Spleen, and both to the Muſcles on which they are placed, and to the Renal Glands and Colon, by Cellular Subſtance and by the Peritoneum.

They are alſo connected to the Aorta and Vena Cava by the Blood-veſſels, and to the Bladder of Urine by the Ureters.—

They accompany the motions of the Liver and Spleen, in the different ſtates of Reſpiration.

Each Kidney is ſurrounded by looſe Cellular Subſtance, which commonly contains a conſiderable quantity of Fat, from which it is termed *Tunica Adipoſa*.

The *Tunica Adipoſa* covers not only the Kidney, but large Veſſels, and defends them from the preſſure of the ſurrounding Viſcera.

Under the Tunica Adipoſa, there is a *Membrane* compoſed of the original proper Coat and Cellular Subſtance incorporated, which adheres cloſely to the Kidney, and is reflected over the edges of the Sinus, to be joined to the Pelvis and large Veſſels.

The ſubſtance of the Kidney is commonly ſmooth and uniform, though ſometimes it is irregular, in conſequence of the Lobes which originally form it not being completely incorporated.—It conſiſts of an outer part called *Cortical*, and an inner termed *Medullary*.

The *Cortical Subſtance*, termed alſo *Secerning*, ſurrounds the Kidney, and forms about a third of its breadth;—it likewiſe ſends in Proceſſes or Partitions, which ſeparate the Medullary parts from each other.

The *Medullary*, termed alſo *Uriniferous Subſtance*, is of a redder colour than the former, and is divided into a number of diſtinct Columns, each of which terminates in a projection called *Papilla*, or *Proceſſus Mammillaris*.

The *Papillæ* are merely the continuation of the Uriniferous part; though frequently conſidered as a third diviſion of the ſubſtance of the Kidney.

Each Kidney has one, and ſometimes more *Arteries*, which run tranſverſely from the Aorta, and a Vein ſtill larger, which terminates in the Cava.—They enter at the Sinus of the Kidney, and are included in Cellular Subſtance, which accompanies them throughout their courſe.

The Right Renal Artery is longer than the Left, in conſequence of the Vena Cava, behind which it paſſes, being placed upon the Right Side of the Aorta.

The Artery, as it approaches the Kidney, is divided into Branches, which are afterwards minutely diſtributed through the Cortical Subſtance, forming Arches and Anaſtomoſes;—but theſe are found to be much leſs frequent than are commonly deſcribed.

The ſmall Branches, after turning and winding in various directions, paſs partly towards the Surface of the Kidney, where they form irregular *Stars*, ſome of which ſupply the proper Membrane.

Others turn inwards in a waving direction, and form *Corpuſcles*, which are diſpoſed ſomewhat after the manner of *Cluſters of ſmall Berries*, which can only be ſeen diſtinctly by the aſſiſtance of Glaſſes, after a minute injection.

The *Corpuſcles* were conſidered by Dr. NICHOLS as the Globular termination of Blood-veſſels, and termed by him *Globuli Arteriarum Termini*;—but theſe Globuli were afterwards obſerved by Mr. HEWSON to conſiſt of ſmall Veſſels intimately intermixed.

The *Veins* returning from the extremities of the Arteries unite in the Cortical Subſtance of the Kidney.

The Branches of the Renal Vein are much larger than thoſe of the Artery, but correſpond with them in their courſe.—They form a large Trunk on each ſide, which lies anterior to the correſponding Artery, and runs tranſverſely to the Cava;—the left, which is the larger of the two, paſſing acroſs the fore-part of the Aorta,

The *Lymphatics* of the Kidney run from without inwards, and terminate in the Lumbar Glands, and afterwards in the Thoracic Duct.—The Superficial Lymphatics are ſo ſmall, as ſeldom to be ſeen, excepting in the diſeaſed ſtate of the Kidney.

The *Nerves* are from the Semilunar Ganglion formed by the great Sympathetic and Nighth Pair. They form a Plexus which ſurrounds the Blood-veſſels, and accompanies them in the Kidney.

From the minute Extremities of the Renal Artery, in the Corpuſcles ſeated in the Cortical Subſtance, the *Uriniferous Tubes* ariſe. They are mixed with ſome extremely ſmall Blood-veſſels, and conſtitute the Medullary Subſtance of the Kidney.

By degrees they unite into larger Tubes, which run in a radiated manner, the direction being from the outer edge or circumference, towards the inner part or Cavity of the Kidney.

The radiated Tubes, becoming ſtill larger in their paſſage, terminate in the *Papillæ*, which are of a compreſſed conical form, and are at a little diſtance from each other.

The *Papillæ* are twelve or more in each Kidney, the number varying according to that of the original Lobes of which the Kidney is compoſed, and likewiſe from ſome of the Papillæ being incorporated with each other.

Upon the points of the Papillæ are the terminations of the Uriniferous Tubes,—large enough to be diſtinguiſhed by the naked Eye,—through which the Urine diſtils from the Subſtance of the Kidney.

Round the root of each Papilla, a Membranous Tube ariſes, termed *Infundibulum* or *Calix*, which receives the Urine from the Papillæ.

The *Infundibula* are commonly the ſame in number with the Papillæ; the number, however, varying in different ſubjects, two or more of the Papillæ ſometimes opening into the ſame Infundibulum.

The Infundibula join into two or three larger Trunks, which afterwards form a Dilatation of conſiderable ſize, of the ſhape of an inverted Cone, and termed *Pelvis* of the Kidney.

The *Pelvis* is placed partly within, but the greateſt part of it without the body of the Kidney, and contracts into a long Tube, about the ſize of a Writing-pen, called *Ureter*.

The *Ureters* are commonly one to each Kidney, though in ſome rare inſtances they are double on one or on both ſides.

The Artery of the Kidney is placed uppermoſt,—the Vein in the middle and fore-part,—and the Pelvis and beginning of the Ureters at the under and back-part of the Blood-veſſels.

The Ureters deſcend obliquely inwards behind the Peritoneum, and go over the great Pſoæ Muſcles and Iliac Veſſels, oppoſite to the anterior and lateral parts of the Os Sacrum.

They paſs afterwards into the Pelvis, and terminate in the under, outer, and back-part of the Bladder.

In their deſcent, they are not ſtraight, but form turns which are commonly compared to the Italic *ſ*;—neither are they cylindrical, as they form ſlight dilatations and contractions in their courſe, two of which contractions are more obſervable in their paſſage over the Pſoæ Muſcles, and at their inſertion into the Bladder.

The Ureters are covered anteriorly by the Peritoneum, and compoſed of an *External Membranous Coat*, a *middle Muſcular* one, formed chiefly of circular Fibres, and an *Internal Coat*, ſometimes called *Villous*.

The Inner Coat is very Vaſcular, and is perforated by the Mouths of ſmall Ducts, which line it with a Mucus to defend it from the Urine.

The Veſſels and Nerves of the Ureters are from thoſe of the contiguous parts.

The *Uſe* of the Kidneys is to ſecrete the Urine from the Blood, and convey it by means of the Ureters to the Bladder.

RENAL GLANDS.

The *Renal Glands*, termed alſo *Capſulæ Atrabilariæ*, *Capſulæ Renales*, *Renes Succenturiati*, and *Glandulæ Suprarenales*, are two ſmall, flat, Glandular-like bodies of a dark-yellow-colour, lying in the upper and back-part of the Abdomen.

They are ſituated at the upper, inner, and fore-part of the Kidneys, over the large Pſoæ Muſcles and Diaphragm, and higher than the Renal Veſſels.

They are of an irregular figure, and are about a couple of fingers-breadth in length, but much larger, proportionally, in the Fœtus than in the Adult.

The Right one is connected to the Liver, the Left to the Spleen and Pancreas, and both to the ſmall Muſcle of the Diaphragm, and to the Pſoæ Muſcles and Kidneys, by Cellular Subſtance. They are likewiſe retained by numerous Veſſels and Nerves which are ſpread over them.

They are ſurrounded by Cellular Subſtance, which is part of the Tunica Adipoſa of the Kidneys, and have a thin proper Coat, which adheres firmly to them.

They are frequently obſerved to be hollow, and to contain a dark-coloured Bilious-like matter, which is conſidered by many Anatomiſts as the Internal, very Vaſcular and tender parts melted down by putrefaction.

Their *Arteries* come from thoſe of the adjacent parts, particularly from the Renal, and alſo from the Aorta, and Diaphragmatic Arteries.

Of the principal *Veins*, the Right goes to the Vena Cava, and the Left to the Renal Vein.

The *Lymphatics* go chiefly to thoſe of the Kidneys.

The Nerves come principally from the Renal Plexus.

They have no Excretory Ducts.

The Renal Glands have been ſuppoſed to furniſh Lymph for the dilution of the Blood returning in the Renal Veins, after the ſecretion of the Urine;

Or,—to reſtore to the Blood of the Vena Cava the irritable parts which it loſes in the ſecretion of the Urine and Bile;

Or,—to convey ſomething uſeful to the Thoracic Duct;

Or, in the Fœtus,—to divert the Blood from the Kidneys, and thereby leſſen the quantity of Urine.

But their *uſe* is ſtill undiſcovered; though it is ſuppoſed from their vicinity to the Kidneys, not only in Man, but in many other animals, that they are ſubſervient to theſe Organs, and particularly to thoſe of the Fœtus.

VESICA URINARIA.

The *Veſica Urinaria*, or *Bladder of Urine*, is a large Sac ſituated in the Pelvis of the Abdomen, in the bottom of the Hypogaſtric Region.

It is placed in the fore-part of the Pelvis, behind the Oſſa Pubis, and before the upper, and above the under portion of the Inteſtinum Rectum.

When empty, it is contracted into a ſmall ſize, which occupies the under and fore-part of the Pelvis; but, when fully diſtended, it riſes above the brim of that Cavity, and ſometimes aſcends to within a little diſtance of the Umbilicus.

When moderately dilated, it is of a roundiſh, or irregular oblong form, but a little flattened before, more convex behind, and broader at its anterior and poſterior, than towards its lateral parts,—a little more capacious, alſo, below than above, eſpecially at its poſterior part.

It is diſtinguiſhed into *Fundus*, *Body*, and *Cervix*, the firſt of which is placed upwards and a little forwards;—the laſt at the under and fore-part.

It is connected below to the Rectum, and at the sides to the Pelvis by the reflected Peritoneum and Cellular Substance, the former of which, when the Bladder is empty, has the appearance of lateral Ligaments.

It is attached, at the fore-part of its Body, by Cellular Substance, to the Ossa Pubis, without the intervention of the Peritoneum.

It is also fixed to the Umbilicus by three Ligaments situated between the Peritoneum and Abdominal Muscles.—They are formed of the Urachus running upwards from the Fundus, and the shrivelled Umbilical Arteries passing obliquely from the sides of the Bladder.

The firmest connection is by means of a Ligamentous expansion, which runs from each side of the Neck of the Bladder and Prostate Gland, to be fixed to the inside of the Arch of the Ossa Pubis.—It is connected, also, at this place, to the Penis, by the Urethra.

It is composed of different *Coats* joined together by Cellular Substance, the first of which is only a partial one continued from the Peritoneum.

The *Peritoneal* or *Common Coat*, recedes from the Abdominal Muscles at the top of the Pubes, and passes over the superior, and down upon the posterior and lateral parts of the Bladder, to near the termination of the Ureters, where it is about a finger's-length from the Anus,—and is there reflected upon the Rectum and back part of the Pelvis.

When the bladder is much distended, it carries the Peritoneum with it, and leaves a space between that Membrane and the Pubes, of such length, that an incision has frequently been made here, and large Calculi extracted from the Bladder, without penetrating into the Abdomen, or wounding the Peritoneum.

The *second Coat* is termed *Muscular*.—It is composed of distinct Fleshy Fibres, interwoven with each other, and forming Fasciculi.

The External Fibres run chiefly in a longitudinal direction, and are connected, at the under and fore-part of the Bladder, with the Ossa Pubis.

More internally, are Fibres which run in all directions, and are intermixed with each other in the form of Net-work.

The Muscular Fibres are contracted about the Neck of the Bladder, and form what has been termed *Sphincter Vesicæ*;—these, however, are merely the continuation of the other Fibres.

The Muscular Coat, by its contraction, occasions the complete evacuation of the Bladder.—The Fibres about the Neck of the Bladder, by acting separately from the rest of the Muscular Coat, prevent the involuntary discharge of the Urine.

The Cellular Substance, under the Muscular Fibres, is frequently termed *Nervous Coat*.

The *Inner Coat*, though often called *Villous*, is ſmooth like the inſide of the Peritoneum, and, though thin, is ſo denſe as to prevent the exſudation of the Urine.

This Coat is rendered ſomewhat unequal by the projecting of the Faſciculi of the Muſcular Fibres; and when the Bladder is empty, it forms large wrinkles or Rugæ.

The inſide of the Bladder is very irritable, in conſequence of which a deſire to expel the Urine is occaſionally excited. It is lined, however, by a Mucus, diſcharged from its Arteries, which prevents it from being conſtantly irritated by that Fluid.

The under part of the Bladder is perforated by *three Openings*, of which one is placed anteriorly, and two poſteriorly.

The Anterior Opening is the beginning of the Paſſage called *Urethra*, and is ſurrounded by the Neck of the Bladder.

It comes off almoſt at a right angle from the lower part of the Bladder, without any tapering of that Viſcus.

The other two openings are formed by the termination of the Ureters, which run obliquely forwards and inwards, between the Muſcular and Inner Coat of the Bladder.

They terminate in the Bladder at a little diſtance from each other, and at the ſame diſtance behind the beginning of the Urethra, each by a ſomewhat oval Opening, which is more contracted than the Ureter is immediately above it.

The *Arteries* of the Bladder come from various ſources, but chiefly from the Umbilical and Pudenda Communis.

The *Veins* return to the Internal Iliacs:—They form a Plexus of conſiderable ſize upon each ſide of the Bladder.

The *Lymphatics* accompany the principal Veins on the Bladder, and, at the under part and ſides, paſs into the Iliac Glands.

The *Nerves* are Branches of the Great Sympathetic and Sacral Nerves.

The Bladder receives the Urine from the Ureters by drops, and ſometimes by ſmall thread-like ſtreams or ſquirts, till by its accumulated quantity and acrimony, it forces that Viſcus to contract and expel it.

The Urine is expelled, partly by the contraction of the Bladder itſelf, and partly by the action of the Abdominal Muſcles and Diaphragm preſſing the Inteſtines againſt the Bladder.

The frequency of the evacuation depends upon the ſize and ſenſibility of the Bladder, upon the quantity of Urine ſecreted, and the degree of acrimony it poſſeſſes.

TESTES.

The *Teſtes*, formerly termed *Didymi* or *Gemini*, are two Glandular Bodies ſituated in the Cavity of the Scrotum.

The *Scrotum*, which furniſhes an external covering to the Teſtes, is a continuation of the common Integuments, has the

ſame Structure with the Skin in general, but is more plentifully ſupplied with Sebaceous Follicles, has no fat in its Cellular Subſtance, and is occaſionally relaxed and corrugated in a greater degree than the Skin in the other parts of the Body.

Upon the Surface of the Scrotum, there is a ſuperficial, longitudinal projecting *Line*, which divides it into two equal parts, and has the name of *Raphe*.

The inner Surface of the Scrotum is lined with Cellular Subſtance, which is firmer and more Vaſcular than in other places.

The Cellular Subſtance of the Scrotum, in conſequence of its redneſs, Fibrous appearance, and ſuppoſed power of contraction, has, by many Anatomiſts, been conſidered as a Muſcle, and called *Dartos*.—This opinion, however, has of late years been rejected.

The Cellular Subſtance of the Scrotum involves each Teſticle ſingly, and forms a Septum or Partition between the two, which prevents Air or Water from paſſing readily from one ſide of the Scrotum to the other.

The *Veſſels* and *Nerves* of the Scrotum are chiefly from thoſe of the neighbouring parts.

The Blood-veſſels are Branches of the Pudendal and Femoral.

The *Lymphatics* go moſtly to the Inguinal,—but ſome of them accompany thoſe of the Teſtes to the Lumbar Glands.

The anterior part of the Scrotum derives Nerves from the Lumbar, and the poſterior from the Pudendal Nerves.

The Scrotum aſſiſts in ſupporting and protecting the Teſtes.

Under the Scrotum are two *Membranes* or *Coats*, proper to each of the Teſtes, the one termed *Vaginalis*, the other *Albuginea*.

The *Tunica Vaginalis*, named from its forming a ſheath, is of the ſame nature with the Peritoneum, being originally a Proceſs of that Membrane, which in the Fœtus deſcends with the Teſticle from the Abdomen.

It forms a ſhut Sac, which has no communication with any other part.

It incloſes the Teſticle, as the Pericardium does the Heart, and lies looſe every where, excepting behind, where it is *continuous* with the Albuginea.

It is conſiderably larger than the Teſtis which it incloſes, reaching as far above and below it as to allow it a certain degree of motion.

It is connected by its external Surface to the Cremaſter Muſcle, and partly, by means of that, to the inner Surface of the Scrotum.

It aſſiſts the Cremaſter in ſupporting the Teſtis, and, by being conſtantly moiſtened within by a Fluid exhaled from its Surface, and from that of the Tunica Albuginea, it allows the Teſticle to move eaſily.

The *Tunica Albuginea*, ſo called from its white colour, is, like the former Coat, a continuation of the Peritoneum, and inveſts the Body of the Teſticle cloſely.

It is a thick, ſtrong, denſe, and inelaſtic Membrane, of a gliſtening appearance.

It is remarkably ſmooth on the outſide, but internally it is rough and unequal, adhering every where firmly to the Body of the Teſtis.

It covers both the Teſtis and Epididymis, connects them to each other, gives ſtrength to them, and conducts their Veſſels in the manner the Meſentery does thoſe of the Inteſtines.

The Body of the Teſtis is of a yellowiſh colour, and has a Pulpy appearance,—is of an oval form, a little flattened at its outer and inner Surface;—and frequently one Teſticle is a little larger than the other.

The Teſtes are placed obliquely, with one end upwards and forwards, and the other end backwards and downwards.

At the outer and back-part of the Teſtis, there is an Appendix named *Epididymis*, from its ſituation upon the Teſtis or Didymis, which is incloſed in the ſame covering with the Teſtis itſelf.

The Epididymis begins at the upper part of the Teſticle, immediately above the entry of the Blood-veſſels; and this part of it being large and of a round form, is termed *Globus Major*, or *Head* of the Epididymis.

In its deſcent, it becomes ſomewhat ſmaller and flatter, and is attached behind to the Body of the Teſticle, where the Blood-veſſels go in; but forwards it is looſe, the Tunica Albuginea dipping in this place, and forming a Cavity or Pouch.

The under part of it becomes more firmly attached to the Body of the Teſticle, and forms the *Cauda*, or *Globus Minor*; it is then turned backwards upon itſelf, after which it ſends out the Excretory Duct of the Teſticle.

The Body of the Teſtis has numerous Arteries, Veins, Abſorbents, and Nerves; but is principally compoſed of a collection of minute, tender, elaſtic Filaments, intricately convoluted, termed *Tubuli Seminiferi*, or *Vaſa Seminalia*.

The *Tubuli Seminiferi* are diſpoſed in Faſciculi or Bundles, between Partitions, which are formed of Blood-veſſels and Cellular Subſtance.

Theſe Septulæ begin at the root or *Nucleus*, ſituated at the back-part of the Teſticle, ſometimes termed *Corpus Highmorianum*, and extend in a radiated manner to the Tunica Albuginea.

The Teſtis is fixed behind by its Veſſels, which are collected into a *Cord* termed *Spermatic*, but is looſe and free before, to prevent it from being pinched.

The *Spermatic Cord*, properly ſo called, extends from the Ring of the External Oblique Muſcle to the Body of the Teſtis, and is compoſed of the Trunks of the different Veſſels belonging to the Teſticle, and of a quantity of Cellular Subſtance.—The Cord is covered by the Cremaſter Muſcle; and within this, by the ſame Proceſs of the Peritoneum which forms the Tunica Vaginalis Teſtis. This part of the Proceſs, however, is ſo incorporated with the common Cellular Subſtance of the Cord, as to appear to form part of it.

The under part of the Vagina of the Cord is ſeparated by a Partition formed by the upper end of the Vaginal Coat of the Teſticle, and by condenſed Cellular Subſtance, ſo that no liquor can paſs eaſily from the Cord to the Teſticle, and *vice verſa*.

The *Arteries* of the Teſtes, termed *Arteriæ Spermaticæ*, and *Arteriæ Preparantes*, ariſe, one on each ſide, from the fore-part of the Aorta, a little below the Renal Arteries.

The *Spermatic Artery* croſſes over the Pſoas Muſcle and Ureter, and deſcends, behind the Peritoneum to the under part of the Abdomen.

At the lower part of the Abdomen, it perforates the Ring of the External Oblique Muſcle, and paſſes in the Spermatic Cord to the Teſticle.

In its deſcent, it gives branches to the adjacent parts, and is ſo interlaced with thoſe of the correſponding Vein, as to have been ſuppoſed by the Ancients to have large lateral communications with them.

After paſſing the Ring, it divides into Branches which go to the Teſtis at its poſterior edge. They are partly diſperſed upon the Epididymis, but the larger Branches run in a ſerpentine direction into the Subſtance of the Teſtis, where they are minutely diſtributed upon the Surface of the Seminal Tubes.

Beſides the Spermatic Artery, there is a ſmaller one from the Hypogaſtric, which accompanies the Vas Deferens, and is diſperſed along with the other Artery.

The *Veins* are much larger than the correſponding Arteries, and have ſeveral Valves in them, eſpecially without the Abdomen.

They form a *Plexus*, which accompanies the Artery on each ſide, and is ſometimes called *Corpus Pampyniforme*, being compared to the ſhoots of the Vine, or *Corpus Pyramidale*, from giving a Pyramidal form to the Cord.

The Plexus aſcends in the Abdomen, and upon the Surface of the Pſoas Muſcle; and about the part where it recedes from the Artery, it forms a ſingle Trunk, which, in the right ſide, terminates in the Vena Cava, nearly oppoſite to the Artery, and, in the left ſide, goes into the Renal Vein.

There is alſo a ſmall interior Spermatic Vein, which accompanies its Artery, and ends in the Hypogaſtric Vein.

The *Tubuli Seminiferi* in the Body of the Teſticle conſiſt of numberleſs extremely minute Ducts, which are of a Cylindrical form, have no diviſion into Branches, and when drawn out, are found to be ſeveral feet in length.

They are firſt collected into Bundles, between the Septulæ of the Teſticle, and theſe again into others ſtill ſmaller, each of the ſmaller being formed of a ſimple Tube, coiled up into a Conical form, with its Baſe forwards, and its Apex towards the poſterior edge of the Teſticle.

From the convoluted Seminal Tubes, an equal number of ſtraight Veſſels are ſent out at the back part of the Teſticle, under the name of *Vaſa Recta.*

At the upper and back-part of the Teſticle, the Vaſa Recta communicate, and form an irregular Plexus or Net-Work, called *Rete Vaſculoſum Teſtis.*

The *Rete Teſtis* ſends out from twelve to eighteen ſtraight Tubes, termed *Vaſſa Efferentia,* which carry the Semen from the Teſticle to the Epididymis.

The *Vaſſa Efferentia* ſoon become convoluted, and form Conical Bundles, termed *Coni Vaſculoſi.*

The *Coni Vaſculoſi* are firmly connected by Cellular Subſtance, and are obſerved by DR. MONRO, in his Treatiſe *De Teſtibus,* to compoſe ſomewhat more than a third part of the Epididymis.

The Vaſcular Cones gradually unite into a ſingle Tube, which conſtitutes the reſt of the Epididymis, and though only about the ſize of a Hog's Briſtle, tranſmits the whole of the Semen.

The ſingle Tube becomes larger in its courſe and leſs convoluted, and at laſt, expanding its convolutions, it comes out greatly increaſed in ſize, and almoſt in a ſtraight direction, under the name of *Vas Deferens.*

Beſides the Ducts already deſcribed, a *Vas Aberrans* is ſometimes obſerved, which is one of the Vaſcular Cones, wandering off, and terminating in the Epididymis lower than uſual.

At other times, the ſame kind of Veſſel forms a *Proceſſus Cæcus,* or blind Duct, with a dilated Extremity which does not communicate with any other part.

VESICULÆ SEMINALES AND PROSTATE GLAND.

THE *Veſiculæ Seminales* are two ſmall Pyriform Receptacles, ſituated between the under and lateral parts of the Bladder and the Inteſtinum Rectum,—about three fingers-breadth in length, and the third part of that in breadth, and a little flattened.

They are at a considerable distance from each other behind, but anteriorly they converge, and become contiguous, forming a sharp angle.

Each of them is composed of a *convoluted Tube*, with *irregular Processes*, and surrounded by a quantity of tough Cellular Substance, and by many Vessels and Nerves.

Internally, they have a *Villous appearance* and are formed of irregular *Cells* which correspond with the irregularities on their External Surface, and communicate freely with each other.—Their shape, size, and general appearance, however, vary in different subjects, and not unfrequently in the same person.

Between the Vesiculæ Seminales, the ends of the Vasa Deferentia, now become larger and Cellular, pass forwards till they arrive at the Prostrate Gland, where each Vas Deferens joins the Vesicula of that side, and communicates so freely with it, that injected Fluids readily pass from the one to the other.

From each Vesicula Seminalis and Vas Deferens of the same side, a *small Canal*, about a Finger's breadth in length, passes out which is firmly connected to its fellow, without communicating with it, and becomes gradually smaller, piercing, obliquely, the Prostate Gland, and terminating in the under part of the Neck of the Bladder.

The *Orifices* of these Canals are separated from each other by a *Caruncula*, or round Projection of the Membrane of the Urethra, termed *Veru montanum*;—or, from being broad behind and rostriform before, it is compared to the Head and beak of the *Wood cock*, and called *Caput Gallinaginis*.

The Vesiculæ Seminales are commonly considered as Reservoirs of the Semen, receiving it from the Vasa Deferentia, and afterwards,—by a power inherent in themselves, assisted by the action of the neighbouring Muscles, particularly of the Levatores Ani,—propelling it to the Urethra.

The Semen is prevented from passing into the Bladder, the opening from it being shut while that Fluid is expelled.

Various experiments have been made on the Vesiculæ Seminales by the late Mr. Hunter, from which he was of opinion, that they are not Reservoirs of Semen, but Glands, secreting a particular Mucus;—that, with other parts, they are subservient to the purposes of Generation;—and that the Bulb of the Urethra is the receptacle of the Semen in which it is accumulated previous to its ejection.

The *Prostate Gland*, named from its situation before the Vesiculæa Seminales, lies immediately behind the under end of the Symphysis of the Pubis, and rests upon the Intestinum Rectum.

It surrounds and closely embraces the Neck of the Bladder, or beginning of the Urethra; but the greater part of it is placed posteriorly and laterally, having a Lobe projecting on each side.

It is about the size of a Walnut, and of the figure of a Spaniſh Cheſnut,—or it reſembles a Heart as commonly painted on Playing-cards, with the Baſe towards the Bladder, and the Point towards the Penis.

It has a Spongy Subſtance, but is one of the firmeſt Glands of the Body, and generally ſends out *ten* or *twelve Ducts*, which open obliquely at the beginning of the Urethra, at the ſides of the Caput Gallinaginis, and near the termination of the Seminal Ducts.

From the Ducts of the Proſtate Gland, a thin white Liquor is diſcharged,—from the ſame cauſes, and at the ſame time with the Semen,—into the Urethra, and is ſuppoſed to be uſeful in the proceſs of Generation;—or, according to ſome Authors, this Fluid facilitates the paſſage of the Semen through the Urethra.

The Blood-veſſels, Abſorbents, and Nerves of the Veſiculæ Seminales and Proſtate Gland, are in common with thoſe of the parts which ſurround them.

PENIS.

The *Penis*, which has obtained a variety of other names, ſuch as *Membrum Virile*, *Mentula*, &c. conſiſts of three Spongy Subſtances, two of which form the upper part and ſides, or Body of the Penis and are termed *Corpora Cavernoſa Penis*, the third ſurrounds the Urethra, and has the name of *Corpus Spongioſum Urethræ*.

The Penis is covered with a continuation of the common Integuments, which are thinner than elſewhere; and, inſtead of Fat, there is as in the Scrotum, a Reticular Subſtance only under the Skin.

At the anterior extremity of the Penis, the Integuments form a looſe fold, termed *Prepuce*, which is connected to the anterior and under part, or *Glans* of the Penis, by a triangular fold, called *Frænum Præputii*.

The *Corpora Cavernoſa Penis* reſemble two equal but irregular Cylinders, cloſely applied to the ſides of each other, and each covered by a ſtrong, elaſtic, Ligamentous Sheath, the Fibres of which run in a tranſverſe, and partly in an oblique direction.

They ariſe one on each ſide, by two blind Conical extremities, called their *Crura*, from the inner part of the Crura of the Oſſa Iſchia and Oſſa Pubis, to both of which they are very firmly connected by Ligamentous Subſtances.

At the under part of the Symphyſis of the Pubis, they are united to each other, and continue ſo till they reach the Glands, where they terminate in a rounded extremity.

At the upper part of the root of the Penis, the Ligamentous Sheath of the Corpora Cavernoſa ſends up a Proceſs of a triangu-

lar form, to be connected to the Symphyſis of the Oſſa Pubis, under the name of *Ligamentum Suſpenſorium*, by which the Body of the Penis is ſupported, and prevented from preſſing too much upon the Scrotum.

The Corpora Cavernoſa leave a *Groove* above, for the principal Vein of the Penis, and a *Channel* below for the Cavernous Subſtance of the Urethra.

The internal ſubſtance of the Corpora Cavernoſa conſiſts of *looſe reticular Plates*, ſomewhat ſimilar to the Cancelli in the ends of long Bones, and, like them, readily communicating with each other.

Upon the Cells of the Corpora Cavernoſa, the Arteries are plentifully diſperſed, and open freely into them, the Blood of the Arteries tinging the Cells in the relaxed ſtate of the Penis, and filling them completely when it is diſtended.

The Corpora Cavernoſa are united to each other by a *Septum* or *Partition*, formed by a continuation of the Elaſtic Ligament which covers theſe Bodies.

The *Septum Penis* is compoſed of Cords, extending, nearly in a parallel direction, from the Dorſum, or upper part of the Penis, to the Corpus Spongioſum Urethræ.

Between the different Cords, *Fiſſures* are left, through which the Blood, or an injected Fluid, paſſes without obſtruction from one of the Corpora Cavernoſa to the other.

The *Corpus Spongioſum Urethræ* is ſituated under and between the Corpora Cavernoſa Penis, but projects conſiderably beyond them.

It begins a little behind the part where the Corpora Cavernoſa are united, adheres to them by condenſed Cellular Subſtance, and terminates at the anterior extremity of the Penis.

It has an external covering ſimilar to that of the Corpora Cavernoſa Penis, but more delicate and more of a Membranous appearance.

The poſterior part of the Corpus Spongioſum is dilated into a *longitudinal Prominence*, of a *Conical* form, ſituated within the Skin of the Perineum, and termed *Bulb* of the Urethra. It extends from the root of the Penis to near the Anus, projects moſt towards the under and back part, and is divided anteriorly by a Septum.

The Corpus Spongioſum is continued along the under part of the Corpora Cavernoſa, and at the end of theſe expands into the Subſtance called *Glans Penis*, which covers and incloſes the ends of the Corpora Cavernoſa.

The *Glans* or *Nut*, named from its reſemblance to an Acorn, is ſeparated from the Corpora Cavernoſa by a continuation of the Ligamentous Sheath which covers them, and is encircled at its poſterior part by a prominent margin, called *Corona Glandis*, behind which is a Cervix or Neck.

The Surface of the Glans is covered with a *Plexus*, chiefly of Venous Veſſels, and with *Nervous Papillæ*, which give it its ſenſibility; and theſe are incloſed in a fine Membrane continued from the inſide of the Prepuce.

About the Cervix and Corona of the Glans, are many *Follicles*, termed *Glandulæ Odoriferæ*, which diſcharge a Sebaceous Matter, to preſerve the ſenſibility of the Glans, and allow the Prepuce to move backwards and forwards upon it with facility.

The Internal Structure of the Bulb of the Urethra and Glans of the Penis, is of the ſame nature with that of the Corpora Cavernoſa; and the Internal Structure of the reſt of the Corpus Spongioſum differs from that of the Corpora Cavernoſa only in this, that the Cells are ſmaller and of a more delicate texture.—Some Anatomiſts conſider the greater part of the Corpus Spongioſum as merely a Plexus of convoluted Veins.

The *Urethra*, named from the Urine paſſing through it, is a long Canal, the Diameter of which is nearly equal to that of a writing-pen. It begins at the under and fore-part of the Bladder, runs through the Corpus Spongioſum, and terminates in the point of the Penis by a longitudinal Orifice.

At its origin, it deſcends a little, and then paſſes forwards, under the Symphyſis of the Oſſa Pubis, to which it is cloſely connected by Cellular Subſtance: It then aſcends at the under and fore-part of the Oſſa Pubis, varying in the remainder of its courſe, according to the different degrees of relaxation or diſtenſion of the Cells of the Penis.

There are commonly *three Dilatations* in the Urethra; one of which is at the Proſtate Gland, the ſecond in the Bulb of the Urethra, and the third about the beginning of the Glans.

In general, it has alſo the ſame number of *ſlight Contractions*; the firſt at its origin from the Bladder, the ſecond between the point of the Proſtate Gland and Bulb of the Urethra, and the third at the point of the Glans.

Between the point of the Proſtate Gland and part where the Urethra penetrates the Corpus Spongioſum,—including nearly the ſpace of a Finger's-breadth,—the Urinary paſſage is entirely *Membranous*, and covered only with the common Cellular Subſtance.

At the upper ſide of the Bulb, the Urethra enters the Corpus Spongioſum, in which it is incloſed to its termination in the point of the Penis.

The inſide of the Urethra is lined by a very *Vaſcular* and *ſenſible Membrane*, which is obſerved to poſſeſs a certain degree of contractility, and is therefore preſumed by ſeveral Anatomiſts to be endowed with Muſcular Fibres.

Between the Corpus Spongioſum and Membrane which lines the Urethra, eſpecially towards the Septum of the Penis, numerous *Lacunæ* of different ſizes are ſituated, one or two of which in particular, next the Glands, are often conſiderably larger than the reſt.

They run in a longitudinal direction from behind forward, and perforate the Urethra by Orifices large enough to admit a Briſtle. —They diſcha ge a bland Mucus for the defence of the Urethra.

Beſides the Lacunæ, two ſmall bodies, each about the ſize of a Garden-pea, are frequently met with, and are termed, from their diſcoverer, COWPER's *Glands*.

They are ſituated at the ſides of the Membranous part of the Urethra,—between its Bulb and the point of the Proſtate Gland, —and covered by the Accelerator Muſcles.

When preſent they are obſerved to diſcharge from their Ducts into the Urethra, a Fluid which is ſuppoſed to ſerve the ſame purpoſe with that of the Lacunæ.

The *Arteries* of the Penis are chiefly from the Pudicæ Communes, which are Branches of the Internal Iliacs, and partly from the Femoral Arteries.

Each of the Pudic Arteries having paſſed out of the Pelvis, through the great Notch of the Os Ilium, runs between the Sacro-Sciatic Ligaments to the inner ſide of the Tuber Iſchii, from which it paſſes along the Crus of that Bone, and of the Os Pubis, to the root of the Penis.

In its courſe, it furniſhes Branches to the adjacent parts, and afterwards gives off three principal Branches, which belong to the Penis :—One of theſe goes to the Bulb of the Urethra, to be diſperſed in the Corpus Spongioſum ;—the other two, which are larger than the former, go to the Body of the Penis, one of them penetrating its Crus, and running in the centre of the Corpus Cavernoſum ; the other paſſing between the Symphyſis Pubis and joining of the Crura Penis, and extending along the Dorſum as far as the Corona Glandis.

The Branches of the Femoral Artery to the Penis communicate with thoſe of the former, and are chiefly diſperſed upon the Integuments.

The Arteries of the Penis are divided into minute Ramifications, which communicate with each other, and with their fellows on the oppoſite ſide and terminate partly in the correſponding Veins, and partly in the Cells of the Penis.

The *Veins* ariſe, ſome from the extremities of the Arteries, and others by large open Mouths from the Cells of the Penis.

The greater number of the Veins unite into a Trunk, called *Vena Magna Penis*, which runs in the ſuperior Groove formed by the union of the Corpora Cavernoſa, and is furniſhed with Valves, and with thick ſtrong Coats.

The Vena Magna, at the under end of the Symphyſis Pubis, ſeparates into Right and Left Plexus, which paſs to the correſponding Iliac Veins.

To an obſtruction of the courſe of the Blood through the Veins, by the preſſure of the Muſcles at the root of the Penis,

together with an increaſed influx through the Arteries, is owing that accumulation of Blood in the Corpora Cavernoſa, which occaſions a diſtenſion of the Penis.

The relaxation of the Penis happens from the cauſes which produced the diſtenſion being removed;—The Elaſtic Ligamentous Membrane which covers the Penis again forcing the Blood from the Cells into the Veins.

Upon the Surface of the Penis, there are ſmall ſuperficial Veins, which communicate with thoſe deeper ſeated, and commonly terminate by one or more Branches in the Veins at the top of the Thighs

Theſe Branches aſſiſt in carrying on the circulation, and return part of the Blood during the diſtenſion of the Penis.

Of the *Lymphatics* of the Penis, thoſe from the Prepuce and Skin, in general, go to the right and left Inguinal Glands, while the Lymphatics from the Glans and Body of the Penis accompany the Arteries into the under part of the Pelvis.

The *Nerves* of the Penis are large in proportion to the ſize of that Organ. They come from the Hypogaſtric Plexus, and principally from the laſt Sacral Nerves, and are diſtributed chiefly upon the Ligamentous Sheath which incloſes the Corpora Cavernoſa.

They are ſituated upon the Dorſum of the Penis, more laterally than the Arteries which lie between them and the principal Vein.

For the *Muſcles* of the Penis, ſee Part II.

The Penis ejects the Semen into the Vagina, and ſerves for the conveyance of the Urine from the Bladder.

OF THE

ORGANS OF URINE AND GENERATION

IN THE FEMALE.

THE *Kidneys*, *Renal Glands*, and Ureters, have the ſame ſituation and ſtructure as in the Male.

The *Bladder* has alſo the ſame ſituation behind the Oſſa Pubis, but riſes higher when it is in the diſtended ſtate.

It is proportionally larger than the Bladder of the Male, and is broader from one ſide to the other, corresponding to that part of the Cavity of the Pelvis to which it belongs.

The *Urethra* is much ſhorter,—being ſcarcely two inches in length,—and ſtraighter than in the Male, having only a ſlight bend downwards between its extremities.

It is produced from the moſt depending part of the Bladder, has no proſtate Gland, but is furniſhed, as in the Male, with *Lacunæ*, which open into it, and diſcharge a Mucus to defend it from the Urine.

The Parts of Generation in the Female (which are here ſuppoſed to be in the unimpregnated ſtate) are divided into *Internal* and *External*. The former conſiſt of the Uterus and its Appendages, the latter are thoſe which are ſeen without any Diſſection.

Internal Parts.

The *Uterus*, *Matrix*, or *Womb*, is a hollow Viſcus, ſituated in the Pelvis, in the Hypogaſtric Region, between the Bladder and Rectum, with which it is connected.

It is of a *triangular figure*, and a little flattened before and behind, but more ſo anteriorly; is large above, ſmall below, and has two angles at its upper and lateral parts, called *Corners* of the *Uterus*.

It is diſtinguiſhed into *Fundus*, or upper part, which includes the ſpace above the inſertion of the Fallopian Tubes, the *Body* or middle, and *Cervix* or under part, the two laſt being nearly of equal length.

The extent and figure of the Uterus varies conſiderably in different ſubjects.—In Women who have never been pregnant, it is commonly about two inches and a half in length, from one inch and a half to two inches in breadth at the Fundus, and about half as broad at the Cervix.—It is near an inch in thickneſs, and is larger in Women who have borne Children, than in the Virgin ſtate.

The Cavity, like the external part of the Uterus, is of a *triangular form*, but is ſmall in proportion to the ſize of the Organ, —being ſcarcely capable of containing the Kernel of an Almond, —and has its ſides cloſely applied to each other.

It is covered externally through its whole length, with a ſmooth poliſhed Coat, continued from the Peritoneum, which, at the under part of the Cervix, is reflected forwards upon the Bladder, backwards over the Rectum, and laterally towards the Sides of the Pelvis.

Its Subſtance is of a compact, Cellular, and Fleſhy nature, and plentifully ſupplied with Blood-veſſels: The Fleſhy Fibres, however, are ſeen diſtinctly only in the Gravid Uterus.

It is remarkably Vaſcular in its Body, leſs ſo in its Cervix, and is nearly of the ſame thickneſs throughout, excepting at its Corners, where the Uterine or Fallopian Tubes terminate.

It is lined with a fine and very vascular Membrane, of a somewhat Porous and Villous appearance, in which the Arteries terminate which discharge the Menstrual Fluid.

The Cavity of the Cervix has *two small Longitudinal Lines* projecting in it, one in the anterior, the other in the posterior part, on each side of which are numerous *Rugæ*.

The *Rugæ* run, in an obliquely transverse direction, and are formed not only of the inner Membrane, but also by the Fibres which compose the Body of the Uterus.

Between the Rugæ are many small *Follicles*, which discharge a Mucus for lubricating the parts near which they are placed:—Some of them, being of a roundish form, were mistaken by NABOTH for Female Ovula.

The under part of the Cervix projects into the Vagina, somewhat in form of the Glans Penis, and is perforated by a transverse slit, termed *Os Tincæ*, from its supposed resemblance to the Mouth of the Tench Fish.

The *Os Tincæ*, in an Uterus which has never been impregnated, is about the size of the orifice of the Urethra in the Male, but nearly twice as large in the Uterus of a Woman who has borne Children.

It is smooth on its external surface, is placed obliquely in a direction towards the back-part of the Vagina, and is surrounded with several Mucous Follicles.

Appendages of the Uterus.

The *Appendages* of the Uterus, are the *Broad* and *Round Ligaments*, the *Ovaria*, the *Fallopian Tubes*, and the *Vagina*.

The *Ligamenta Lata*, termed sometimes *Alæ Vespertilionis*, from their resemblance to the Wings of a Bat, are two Membranous productions, or Doublings of the Peritoneum, sent from the edges of the Uterus and posterior extremity of the Vagina, to be fixed to the sides of the Pelvis.

Along with the Uterus, they separate the Pelvis into anterior and posterior Cavities, and are themselves divided into large and small, or anterior and posterior Alæ or Pinions.

They contain and support the Ovaria and Uterine Tubes, with part of the Spermatic and Uterine Vessels and Nerves. They likewise inclose a portion of the Ligamenta Rotunda, &c. connect the Uterus to the sides of the Pelvis, and assist in retaining it in its place. In the time of Gestation they become effaced, by furnishing the Uterus with part of its external covering.

The *Ligamenta Rotunda* are two long and slender Cords, composed of Vessels and Ligamentous Fibres, arising from the Corners of the Uterus, immediately before and below the Fallopian Tubes, from which they descend obliquely in the Ligamenta Lata, diminishing a little in their course towards the Groins.

They pass through the Rings of the Abdominal Muscles, in the same manner as the Spermatic Cords do in the Male, and are afterwards inserted by separate Branches into the upper and lateral parts of the Pudendum.

They assist the Ligamenta Lata in preserving the equilibrium of the Uterus.

The *Ovaria*, anciently called *Testes Muliebres*, are situated at the sides of the Fundus of the Uterus, about an inch distant from it, and are contained in the posterior Pinions of the Ligamenta Lata, which form a Coat to them similar to the Tunica Albuginea Testis.

The Ovaria are plain above, and prominent and semi oval below, flattened at their anterior and posterior Surfaces, and the size of each, when in a state of the greatest maturity, nearly equal to half of the Male Testicle.

They are large, uniform, and smooth, in the vigour of life, but become small, unequal, and shrivelled, in Old Women, or in those who have borne many Children.

They are attached to the Uterus by the Ligamenta Lata, and by two small Cords, termed *Ligamenta Rotunda Ovarii*, which were mistaken by the Ancients for Vasa Deferentia, carrying a secreted Liquor to the Uterus.

They are composed internally of a loose whitish Cellular Substance, intermixed with Vessels and Nerves, and contain a number of small Vesicles, called *Ova*, filled with a limpid Fluid, which partakes of the qualities of the White of an Egg.

These Vesicles differ much in size in the same Ovarium ;—the largest of them are seldom equal to the size of a small Garden-pea.

The number of Ova is differently estimated by different Anatomists,—from ten to twenty and upwards having been found in one Ovarium.

According to experiments made by MR. HUNTER, it is ascertained,—that the number of originally existing Ova in each Ovarium, whether that number be greater or smaller, may be diminished, but cannot be increased.

The Ovaria serve for the nourishment of the Ova, which contain the rudiments of the Fœtus.

The *Uterine*, or *Fallopian Tubes*, compared in shape, by FALLOPIUS, to that of a Trumpet, are two Conical and Vermiform Canals, attached to the Corners of the Uterus, and terminating in it, each by a *small Opening* which scarcely admits the entrance of a Bristle.

They become gradually larger in their passage towards the sides of the Pelvis : Near their outer extremity, they are convoluted and considerably dilated, but are afterwards suddenly contracted, and terminate by *open Mouths* sufficiently large to admit the point of a Goose-quill.

Their outer ends are free and fluctuating in the Pelvis, and expand into many irregular jagged or pointed extremities, called *Fimbriæ*, which are conſiderably longer at one ſide of the Tube than the other.

They are commonly upwards of a hand-breadth in length, and contained in a Doubling of the Ligamenta Lata.—In their natural ſituation, they lie near the Ovaria; but when drawn out and extended, are a Finger's-breadth diſtant from them.

The ſtructure of the Tubes is nearly the ſame with that of the Uterus, and, like it, they are capable of dilatation and contraction: Their inner ſide, however, has a different appearance, being furniſhed with many ſmall longitudinal Plicæ, which are moſt conſpicuous towards the outer extremities.

The Tubes are ſuppoſed to convey the prolific part of the Male Semen from the Uterus to the Ovaria, in order to fœcundate the Ova; and by graſping that part of the Ovarium where the ripeſt Ovum is ſituated, to carry the Ovum, according to ſome Authors, or its contents only according to others, to be mixed with the Male Semen, and to be lodged in the Cavity of the Uterus.

The *Vagina* is a Membranous Canal, which extends from the Neck of the Uterus to the opening of the Pudendum.

It is ſituated behind the Bladder and Urethra, and before the under part of the Inteſtinum Rectum, to each of which it is cloſely connected by Cellular Subſtance.

It begins a little above the Internal Orifice of the Uterus, but reaches higher at the poſterior than anterior part; from which circumſtance, together with a ſlight Curvature it has backwards, the Canal is found to be longer in its poſterior than anterior Surface.

From the Os Tincæ, it paſſes downwards and forwards, and terminates between the Labia Pudendi, the Axis of the Vagina forming a conſiderable Angle with that of the Uterus.

The dimenſions of the Vagina correſpond with the ſize of the Penis in the Male; but vary according to the temperament of the Body, and become larger in Women who have borne Children.

The Body of the Vagina is compoſed of thick, ſtrong, Membranous parts, and furniſhed internally with numerous irregular *Rugæ* or Wrinkles, and Nervous *Papillæ*, the former of which conſiderably diminiſh the capacity of the Canal, and the latter add to its ſenſibility.

The *Rugæ* run in a tranſverſe direction, and are ſo diſpoſed as to divide the Vagina into anterior and poſterior *Columns*, which join together laterally, and produce a *Raphe* or Suture at the right and left ſides.

They are deepeſt, largeſt, and moſt crowded upon the anterior and towards the outer part of the Vagina; are moſt conſpicuous

in Virgins, less so in married Women, and become more and more effaced in those who have borne Children.—The Rugæ facilitate the distension of the Vagina during Child-birth.

The whole extent of the Vagina, particularly towards its outer extremity, is furnished with small *Follicles*, the orifices of which can frequently be seen.

They supply a *Mucus*, with which the Canal is always lubricated, and which is discharged, in time of Coition, in such abundance, as to have been formerly considered as an emission of Female Semen.

The outer end of the Vagina is covered, on each side, by a Substance composed of Blood-vessels and Cells similar to those of the Penis, and described by DE GRAAF under the name of *Plexus Reteformis*, and by later Anatomists under that of *Corpus Cavernosum Vaginæ*.

The *Corpora Cavernosa* are covered by the Sphincter Vaginæ Muscle, the action of which, joined to the Dilatation of these Bodies, serves to contract the entry of the Vagina in the time of Coition.

The *Use* of the Vagina is to receive the Penis and Semen, and to convey from the Uterus the Menstrual Flux, the Fœtus, the Secundines, and the Lochia.

The Uterus, with its Ligaments, Ovaria, and Uterine Tubes, are supplied with Blood from the Spermatic and Uterine Arteries.

The *Spermatic Arteries* arise from the Aorta, as in the Male, and run in the Ligamenta Lata, to be dispersed upon the Ovaria and Uterine Tubes, and afterwards upon the Uterus itself.

The *Uterine Arteries* are derived from the Internal Iliacs, and are much larger than the Spermatics. They direct their course, first to the under part of the Uterus, after which they ascend along its edges, and near its upper part join the Spermatic Arteries.

From the Uterine chiefly, and partly from the Spermatic Arteries, many small Branches are furnished, which run in a serpentine manner, and communicate with their fellows in the opposite sides of the Uterus.

The Vagina is supplied with an Artery on each side,—termed *Vaginal*,—from the Uterine, and with small Branches from the Umbilical, Middle Hæmorrhoidal, and Pudendæ Communes.

The *Spermatic Veins* have the same termination as in the Male, but are considerably larger.—The other Veins run into the Internal Iliac.

The *Lymphatics*, like the Blood-vessels, run also in two Sets. Those of the one set accompany the Spermatic Blood-vessels, and, like the Absorbents of the Testes in the Male, go to the Lumbar Glands. Those of the other correspond with the Hypogastric Blood-vessels, and terminate in the Glands at the lateral parts of the Pelvis.

The *Nerves* are from the Sacral and Great Sympathetics.

The *Uſe* of the Uterus is,—to receive from the Ovaria, by means of the Fallopian Tubes, the Rudiments of the Fœtus,—to nouriſh it, and, after bringing it to maturity,—to expel it through the Os Internum Uteri and Vagina.—From the Inner Surface of the Uterus, the Menſtrual Evacuation is alſo diſcharged.

External Parts.

The *External Parts*, called *Pudendum* or *Vulva*, are formed of two prominent ſides, termed *Labia Pudendi*, *Labia Externa*, or *Alæ Majores*. Theſe are contiguous, when the Limbs are not much ſeparated, thereby preventing the acceſs of Air to the Internal Parts, which they at the ſame time protect and conceal.

The upper part of the Pudendum, named *Pubes* or *Mons Veneris*, is ſituated on the fore-ſide of the Oſſa Pubis, and is covered with Hair ſimilar to that in the Male, and beginning to grow about the ſame period of life.

The Pubes is compoſed of the Common Integuments, under which a conſiderable quantity of Fat is ſituated, rendering it thick, ſoft, and prominent.

The *Labia Pudendi* extend from the Pubes to within about an inch of the Anus, the ſpace between the Pudendum and Anus obtaining the name of *Perineum*, from a moiſture ſuppoſed to flow about this part of the Skin.—It is ſometimes alſo called *Anterior Perineum*, to diſtinguiſh it from that part which extends from the Anus to the Coccyx, termed by ſome Anatomiſts *Poſterior Perineum*.

The opening between the two Labia has the name of *Foſſa Magna*;—it increaſes a little in ſize and depth as it deſcends, and forms a ſmall boat-like Cavity at its under extremity, termed *Foſſa Navicularis*.

The Labia are thickeſt above, become thinner below, and terminate in a tranſverſe fold of the Skin, named *Frænum*, *Furcula*, or *Fourchette*, which is frequently lacerated in the firſt Childbirth.

The Labia are compoſed of the Skin elevated by a large quantity of Cellular Subſtance and ſome Fat, and lined by a very Vaſcular Membrane, which is thin, tender, and red like the inſide of the Lips, and is furniſhed with numerous Sebaceous Follicles, ſecreting a Liquor, whereby the parts are preſerved ſmooth and moiſt.

Between the upper ends of the Labia, is the Subſtance named *Clitoris*, and by ſome *Mentula Muliebris*,—not exceeding an inch in length, and little more than the third part of that in thickneſs, and tied down to the fore-part of the Symphyſis Pubis.

It is extremely Vascular and Nervous, and is composed, like the Penis in the Male, of two *Crura* and *Corpora Cavernosa*, contained in a Ligamentous Sheath, with a Septum between them.

The *Crura* are upwards of twice the length of the *Body* of the Clitoris, and, together with Muscles belonging to them, arise, as the Crura of the Penis do in the Male, from the Crura of the Ossa Ischia and Pubis.

The Clitoris is also provided with a *Ligamentum Suspensorium*, by which it is connected to the Ossa Pubis, and with a *Glans*, which, like that of the Penis, is extremely sensible, but has no perforation in it for the passage of the Urine.

It is covered by a continuation of the Skin of the Labia, which at its inferior extremity, forms a Semilunar Fold, termed *Prepu-tium Clitoridis*.

The Prepuce is furnished with *Glandulæ Odoriferæ* upon its inner Surface, and with a small Frænum which fixes it to the Glans.

In the time of Coition, the Glans Clitoridis is supposed to produce nearly the same sensation in the Female, as the Glans Penis does in the Male.

At the under and outer part of the Clitoris are two Bodies, called *Nymphæ*, from their being supposed to preside over and direct the course of the Water proceeding from the Bladder.

The *Nymphæ* arise narrow from the Prepuce and Glans, and run obliquely downwards and outwards along the inside of the Labia, increasing in breadth, but suddenly contracting again at their lower extremity.

They are chiefly formed by a production of the inside of the Labia, have the same florid colour with them, and in their natural state are contiguous, and cover the Orifice of the Urethra.

They are sometimes of unequal size, and not unfrequently, particularly in warm climates, they project beyond the edges of the Labia.

Their Internal Structure consists of Cellular Substance, with a large proportion of Blood-vessels. They have also many Nervous Papillæ, which render them very sensible, and Sebaceous Follicles, the contents of which prevent them from being injured by the Urine.

The Nymphæ assist in directing the course of the Urine from the Urethra, and in preventing the Air from entering the Vagina. —They also tend to enlarge the Passage for the Child in the time of Parturition.

Between the Perineum and Nymphæ, there is a smooth *Cavity* or *Vestibulum*, which is most complete in Virgins, and leads to two Passages, viz. to the Urethra above, and to the Vagina below.

The *Orifice of the Urethra* is placed a little below the Glans of the Clitoris, and between the two Nymphæ, and is ſurrounded by a Spongy Eminence, which projects at its under part,—called by ſome Authors *Corpus Glanduloſum*, or *Glandulæ Proſtatæ Mulierum.*

The Corpus Glanduloſum is perforated by *Lacunæ*, ſome of which are of conſiderable depth, and diſcharge a Viſcid Matter round the Orifice of the Urethra.

The *Orifice of the Vagina* termed likewiſe *Os Externum Uteri*, is placed immediately under that of the Urethra, and is naturally ſtraiter than the reſt of the Canal, but in the Virgin ſtate is ſtill more contracted by the Subſtance called *Hymen*, or *Circulus Membranoſus*, which partly ſurrounds it.

The *Hymen* approaches to a Circular Figure, but the Circle is frequently incomplete next the orifice of the Urethra, the broad part being turned towards the Perineum.

When the Hymen is ruptured, it degenerates into ſmall Conical Papillæ, termed *Carunculæ Myrtiformes*, from their ſuppoſed reſemblance to Myrtle-berries.

The Hymen has been conſidered as a Teſt of Virginity;—but neither the preſence nor abſence of this Membrane can be depended upon as a certain Criterion.

About the Orifice of the Vagina are ſeveral Mucous Follicles, ſimilar to thoſe round the Opening of the Urethra.

The *Blood-veſſels* and *Nerves* of the External Parts are from the Pudic Branches, and are diſperſed in numerous Ramifications upon the end of the Vagina, Labia Externa, and Clitoris.

The *Abſorbents* paſs partly to the Inguinal Glands, and partly to thoſe placed at the ſides of the Pelvis, or upon the Lumbar Vertebræ.

OF THE GRAVID UTERUS.

When the Rudiments of the Fœtus have been conveyed from one of the Ovaria into the Cavity of the Uterus, through the medium of the correſponding Uterine Tube, whether in the ſtate of a Fluid only, or of a complete Ovum, Impregnation is ſaid to have taken place.

Some days after Impregnation has commenced, an *Ovum*, conſiſting of a Veſicle filled with a limpid Fluid, is found in the Cavity of the Uterus.

The Ovum, when firſt viſible, is obſerved to have a ſmooth Surface, but in a ſhort time thereafter it ſends off flocculent Branches, the greater part of which are by degrees converted into a *Placenta* at that part of the Uterus where the Ovum happens to be firſt attached.

The Rudiments of the Fœtus, however, are not always conveyed to the Uterus after Impregnation, for ſometimes a Fœtus is found in the Ovarium; at other times in one of the Uterine Tubes; and ſome rare Inſtances have occurred, where the Embryo has dropped from one of the Ovaria or Tubes, into the Cavity of the Abdomen, where a Placenta has been formed, by which it has been nouriſhed.

The Ovum, at an early period of Geſtation, conſiſts of a thin *Membranous Capſule*, which incloſes the Embryo or Germ with the Umbilical Cord and Waters; and the Capſule, again, conſiſts of an internal Membrane called *Annios*, on the outſide of which is the *True Chorion*, which is covered with a Filamentous and Spongy Subſtance, termed by RUYSCH *Tunica Filamentoſa*, and by more modern Authors, *Falſe* or *Spongy Chorion*.

The *Spongy Chorion* is deſcribed by DR. HUNTER as conſiſting, in early Geſtation, of *two Layers*, one lining the Cavity of the Uterus, and termed by him *Membrana Decidua*, from being ſuppoſed to be caſt off from the Uterus: The other, covering that part of the Ovum which does not adhere to the Uterus, he terms *Decidua Reflexa*.

The *Decidua* is leaſt diſtinct between the Uterus and Placenta. Near the edge of the Placenta, both it and that part of it called *Reflexa*, are thickeſt and ſtrongeſt, and decreaſe in thickneſs towards the other end of the Uterus and Ovum, in proportion as theſe become more expanded.

The Decidua and Decidua Reflexa unite into one Membrane in advanced Geſtation. They have been ſuppoſed to be formed originally by an efflorescence thrown out upon the parts on which they are placed, in the manner it is thrown out upon inflamed ſurfaces.

Between the Amnios and Chorion, a *Gelatinous Fluid* is contained in the early Months, at which period a ſmall *Bag*, filled with a milky-like Fluid, is obſerved on the Amnios, near the Umbilical Cord, and is termed *Veſicula Umbilicalis* or *Alba*.

The *Veſicula Umbilicalis* is connected to the Cord by a Filament conſiſting of an artery and Vein, which, with the Fluid and Bag, ſoon diſappear. The uſe of this Veſicle, which has ſometimes been miſtaken for an *Allantois*, is not yet underſtood.

In early Geſtation, the Ovum is large in proportion to the Embryo; but towards the latter period of Pregnancy, the proportion is reverſed, as appears from the following Obſervations.

No well authenticated account has been yet received, of the Embryo being obſervable till near the end of the third Week, when it is found to appear like an oblong Veſicle floating in the limped Liquor of the Ovum.

In the fourth Week, the Ovum is about the ſize of a Pigeon's Egg, and the Embryo not larger than that of a common Fly.

About the end of the third Month, the Ovum is the ſize of a Gooſe's Egg, and weighs eight ounces, while the Embryo is between two and three ounces in weight, and three inches in length; —and the Head and Extremities being now diſtinctly obſervable, it obtains the name of *Fœtus*, which it retains from this time till the end of Geſtation.

In the ſixth Month the Placenta and Membranes weigh ſeven or eight ounces, the Fœtus, twelve or thirteen, and is eight or nine Inches in length, and perfect in all its external parts.

At Birth, the Secundines weigh only between one and two pounds, the Fœtus ſix or ſeven, and is from eighteen to twenty-two inches in length.

Still however, from the difficulty of aſcertaining when Pregnancy commences,—from the differences of Fœtuſes of the ſame age in different Women, and in the ſame Woman in different Pregnancies, and—from the Fœtus being frequently retained in the Uterus ſome time after it is dead, as well as from the ſmall dependance to be placed upon many of the Figures given of theſe Parts,—the above Obſervations are not altogether to be depended upon.

Changes Produced in the Uterine System by Impregnation.

Immediately after Impregnation, a large *Orifice* is conſtantly obſerved in the Ovarium, leading to a *Cavity* in that part of it from whence the Rudiments of the Fœtus have been derived.

This *Cavity* appears firſt flocculent, and is afterwards filled up with a Granulous Subſtance, which has the name of *Corpus Luteum*, from the yellow appearance it aſſumes, eſpecially in Quadrupeds.

The *Corpus Luteum*, conſiſts of an outer Vaſcular, and an inner Inorganic-looking Subſtance, which has been conſidered by ſome Authors as the remains of the Ovum.

The Corpus Luteum is not found till after Impregnation. It contines during Pregnancy, and for ſome time after Delivery, when it gradually vaniſhes, but leaves a *Scar* in the Ovarium, which continues for life.—The number of Corpora Lutea correſponds with that of the Ova impregnated.

After the Embryo is received into the Cavity of the Uterus, the Os Tincæ is ſhut up by a *Ropy Mucus* ſecreted from the Fol-

licles in the Cervix Uteri ; the Menſtrua *ceaſe to flow*,—and the Uterus by degrees is changed from a triangular to an *oval* form.

From the influx of Blood, and the growth of the Ovum, the Cavity of the Uterus gradually enlarges from a ſize capable only of admitting an Almond, to that which contains the full-grown Fœtus, the Secundines and Waters ; compoſing together a Maſs equal to nine or ten pounds weight.

Some time after impregnation, the Fundus and Body of the Uterus, being ſofter and looſer than the Cervix, firſt yield to the parts which it contains.

For the two firſt Months, the Uterus increaſes ſo little as to remain in the Cavity of the Pelvis, and it is generally after the third month, before the Tumour formed by it can be felt above the Symphyſis of the Pubis.

During the firſt three Months, the Os Tincæ remains ſmooth and even, and its Orifice is nearly as in the un-impregnated ſtate ; but between the third and fifth Month, the Cervix and Orifice begin to be dilated, the former becoming ſofter, and the latter changing its common appearance, and projecting more into the Cavity of the Vagina.

The Uterus continues to riſe through the whole period of Geſtation, but frequently inclines a little to one ſide.—In the ſeventh Month, it reaches the Umbilicus, and at laſt touches the Scrobiculus Cordis, Stomach and Colon, occupying the whole of the Umbilical Epigaſtric Regions.

In the progreſs of Geſtation, the whole Uterus becomes ſofter, looſer, and more Vaſcular, and the Veſſels are greatly enlarged, the proportional increaſe being nearly ſimilar to that of the Uterus.

The courſe of the Arteries is remarkably convoluted,—fully as much ſo as they are previous to Conception,—and greatly more ſo than that of the correſponding Veins.

The Veins are much larger than the Arteries, their diameters being ſuch as to have diſtinguiſhed them by the name of Sinuſes ; —and to them the great bulk of the Uterus is chiefly owing.

The ſubſtance of the Uterus was formerly ſuppoſed by ſome to be thicker, and by others to be thinner in the Gravid, than in the unimpregnated ſtate ; but the generality of Anatomiſts ſeem now ſufficiently ſatisfied, that it is nearly of the ſame thickneſs in both ſtates, and during the whole term of Pregnancy.

In the latter Months, the Tubercle of the Os Uteri is conſiderably enlarged, and the firmneſs of its texture converted to the Spongy ſoftneſs of the Body of the Uterus. The tranſverſe Rima or Orifice is changed into an oval Pit, and in Women who have borne ſeveral children, it is conſiderably dilated near the end of Geſtation.

The ſituation of the Appendages of the Uterus is alſo conſiderably altered. The Ovaria, with the Tubes and Ligaments of

the Uterus, are lower ſituated, in reſpect to the Fundus Uteri, in proportion as it aſcends ; and at the full time, the Broad Ligaments, by aſſiſting in forming a covering to the Uterus, are nearly obliterated.

In the enlarged ſtate of the Uterus, the *Muſcular Fibres* are diſtinctly ſeen.—They form Faſciculi which run in various directions, but cannot be traced far without interruption.

A deſcription is given by RUYSCH of a *Circular Muſcle* in the bottom of the Uterus, for the expulſion of the Placenta ;—but the Placenta is found to adhere to other parts beſides the Fundus Uteri ; nor has ſuch a Muſcle been obſerved by later Anatomiſts.

The Muſcular Fibres of the Uterus aſſiſt in the delivery of the Child and expulſion of the Placenta ; and in a few days afterwards, the Uterus, partly by the contractile power of theſe Fibres, and partly by that of the Blood-veſſels, is reſtored to near its former dimenſions.

CONTENTS OF THE UTERUS ABOUT THE END OF PREGNANCY.

The Contents of the Uterus, towards the end of Pregnancy, conſiſt of the *Fœtus*, the *Umbilical Cord Placenta*, *Membranes*, and *Waters*.

The Cord, Placenta, and Membranes, are named the *Secundines*, or *After-birth*, with which ſome include the Waters though theſe are diſcharged previous to the expulſion of the Child.

The *Cord* is fixed by one end to the Umbilicus of the Fœtus, and by the other it is attached to the Placenta at a little diſtance from its middle, from which circumſtance the extraction of the Placenta is more eaſily effected.

It is commonly about two feet long,—in ſome inſtances more, in others leſs ; but in general it is of ſufficient length to allow the Birth of the Child, while the Placenta adheres to the Uterus of the Mother.

Its thickneſs is nearly equal to that of ones Finger, but ſmaller and weaker at the extremity next the Placenta.—It is ſeldom of a cylindrical form, being marked with Sulci correſponding to the courſe of its Veſſels.

It is compoſed of *one Vein* and *two Arteries*, which twiſt about each other in a ſpiral direction, and are covered by a ſmooth Coat derived from the Membranes.

The Trunks of the Veſſels are incloſed in a *Gelatinous Cellular Subſtance*, which adds to the ſtrength and elaſticity of the Cord, and allows the Blood to paſs freely between the Fœtus and Placenta, without being in danger of interruption from preſſure.

The *Vein* is much larger than the Arteries; it is deſtitute of Valves, and ſends off no Branches till it reaches the Fœtus.

It ariſes from the ſubſtance of the Placenta, and, after perforating the Umbilicus, it paſſes in the inferior part of the Ligamentum Suſpenſorium, to the under ſide of the Liver.

The *Arteries* ariſe from the Iliac Arteries of the Fœtus, perforate the Umbilicus, and run to the Placenta, in the ſubſtance of which they divide into their ultimate Branches, where the Ramifications of one Artery frequently form large Anaſtomoſes with thoſe of the other, and both communicate with the Branches of the Vein, in the manner Arteries and Veins do in other parts of the Body.

The *Uſe* of the Cord is, by means of the Vein, to convey pure Blood from the Placenta for the nouriſhment of the Fœtus, and, through the medium of the Arteries, to return what is not uſed in Nutrition, again to be mixed with the Blood of the Uterus.—By the intervention of the Cord alſo, the Placenta is more readily extracted.

The *Placenta* ſo called from its reſemblance to a broad Cake, is a ſpongy maſs, of a round form, occupying near a fourth part of the Ovum.

It is about ſeven or eight inches in breadth, and upwards of one inch in thickneſs, but is thinner at the edges where the Membranes go off.

The external ſurface, or that next the Uterus, is divided into Lobules with deep Fiſſures, while the internal, or that next the Fœtus, forms a regular Maſs, which has numerous large Branches of the Umbilical Veſſels diſperſed upon it.

In the Placenta are to be obſerved,—on the ſide next the Child, the ramifications of the Umbilical Veſſels forming the principal part of its ſubſtance,—on the ſide next the Mother, Branches of the Uterine Arteries, almoſt of the ſize of Crow-quills, paſſing in a convoluted manner between the Uterus and Placenta, and terminating in the latter;—Veins correſponding with theſe Arteries but flat and of great ſize, running obliquely to the Uterus,—and, in the ſubſtance of the Placenta, an Appearance which has been ſuppoſed by many Authors to be the common Cellular Membrane, of a tender nature, and eaſily ruptured by injection, but which is conſidered by late Authors as a regular Spongy Subſtance, ſimilar to that in the Body of the Penis.

The Placenta is connected to the Uterus on one ſide, by Blood-veſſels and by the Decidua, and to the Fœtus on the other, by means of the Umbilical Cord.

The common place of attachment is near the Fundus Uteri, though it is found at different times adhering to all the other parts of the Uterus, not even the Os Tincæ excepted.

In the caſe of Twins, there is ſometimes only one, but moſt frequently two diſtinct Placentæ, adhering together by the in-

tervention of a Membrane in which the Veſſels of the two Placentæ occaſionally communicate with each other.

There are in theſe caſes alſo, two diſtinct Apartments ſeparated by a Partition, each Apartment containing its own Waters and Cord.

The *Uſe* of the Placenta is, to receive Blood from the Uterus, and, according to the opinion of modern Anatomiſts, to purify it, (as the Lungs do in the Adult), for the nouriſhment of the Fœtus.

The *Membranes* conſiſt of the *Spongy Chorion*, the *True Chorion*, and the *Amnios*.

They form a complete but ſlender *Bag*, which lines the Cavity of the Uterus, and incloſes the Fœtus, Umbilical Cord, and Waters.

The *Spongy Chorion* is a thick opaque ſubſtance, which adheres to the Uterus, and forms the outer Layer of the Ovum, but ſcarcely penetrates between the Lobules of the Placenta.

Between the Uterus and Placenta, it is leſs diſtinct than elſewhere, being perforated there, and in ſome degree concealed by the Blood-veſſels proceeding from the inſide of the Uterus.

It has a Spongy and Villous appearance, and is full of ſmall Blood-veſſels, which can be readily injected from thoſe of the Uterus.

The *True Chorion*,—the term derived from *Chorus* a *Company*, *numerous* Veſſels being found to exiſt in it in the Quadruped,—is thinner, ſmoother, and much denſer than the former.

It is connected with the Spongy Chorion as far as the edge of the Placenta, where it ſeparates from it, is reflected over the Surface of the Placenta, which is oppoſed to the Fœtus, and is afterwards continued over the whole of the Cord.

It is uniform in its texture, has a tranſparent appearance, adheres to the Spongy Chorion and ſurface of the Placenta, by a delicate Cellular Subſtance, and has no Veſſels viſible to the naked Eye, or which can be injected.

The *Amnios*,—ſo called, according to ſome Authors, from its ſuppoſed reſemblance to a Veſſel uſed by the Ancients for the reception of Blood in Sacrifice,—lines the Surface of the True Chorion, and, with it, is reflected from the Placenta upon the Cord, which it ſupplies with an external covering.

It is thinner, more denſe, and tranſparent, than the Chorion, to which it adheres every where by a Jelly.

It is ſmooth and poliſhed on the ſide next the Fœtus, and is deſtitute of Blood-veſſels.

The Membranes, beſides containing the Child and Waters, give origin to the latter, and, in the time of Labour, aſſiſt in opening the Orifice of the Uterus.

The *Waters*, called *Liquor Amnii*, are thineſt and cleareſt in the firſt Months, after which they acquire ſome degree of colour and ropineſs.

The *Liquor Amnii* is chiefly compoſed of the Serum of the Blood. In its natural ſtate, it has all the Characters of the Liquor Pericardii, or of the Liquors exhaled from the Surfaces of other Membranes ſimilar to the Pericardium.—It is ſuppoſed to be derived from the Exhalent Arteries of the Amnios.

It is proportionally greater in quantity in the firſt than in the laſt Months, but the proportion and quantity vary conſiderably in different Women, and in the ſame Woman in different Pregnancies.

Between the Amnios and Chorion, Water is frequently collected, but in much ſmaller quantity than in the Amnios, and is termed *Falſe Water*, or *Falſe Delivery*.—It is frequently diſcharged ſome time previous to the Birth of the Child, without any danger.

The Liquor Amnii defends the Child and Umbilical Veſſels from the preſſure of the Uterus, aſſiſts in diſtending the Uterus during Geſtation, and allows the Fœtus a certain degree of motion.

In the time of Labour, it alſo aſſiſts in dilating the Mouth of the Uterus, and, by lubricating the Vagina, facilitates Delivery.

Peculiarities of the Fœtus.

All the Bones of the Body, excepting a few, are *ſoft, yielding*, and *imperfect*, and many of them entirely in a *ſtate of Cartilage*.

The Head is *large* in proportion to the reſt of the Body, and the Bones of the Cranium are united by *Membrane*, which allows the ſize of the Head to be diminiſhed, whereby its Paſſage is facilitated in the time of Delivery.

Between the Frontal and Parietal Bones, is the Membrane called *Bregma*, formed by the Dura Mater and Pericranium, which commonly diſappears before the Child is two years of age, the margins of the Bones being then united.

—*The other peculiarities of the Bones of the Fœtus are taken notice of in the Deſcription of the Bones of the Adult.*—

There is a *large proportion* of Fluids, and the Solids are generally *ſofter* than in the Adult.

The Skin is of a *bright red colour*, in conſequence of its greater degree of Vaſcularity.

That part chiefly of the Cellular Membrane is *Adipoſe*, which is upon the Surface of the Body; ſcarcely any Fat being found in the interior parts, where it gradually accumulates as the perſon grows older.

The Brain, Spinal Marrow, and Nervous Syſtem, are proportionally *larger*, but *ſofter*.

The Sanguiferous Syſtem, and Glandular Organs, are *larger*.

In the Eye is the *Membrana Pupillaris*, which ariſes from the inner margin of the Iris, and completely covers the Pupil.

It separates the Cameræ from each other, and is very Vascular. According to BLUMENBACH, it keeps the Iris expanded, during the rapid increase of the Ball of the Eye.

The Crystalline Lens is almost *Spherical*, and has numerous *Vessels* dispersed upon its Capsule.

The Meatus Auditorius is wholly *Cartilaginous*, and adheres by its extremity to an imperfect Bony Circle, in which the Membrana Tympani is placed.

The Meatus Externus, and Membrana Tympani, are lined by a *Mucous Membrane*, which is cast off after Birth.

The Thymus Gland, in the Fœtus, is a *large* Substance, situated in the upper part of the Thorax, between the Layers of the Anterior Mediastinum.

It lies over the Pericardium, and occupies the space where the Aorta sends off the Carotid and Subclavian Branches, and extends a short way into the fore-part of the Neck.

It has *two long Cornua* above, and *two broad Lobes* below, is of a pale-red colour, and becomes afterwards of a darker hue.

A *white serous liquor* can frequently be squeezed from its substance; but it has no Excretory Duct; nor is the use of the Fluid, or of the Gland itself, yet ascertained.

Some Anatomists are of opinion, that the white Fluid is Chyle sent by a retrograde motion from the Thoracic Duct, and that the Thymus Gland is a Diverticulum to the Chyle, when too great a quantity of Lymph is sent to the Subclavian Vein.

In the Adult, the Thymus Gland is so completely absorbed, that scarcely any thing but Cellular Substance remains in its place.

The Blood-vessels of the Thymus are Branches of the Subclavian and Internal Mammary; the Nerves come from the Great Sympathetics and Eighth Pair.

Its Lymphatics have not yet been very accurately traced.

The Lungs are small, firm, and of a dark-red Colour, and *sink* when thrown into water, in consequence of the Bronchial Cells having not yet received Air.

But if Air be admitted to them by putrefaction or otherwise, they swim in Water, in the same manner as if Air had been conveyed to them in consequence of Respiration.

The Valve of Eustachius is *distinct* in the Fœtus, but frequently Cribriform in the Adult, is *larger* in proportion, and is supposed to direct the Blood of the Inferior Cava, immediately through the Foramen Ovale to the Left Auricle.

In the back-part of the Septum, between the Right and Left Auricles, is the *Foramen Ovale*, nearly equal in size to the Mouth of the Inferior Cava, bounded by a thick Muscular edge, termed *Annulus Foraminis Ovalis*.

Upon the left side of the Foramen Ovale, a *Membranous Valve* is placed, which allows part of the Blood of the Right Auricle

to pafs through the Foramen Ovale immediately to the left one, but which completely prevents its return.

The Blood going through the Foramen Ovale, aſſiſts in keeping up the balance of Circulation between the two ſides of the Heart, till the Lungs be ready to receive it.

ThePulmonary Artery divides into three Branches, the right and left of which run to the Lungs, while the middle one, called *Ductus Arterioſus*, larger than both the other Branches, and its Area nearly equal to that of the Foramen Ovale, paſſes in an oblique direction to the beginning of the deſcending Aorta.

The Ductus, or Canalis Arterioſus, forms nearly one half of the Aorta, carries part of the Blood of the Right Ventricle into that Artery, without allowing it to paſs to the Lungs ; and the Aorta, formed in this manner, receives the force of both Ventricles, by which it is more enabled to ſend Blood through the Umbilical Arteries to the Placenta.

The Stomach is of a *rounder* form than in the Adult, and commonly contains a ſmall quantity of a *Gelatinous Matter*.

The Appendix Vermiformis is *larger* in proportion, and is inſerted into the extremity of the Colon, which, at this time, does not project to form a proper Cæcum.

The Colon, and frequently alſo the end of the Ilium, are filled with a *greeniſh black Fæces*, of a viſcid conſiſtence, termed *Meconium*.

The Liver is *ſo large* as to occupy both Hypochondriac Regions.

The *Umbilical Vein* paſſes from the Umbilicus, in a duplicature of the Peritoneum, to the left Branch of the Vena Portæ, and carries the Blood from the Placenta to the Liver.

From the Trunk of the Umbilical Vein, where it terminates in the Liver, a Branch, called *Ductus*, or *Canalis Venoſus*, runs in a ſomewhat waving direction, and joins the Left Vena Hepatica, where that Vein enters the Cava.

The Ductus Venoſus is much ſmaller than the Trunk of the Umbilical Vein, and carries part of the Blood of the Vein directly to the Heart, without allowing it to enter the Circulation in the Liver.

The Umbilical Vein ſends Branches to the Right Lobe of the Liver, but is principally diſtributed through the Left Lobe; while the Right Branch of the Vena Portæ carries the Blood of the Splenic and Meſenteric Arteries to the Right Lobe of the Liver.

After Birth, the Left Lobe of the Liver, which was formerly more particularly ſupplied by the Umbilical Vein, receives an additional proportion of Blood from the Vena Portarum.

The reaſon why the Umbilical Vein goes partly to the Cava, and not entirely to the Heart, is not underſtood.

The Kidneys are irregular on their Surface, being formed of *Lobes*, each of which conſiſts of a Cortical, a Medullary part, and a Papilla, and is covered by a Proper Membrane.

The Glandula Renalis is almoſt *as large* as the Kidney, but afterwards rather diminiſhes than increaſes in ſize.

The Bladder of Urine is of a *long* form, and extends almoſt to the Umbilicus. The greater part of it is above the Pelvis, and is more particularly covered by the Peritoneum than in the Adult.

The Urachus, which is of a *Conical form*, aſcends from the bottom of the Bladder, between the Umbilical Arteries, and between the Peritoneum and Linea Alba, to the Umbilicus, and vaniſhes by degrees in the Umbilical Cord.

It is formed by a production of the Fundus Veſicæ, and in the Human Body is generally ſolid, forming a Suſpenſory Ligament of the Bladder.

It has been ſometimes found hollow at its beginning and has been ſaid to be ſo, in one or two inſtances, throughout its whole length.

In the Fœtal Quadruped, it is a large Tube, which tranſmits Urine from the Bladder to a Bag between the Amnios and Chorion, called *Allantois*.

The common Iliac Arteries divide, on each ſide, into a *ſmall* External, and *large* Internal Branch.

The principal part of the Internal Iliac is occupied in forming the *Umbilical Arteries*, which mount by the ſides of the Bladder, on the outſide of the Peritoneum, and perforate the Umbilicus in their progreſs to the Umbilical Cord.

Soon after Delivery, the Foramen Ovale, Ductus Arterioſus, and Venoſus, with the Umbilical Vein and Arteries, begin to contract, and are, in general, completely cloſed, and the Veſſels ſhrivelled into Ligaments within a year after Birth.

This obliteration is produced by a contractile power in the parts, by a preſſure in the ſurrounding Viſcera, and by the Blood being directed through other channels.

The Pelvis of the Fœtus is commonly ſo *ſmall*, that the principal parts of its Viſcera are contained in the open cavity of the Abdomen.

The Prepuce of the Clitoris is proportionally ſo much *larger* in a young Fœtus than it is afterwards, that, in an Abortion, a Female Fœtus has been frequently miſtaken for a Male.

The Teſtes are lodged during the greater part of Geſtation, in the Cavity of the Abdomen, over the Pſoæ Muſcles, and a little below the Kidneys.

They then conſtitute a part of the Abdominal Viſcera, and, in a ſimilar manner with them, are connected to the Body by a production of the Peritoneum, which forms their Tunica Albuginea.

Between the Teſticle and Scrotum, a Fibrous and Vaſcular Subſtance, of a conical form, is extended,—called by Mr. Hunter, *Gubernaculum*, or *Ligamentum Teſtis*, which he conſiders as a principal agent in directing the courſe of the Teſticle, and in making way for it in its deſcent.

About the eighth month of Pregnancy, the Teſtis, by means not yet completely aſcertained, paſſes gradually along to the Scrotum, a Proceſs of the Peritoneum preceding it, which afterwards forms its Vaginal Coat.

The Teſtis through the whole of its courſe, continues to be covered by the Peritoneum, is connected to the parts on which it reſts, and has its Veſſels paſſing to it from behind forwards, the ſame as when ſituated in the Abdomen.

While the teſticle is paſſing through the Ring of the Abdominal Muſcle, the Ligamentum Teſtis is found to be in ſome meaſure inverted, and to form the under and fore-part of the Vaginal Coat, on which the Cremaſter Muſcle is expanded.

After the deſcent of the Teſticle, the Peritoneal Proceſs, which deſcends along with it, begins to contract at the Ring, and a firm adheſion of its ſides, to within a little diſtance of the Teſticle, is commonly found to be produced by the time of Birth.

Position of the Fœtus.

In the firſt Months, the Embryo ſwims in the Liquor Amnii, free from the preſſure of the ſurrounding parts;—and from many diſſections and obſervations made by the lateſt Anatomiſts, it is aſcertained,—that the Head preponderates, and in general continues undermoſt till the Child is delivered.

Formerly it was ſuppoſed that the Embryo, in the firſt Months, was ſituated with the Head uppermoſt, and that, in the latter Months, the attitude of the Fœtus was inverted.

The Fœtus is obſerved to be coiled up into as round a figure as poſſible, ſo as to be properly adapted to the Cavity of the Uterus.

The Head is bent towards the Thorax, and the arms are folded:—The Knees are drawn towards the Abdomen, and the Heels towards the Nates.

The Spine is bent into an Arch, and one ſide of the Body of the Fœtus is frequently turned forwards.

The Head is placed diagonally, with its long Diameter correſponding to that of the Pelvis, and the Occiput oppoſed to the Os Tincæ.

Circulation of the Blood in the Fœtus.

The Blood is ſent by the Arteries of the Uterus to the Subſtance of the Placenta, from which according to moſt of the ancient Anatomiſts, it paſſes to the Umbilical Vein by a direct communication of Branches; or, according to the opinion of the greater part of modern Anatomiſts,—by Abſorbtion.

By the Umbilical Vein it goes principally to be circulated in the Liver, and by the Ductus Venosus, a small portion of it goes to the right Auricle of the Heart.

The Blood sent from the Inferior Cava is transmitted by the Foramen Ovale to the left Auricle, and that sent by the Superior Cava is transmitted to the right Auricle and Ventricle, and from thence to the Pulmonary Artery.

From the Pulmonary Artery, one portion of it passes through the Circulation of the Lungs, and another goes by the Ductus Arteriosus to the Aorta Descendens.

From the Lungs it is returned by the Pulmonary Veins to the Left Auricle, where it mixes with that coming from the right Auricle by the Foramen Ovale, and is sent by the Aorta to the different parts of the Body.

From the Iliac Arteries, it is conveyed by the Umbilical Branches to the Substance of the Placenta, where one portion of it returns by corresponding Veins to the Fœtus, the rest going to the Uterus in the manner it was discharged from the Uterine Arteries to the Branches of the Umbilical Vein.

PART V.

OF THE

ABSORBENT SYSTEM.

Of the ABSORBENTS *in General.*

THE *Abſorbent Syſtem* conſiſts of the *Abſorbent Veſſels* and *Conglobate Glands*, the former of which are divided into *Lymphatic* and *Lacteal Veſſels*.

The *Abſorbents* are ſmall pellucid *Tubes*, which have been diſcovered in moſt parts of the Body, and are ſuppoſed to exiſt in all.

They begin by numberleſs open *Mouths*, too minute to be viſible to the naked Eye; though, by the aſſiſtance of Glaſſes, the Orifices of the Lacteals have been ſeen in the Human Body by Mr. CRUICKSHANK, and thoſe of the Lymphatics, in certain kinds of Fiſhes, by Dr. MONRO.—*See their Treatiſes upon this Subject.*

They ariſe from the external Surface of the Body, from the Cellular Subſtance, from the Surfaces of the large Cavities, and from the Surface and Subſtance of the different Viſcera;—but have not yet been obſerved in the Cavity of the Cranium, or in the Placenta and its Membranes.

In the different parts of the body in general they run in two ſets, one ſuperficial and very numerous, the other accompanying the Arteries, and at leaſt double their number.

The Lacteals are of the ſame nature with the other Abſorbents. They begin from the inſide of the Inteſtines, and, when theſe contain Alimentary matter, they carry a white Fluid, called *Chyle*, and at other times a *Clear Fluid* or *Lymph*, to be mixed with the contents of the Lymphatics.

Moſt of the Lymphatics, and all the Lacteals, terminate in the Thoracic Duct, by which the Lymph and Chyle are conveyed to the Red Veins, to be mixed with the Blood.

The common place of termination is in the large Veins in the bottom of the Neck;—no Facts or obſervations having been yet eſtabliſhed of their terminating in any other part of the Venous Syſtem.

The *Coats* of the Abſorbents are thinner and more tranſparent, but ſtronger than thoſe of the Red Veins, being able to ſupport a Column of Mercury of conſiderable weight; but from their thinneſs they cannot be enumerated.

They are generally ſuppoſed however to be formed of different *Membranous Layers*, like the Blood-veſſels. Fibres can be ſeen in them, and their Muſcularity is rendered probable by the Contractile power which they are obſerved to poſſeſs in a living or moribund Animal.

By this contractility they convey their contents from their Origins towards their terminations, in which they are aſſiſted by the motions of the ſurrounding parts, independent of ſuch a *Vis a tergo* as contributes to propel the Blood through the Veins.

They are furniſhed with *Blood-veſſels* for their nouriſhment, as is ſometimes obſerved by penetrating injections; and this is rendered ſtill more evident by their being ſuſceptible of inflammation and pain.

The preſence of *Nerves* alſo appears probable from the acuteneſs of their feeling when in a ſtate of inflammation.

In general, they form an irregular *Net-work*, having frequent communications with each other; and theſe are moſt numerous in the vicinity of their Glands.

Through their whole extent, they are intercepted by *Valves*, which are placed in pairs, and are of a ſemicircular form, having one edge of each Valve fixed to the ſide of the Veſſel, and the other edge looſe acroſs its cavity, but turned towards the general terminations.

The Valves are found, in ſome parts, to be ſituated at equal diſtances; in others, more irregularly.—Their number alſo is very uncertain, amounting in ſome parts to three or four, and in others to ſeven or eight, or upwards, in the length of an inch; —but varying ſtill more with reſpect to number, in different Bodies, and in different parts of the ſame Body.

When the Abſorbents are diſtended, they appear largeſt on the ſide of the Valves towards their general termination, and the enlargements are ſuch as to give the Lymphatics a jointed, and the Lacteals frequently a veſicular appearance.

In the termination of the Abſorbents, whether in the Thoracic Duct, or in the Red Veins, there is always one and commonly two Valves, to prevent the contents of the Duct or of the Veins from paſſing into them.

The *Uſe* of the Valves is to promote the general courſe of the Lymph and Chyle, and to prevent the retrograde motion of theſe Fluids within their Veſſels.

Uſe of the Abſorbents: The Lymphatics take in the Fluids applied to their Orifices by Capillary Attraction, and by a power inherent in themſelves, and by their contractile nature conduct them into the Maſs of Blood, whereby they prevent morbid accumulations.—The Lacteals, in like manner, receive the Chyle from the Inteſtines for the nouriſhment of the Body.

The *Conglobate Glands*, or Glands of the Abſorbent Veſſels, are found in various parts of the Body, and are ſituated in the Cellular Subſtance under the Skin, or over the Trunks of the Blood-veſſels belonging to the different Viſcera:—They are of a round or oval form, and frequently a little flattened.

They are of different ſizes, from that of a Millet-ſeed to that of a Subſtance near an inch in diameter; and ſometimes ſeveral are collected into one maſs.

Their colour alſo varies in different parts of the Body, and at different times of life.

In young ſubjects, they are generally largeſt, and of a reddiſh or brown colour, but become ſmaller and paler with increaſing age; and immediately under the Skin, they are redder and firmer than within the large Cavities.

They have a ſmooth, denſe, *Membranous Covering*, which gives them a ſhining appearance, and are connected to the ſurrounding parts by looſe Cellular Subſtance.

Their Coat is connected to the Glandular part by a Cellular Membrane, which, according to Dr. HALLER, is pervaded by a *Succus proprius* full of Globules, which, Mr. HEWSON ſuppoſed, afterwards form the Red Globules of the Blood.

Like other Glands, they have Arteries, Veins, and Nerves, entering their compoſition.

They are deſcribed by ſome Anatomiſts, as being compoſed of *Cells internally*, while others conſider them as being a Congeries of convoluted Abſorbent Veſſels.—Moſt of the Glands have much of the former, but many of them of the latter appearance.

The Abſorbents entering into the Glands, are called *Vaſa Inferentia*. When they approach, or come in contact with the Gland, they ſplit into radiated Branches, which, after ſpreading over it, penetrate into its Subſtance.

The greater part of the Abſorbents, approaching a Gland, terminate in it in this manner, while others turn aſide, or go over it, and terminate in other Abſorbents or in other Glands.

From the oppoſite ſide of the Glands, Veſſels go out in the manner they entered it, and are termed *Vaſa Efferentia*. They are frequently, though by no means always, fewer in number, but larger than the *Vaſa Inferentia*.

Moſt of the Abſorbents go through ſeveral Glands, but in ſome parts through one only, before they reach their general terminations.

The Lymph and Chyle are ſtrained through the Glands, by which they are ſuppoſed to undergo certain changes,—but the nature of theſe changes has not yet been aſcertained.

Of the Particular Absorbents.

The *Superficial Abſorbents of the Lower Extremities*, conſiſt of numerous Veſſels, which lie between the Skin and Muſcles.

They belong to the Integuments in general, and are much more numerous than the Subcutaneous Red Veins.

They can be traced from the Toes, round which they form a Plexus.

From the Toes, ſeveral Branches, likewiſe forming a Plexus, run over the top of the Foot, to the inner part of the Leg, and from that along the correſponding part of the Knee.

From the outer part of the Foot, another Plexus ariſes, which runs along the outſide of the Leg, where it ſplits into two Diviſions, one of which croſſes obliquely over the fore-part of the Tibia, to the Lymphatics at the inner ſide of the Knee.

The other Diviſion paſſes partly to the Popliteal Glands, ſome aſcending upon the outer and back-part of the Thigh.

The *Popliteal Glands* are commonly two or three in number, and are ſituated near the Artery of the ſame name, but frequently they are ſo ſmall and ſo much buried in Fat, as to be diſcovered with difficulty.

From the Sole, another Plexus of Lymphatics ariſes, and joins thoſe upon the Leg already deſcribed.

From the inſide of the Knee a Plexus runs up, conſiſting of from twelve to twenty Trunks, which paſs afterwards on the fore and inner-part of the Thigh to the Groin.

The greater part of the Trunks of the laſt Plexus, accompany the Vein called *Saphena Major*, and in their paſſage they receive many ſmall Branches from the outer and back-part of the Thigh.

In the Groin, they ſplit into Branches which penetrate the Inguinal Glands.

The *Inguinal Glands* are generally from ſix or eight to a dozen in number, and are of very different ſizes; but ſometimes the number is ſmaller, in conſequence of two or more of them being united into one large Gland.

Of the Inguinal Glands, ſome lie in the angle between the Thigh and Abdomen, and others a few inches farther down on the fore-part of the Thigh.

The greater number are placed upon the outer part of the Tendinous Aponeuroſis, the reſt deeper, being in contact with the great Blood-veſſels.

The *superficial Lymphatics of the Thigh* enter the loweſt of theſe Glands; one or more of them, however, frequently paſs by the firſt Glands they meet with, and penetrate others higher in the Groin, and ſometimes a few do not enter any Glands till they go into the Abdomen.

Into the Inguinal Glands enter likewiſe the ſuperficial Lymphatics of the upper and back-part of the Thigh, with thoſe of the Nates and of the Abdomen and Loins.

The *deep-ſeated Lymphatics of the Lower Extremity* are ſituated among the Muſcles,—they accompany the Blood-veſſels, and are few in number when compared with the Subcutaneous ſet.

In ſeveral places, one only has been yet obſerved on each ſide of the Trunks of the Arteries, though, in others, they are ſomewhat more numerous, forming a Plexus over the Blood-veſſels.

They ariſe from the ſides of the Toes, and from the deep parts of the Sole, accompanying the Plantar Arteries; and after reaching the Leg, they run up with the poſterior Tibial Artery to the Ham.

In the Ham, they lie cloſe upon the Trunk of the Artery, and enter the Popliteal Glands.

Beſides theſe, there are ſimilar but ſmaller Lymphatics, which begin upon the upper part of the Foot, and afterwards accompany the anterior Tibial, and the Fibular Arteries, receiving Branches from the deep parts of the fore and outer-ſide of the Leg.

The anterior Tibial and the Fibular Lymphatics, terminate with the poſterior Tibial in the Glands of the Ham.

From the Popliteal Glands, two and ſometimes more Trunks of conſiderable ſize are ſent out, which accompany the Femoral Artery, and, at different diſtances, communicate with each other, by Branches which paſs obliquely acroſs the Artery.

At the upper part of the Thigh, they enter the undermoſt of the Inguinal Glands, where the Lymph of the ſuperficial and deep-ſeated Abſorbents of the Limb is mixed and incorporated.

The *ſuperficial Lymphatics of the Scrotum* enter the upper and inner Inguinal Glands, thoſe deeper ſeated paſſing with the Lymphatics of the Teſticle into the Abdomen.

The *ſuperficial Lymphatics of the Penis* begin at the Prepuce, and form a few Trunks which run principally upon the Dorſum Penis, receiving in their paſſage Branches which turn round from its inferior ſurface.

In ſome Subjects, they unite into Trunks in the middle of the Dorſum Penis, which afterwards ſeparate into right and left parts.

In others, they are more unconnected, and in all they appear to divide at the root of the Penis into right and left Branches,

passing into the corresponding Inguinal Glands, which lie next the Symphysis of the Pubis.

The *deep-seated Lymphatics of the Penis* arise from the Glans, and from the Body of the Penis, and accompany the Arteries into the under part of the Pelvis.

The *Lymphatics of the Testicle* are numerous, and are among the largest of the Body, some of them exceeding the size of a Crow-quill.

They arise from the Coats and Body of the Testicle, and from the Epididymis, and run with the Spermatic Cord through the Ring of the Abdominal Muscle, to terminate in the Lumbar Glands.—In their passage, they have few communications with each other.

The *Lymphatics of the External Parts of Generation in Women*, go partly to the Inguinal Glands of each side, and partly through the Rings of the external oblique Muscles, in company with the round Ligaments of the Uterus, and terminate in the Iliac or in the Lumbar Glands.

The Superficial Lymphatics of the under part of the Abdomen, those of the *Loins*, *Nates*, and verge of the *Anus*, pass into the Inguinal Glands, each set terminating in such of the Glands as lie nearest the parts to which the Vessels belong.

The Inguinal Glands, having received the Lymphatics of the Inferior Extremity, and likewise the Superficial Lymphatics of the External Parts of Generation, send out Trunks fewer in number, but considerably larger than those which entered the Glands.

The Vasa Efferentia of the Inguinal Glands enter the Abdomen under POUPART'S Ligament, in company with the Inguinal and Iliac Artery.

Some of them go into the Glands situated about the Iliac or the Lumbar blood-vessels. The *Iliac Glands* are frequently almost as numerous as the Glands of the Groin, and one of them is generally found larger than the rest, and placed at the inner edge of POUPART'S Ligament. The Lumbar Glands are more numerous than any of the classes already described, and are placed over the Abdominal Aorta, Inferior Cava, and bodies of the Lumbar Vertebræ.

The rest of the Lymphatics from the Lower Extremity descend at the side of the Pelvis, near the Internal Iliac Blood-vessels, and pass through some of the Glands which are situated there.

The last-mentioned Lymphatics are joined by Absorbents from the viscera of the Pelvis in general, especially by those of the Bladder and Vesiculæ Seminales in the Male, and by a portion of those of the Uterus and of the Vagina in the Female.

The *Lymphatics of the Bladder*, in both sexes, accompany its principal Blood-vessels, pass through some small Glands upon

the side of it, and, at the under part of the Pelvis, go into the Glands which surround the Internal Iliac Artery and Vein.

The *Lymphatics of the Uterus* run in two Sets; one, which is the largest, goes with the Hypogastric, the other with the Spermatic Blood-vessels.

The *Hypogastric Lymphatics* form a Plexus which runs from above downwards, into Glands situated on the sides of the Vagina.

From these Glands they pass to others which surround the Internal Iliac Vessels, and then, intermixing with the Trunks from the Extremities, they terminate in the Thoracic Duct.

The Lymphatics, corresponding with the Spermatic Vessels, terminate in the Lumbar Glands, as in the Male.

The Lymphatics of the Uterus, like its Blood-vessels, are much enlarged and of consequence easily discovered, in the Gravid state.

The *Lymphatics of the Rectum* go first into small Glands which lie between it and the Os Sacrum, and afterwards terminate in the Lumbar Plexus of Glands and Vessels.

Besides the Lymphatics which lie on the inside of the External Iliac Artery, there are others situated on the outside of it, upon the Psoas Muscle.

Of these, one part passes up to the Lumbar Plexus, and goes under the Aorta, in different Branches which terminate in the Thoracic Duct.

Another part passes under the Iliac Arteries, and appears upon the Os Sacrum, forming a remarkable Plexus, which goes through many Glands, and is chiefly situated behind the Aorta and Vena Cava.

The *Lacteal Vessels*, so called from conveying a fluid like milk, which is termed *Chyle*, begin upon the inner Surface of the Intestines. Each Lacteal takes its origin upon one of the Villi, by numerous short radiated Branches, and each Branch is furnished with an Orifice for imbibing the Chyle.

From the Villi the Lacteals run a considerable way under the Muscular Coat of the Intestines, and then pass obliquely through them, uniting in their course into larger Branches.

They follow the direction of the Blood-vessels, and their Trunks are double the number of the Arteries,—one being situated on each side of them.

Upon the outside of the Intestines an External Set appears. They run between the Peritoneal and muscular Coats, and commonly proceed someway in the direction of the Intestine, and with few ramifications.

The Superficial and deep-seated Lacteals communicate in the Substance of the Intestines, and, after leaving them, commonly form a Plexus, which runs between the plies of the Mesentery and Mesocolon, without following the course of the Blood-vessels.

The *Lacteals of the Jejunum* are larger and more numerous than those of the *Ilium*, the principal part of the Chyle being contained in this Intestine.

In their course, they pass through a great number of Lacteal or Mesenteric Glands, which like the Lacteals themselves, are largest and most numerous in that part of the Mesentery which belongs to the Jejunum.

The *Mesenteric Glands* are seated in the Fat between the Layers of the Mesentery, near the Branchings of the Blood-vessels.

They are commonly scattered over the Mesentery, at a little distance from each other; but there are seldom any observed within two or three inches of the Intestines.

They are of different sizes in different parts of the Mesentery, some being about a half, or two thirds of an inch in diameter, while others are so small as to be traced with difficulty.

Their Structure is the same with that of the Absorbent Glands in other parts of the Body, but they are generally flatter, and are of a white colour when filled with the Chyle.

They are considered by some Authors as dividing the Lacteals into different Orders.

From the Intestines to the Glands, the Lacteals are called *Vasa Lactea Primi Generis*, and from the Glands to the Thoracic Duct, *Vasa Lactea Secundi Generis*.

Some divide them into three Orders;—the first consisting of those which go from the Intestines to the Glands,—the second, of those which run from one set of Glands to another,—and the third, of those which pass from the Glands to the Thoracic Duct.

The *Lacteals of the Small Intestines*, after passing through the different Glans in the Mesentery, form at last one, and frequently two, three, or more Trunks, which accompany the Trunk of the superior Mesenteric Artery, till they arrive at the right side of the Aorta, where they sometimes pass into the beginning of the Thoracic Duct: At other times they descend a little, and join the Trunks from the Inferior Extremities, to form that Duct.

The Absorbents of the *Great* are of an inferior size in proportion to those of the *Small Intestines*, and have seldom, though sometimes, been observed to be filled with Chyle.

In their course they go through the Mesocolic Glands, which are situated between the Layers of the Mesocolon, but are generally much less numerous and considerably smaller than those of the Mesentery, or of most other parts of the Body.

The Absorbents of the *Cæcum*, and of the *right portion of the Colon*, join those of the small Intestines, about the root of the Mesentery.

Those of the *left portion of the Colon* accompany the Inferior Mesenteric Artery, and communicate with large Lymphatics near its root.

They terminate at last in the Lumbar Glands, or go directly into the lower part of the Thoracic Duct.

Of the Absorbents of the *Stomach*, one set runs upon its small, and another upon its great Curvature, but neither the one nor the other are found to carry Chyle, though a few have been observed filled with it in other animals,—as the Dog.

The former of these, composed of Branches from the upper and under Surfaces of the Stomach, accompany the superior Coronary Artery.

In their passage, they go through a few small Glands situated at the junction of the Omentum Minus to the Stomach, and, after becoming larger they enter other Glands in company with the deep-seated Lymphatics of the Liver, along with which they terminate in the Thoracic Duct.

The other set passes from the great Curvature of the Stomach, partly to the right, and partly to the left side, and, as on the small Curvature, are formed of Branches from its opposite Surfaces.

Those on the left side receive the Lymphatics of the middle and corresponding half of the Omentum Majus. Running to the left side of the large Curvature of the Stomach, and passing through one or two small Glands on it, they go with the Lymphatics of the Spleen and Pancreas to the Thoracic Duct.

Those of the right side receive the Lymphatics of the corresponding half of the great Omentum, and also pass through one or two small Glands which lie close to the right Gastric Artery.

In their descent by the Pylorus, they meet the Plexus which accompany the superior Coronary Artery, and run with them, and with the deep Lymphatics of the Liver to the Thoracic Duct.

The *Lymphatics of the Liver*, as in other Viscera, run in two sets, the superficial of which are numerous, and unite into Trunks in the manner Roots unite to form the trunk of a tree.

The superficial and deep sets communicate so freely, that upon injecting the Lymphatics on the external Surface, the deep-seated Absorbents are readily filled from them.

The principal part of the Lymphatics upon the convex Surface of the Liver, go by a right and left Plexus towards the Suspensory Ligament.

Running along this Ligament they directly perforate the Diaphragm, after which they pass through Glands situated upon the anterior part of the Pericardium.

Other Lymphatics from the convex part of the liver run towards the lateral Ligaments, where they form on each side one or more Trunks of considerable size.

From the lateral Ligaments they pass through the Substance of the Diaphragm, and afterwards run forwards on its convex Surface, following the direction of the Ribs.—Not unfrequently,

these Veſſels, inſtead of perforating the Diaphragm, run downwards and terminate in the Thoracic Duct, within the Abdomen.

In their courſe upon the Diaphragm, they often ſend Branches backwards, which terminate in Glands upon the Eſophagus; —in other inſtances, theſe Branches are obſerved to go directly into the Thoracic Duct.

They receive Branches from the Subſtance of the Diaphragm, and, after perforating two or three Glands upon its Surface; they join the Trunks from the Ligamentum Suſpenſorium.

The Lymphatics from the lateral Ligaments, joined by thoſe from the Ligamentum Suſpenſorium, form either a principal Trunk, or a Plexus, which runs up, ſometimes between the Layers of the anterior Mediaſtinum, and, at other times, in company with the internal Mammary Blood-veſſels on each ſide.

When this trunk or Plexus runs in the anterior Mediaſtinum, it moſt frequently terminates in the upper end of the Thoracic Duct;—ſometimes, however, it communicates with the general termination in the right ſide of the Neck.

When they accompany the internal Mammary Veſſels, they are obſerved to terminate, the left in the Thoracic Duct, and the right in the general termination of that ſide.

The Lymphatics on the concave Surface of the Liver run towards the Porta, and join the deep-ſeated Set.—One part of them goes over the under Surface of the Gall-bladder, from which they receive numerous ſmall Branches.

The deep-ſeated Lymphatics accompany the Blood and Biliary Veſſels, and communicating with the Superficial Abſorbents already mentioned, they paſs through ſeveral Glands ſituated about the Trunk of the Vena Portæ, and terminate in the Thoracic Duct, near the root of the ſuperior Meſenteric Artery.

The Superficial Lymphatics of the *Spleen* are remarkably ſmall. They paſs from its convex to its concave Surface, where they join the deep-ſeated Lymphatics, which are very conſiderable in ſize and number.

The *Splenic Plexus* of Lymphatics accompany the Splenic Artery, and go though ſeveral Glands of a dark colour ſcattered along the Surface of that Veſſel.

The Lymphatics of the Spleen receive thoſe of the Pancreas, which run into them in a tranſverſe direction.

In their courſe, they unite with the Lymphatics of the Stomach and thoſe deſcending from the under part of the Liver; and the whole of them, near the head of the Pancreas, form a conſiderable Plexus. From this Plexus, Branches are ſent off, ſome paſſing over the Duodenum, and others under it, and all of them going into the Thoracic Duct near the termination of the Lacteals.

The *Lymphatics of the Kidney* are ſeldom ſeen, excepting when it is enlarged or ulcerated, in which caſe they may ſometimes be diſtinctly obſerved.

The Superficial Abſorbents run from its outer towards its inner edge, where, meeting with thoſe deep ſeated, they commonly unite with them, and form a Plexus which accompanies the Renal Blood-veſſels, after which they paſs through ſome of the Lumbar Glands, and terminate in large Lymphatics near the Aorta.

The *Lymphatics of the Capſula Renalis*, which are numerous in proportion to its ſize, terminate in the Renal Plexus.

All the Abſorbents already deſcribed, excepting thoſe from the convex Surface of the Liver, terminate in the Thoracic Duct near its beginning.

The *Thoracic Duct*, at its under extremity, is formed by the union of three, or ſometimes of more principal Trunks, the firſt of which is compoſed of the Lymphatics of the right, and the ſecond of thoſe of the left Inferior Extremity:—the third Trunk, or ſet of Trunks, belongs chiefly to the Lacteals.

Theſe large Abſorbents unite ſo as to form the Duct over the third Vertebra of the Loins.

Sometimes they unite upon the ſecond Vertebra of the Loins, where the Duct formed by them is twice or thrice as large in diameter as it is higher up.

Commonly it enlarges again upon the firſt Vertebra of the Loins, where it has generally been called the Receptacle of the Chyle, and conſidered as the beginning of the Duct, being often found forming an oval, or Pyriform bag, about the third of an inch in diameter.

Theſe large Trunks which form the Thoracic Duct lie cloſe upon the Spine, thoſe of the right ſide being placed below the Right Crus of the Diaphragm, and thoſe of the left between the Aorta and Spine, while the Thoracic Duct itſelf lies at firſt behind the Aorta, but afterwards paſſes from it upwards, and a little to the right ſide, till it gets before the firſt Vertebra of the Loins.

Here it is ſituated behind the Right Crus of the Diaphragm, a little higher than the right Renal Artery, from whence it paſſes upwards, and afterwards appears in the Thorax, upon the fore and right ſide of the Spine, between the Aorta and Vena Azygos, where it is ſuppoſed to be conſiderably aſſiſted by the ſtrokes of the Aorta in impelling its Fluids.

In the middle of the Thorax, it is ſmaller than elſewhere, being only about a line in diameter. After this it gradually enlarges, and, near its termination, is about an eighth or tenth of an inch over.

In the Thorax, it receives the Lymphatics of the Spatia Intercoſtalia, one or two of which accompanies each of the Intercoſtal Arteries, and the whole go through ſmall Glands placed

near theſe Arteries, but moſt numerous about the ſides of the Dorſal Vertebræ, where they form a ſort of chain.

Here, likewiſe, it receives Branches from the Eſophagus and Lungs, the former of which is ſurrounded with a number of Glands, and with a remarkable and intricate Plexus of Lymphatic Veſſels.

The Superficial *Lymphatics of the Lungs* form large Areolæ, which have ſmaller Areolæ within them, the larger running chiefly between the Lobules, and the ſmaller paſſing over them in ſuch a manner as to cover almoſt the whole Surface of the Lungs.

From the ſurface they go to the root of the Lungs, where they paſs through the Bronchial Glands, which have already been taken notice of in the deſcription of the Lungs.

At this place they are joined by the deep-ſeated Lymphatics which creep along the Branches of the Trachea and of the Pulmonary Blood-veſſels.

Through the medium of the Bronchial Glands, the Lymphatics of the two ſides of the Lungs communicate freely with each other.

Having left the Glands, the principal part of thoſe from the Left Lung form a Trunk of conſiderable ſize, which terminates in the Thoracic Duct, behind the bifurcation of the Trachea.

The reſt of the Abſorbents of the left Lung paſs through Glands behind the Arch of the Aorta, which are likewiſe common to thoſe of the Heart. They run at laſt by a principal Trunk into the Thoracic Duct near its termination.

After leaving the Bronchial Glands, the Abſorbents of the right Lung form a few principal Trunks, one of which commonly aſcends on the fore-part of the Vena Cava Superior, and, running in a convoluted manner, opens into the Trunk which terminates in the Veins in the right ſide of the neck.

The reſt of theſe Trunks go into the Thoracic Duct, near the bifurcation of the Trachea.

The *Abſorbents of the Heart* are ſmall, but numerous, and form principal Trunks which accompany the Coronary Arteries, and, like them, the largeſt belong to the left Ventricle.

From the ſide of the right Coronary Artery, an Abſorbent Trunk which correſponds with it, paſſes over the Arch of the Aorta to a Gland commonly found behind the origin of the Carotid Arteries.

From this Gland it goes afterwards to the general termination in the ride ſide of the Neck.

The Lymphatic Trunk accompanying the left Coronary Artery is formed of two principal Branches, one of which runs in the Groove between the Ventricles on the ſuperior Surface of the Heart: The other runs in a ſimilar Groove on the under ſide of the Heart, and having reached the ſpace between the Auricles

and Ventricles, turns round to join the former Branch near its correſponding Artery.

The Trunk runs next to a Gland placed behind the Pulmonary Artery, between the Arch of the Aorta and Root of the Trachea, which, with the others here ſituated, is common to the Abſorbents of the Heart and Lungs.

This Trunk terminates at length in the upper end of the Thoracic Duct.

The Thoracic Duct, after receiving numerous Lymphatics within the Thorax, and having reached as high as the third or fourth Dorſal Vertebra, paſſes obliquely over to the left ſide of the Spine, behind the Eſophagus and end of the Arch of the Aorta, or beginning of the Aorta Deſcendens, till it reaches the left Carotid Artery.

After this, it emerges from the Thorax, and runs between the Longus Colli Muſcle and Internal Jugular Vein, to about the ſixth Vertebra of the Neck.

It now makes a turn downwards, and, after deſcending near an inch, terminates in the upper and back part of the angle formed by the left Interna Jugular and Subclavian Vein.

Throughout its whole courſe, it has a waving appearance, and this becomes more conſpicuous in proportion as it is diſtended by injection. Near the middle of the Thorax, it not unfrequently ſplits into two or more branches, and ſometimes forms a Plexus, the Branches of which again unite into a common Trunk a little higher up.

After emerging from the Thorax, it commonly divides into two parts, which unite again previous to the termination of the Duct in the red Veins; and where there is no diviſion, there is generally a Dilatation or Sac at the termination.

Sometimes there is one termination in the angle formed by the red Veins, and one or two in the Subclavian Vein, and now and then, though more ſeldom, in the Internal Jugular, near the angle.

In a few inſtances, it has been found double through its whole length, one Duct going to the common place of termination in the left ſide of the Neck, and the other in the correſponding part in the right.

It has alſo, in a few rare inſtances, been found terminating in the Veins in the right ſide of the Neck, while a ſhort Trunk, ſimilar to that commonly found there, has terminated in the left ſide.

The *Superior*, in a ſimilar manner with the Inferior Extremities, have two ſets of Lymphatics, one lying immediately under the Integuments, and belonging to the Skin and Cellular Subſtance under it, the other accompanying the principal Blood-veſſels, and belonging to the parts deep-ſeated.

The Superficial Lymphatics are numerous, and are readily ſeen in emaciated Subjects.

They arise from the fore and back-parts of the Fingers and hand, by a considerable number of Branches, and form an extensive Plexus upon the corresponding sides of the Fore Arm.

Those upon the anterior part of the Fore-arm run directly upwards to the Arm, while the Lymphatics on its back-part, separate into two sets, one of which passes obliquely over the Muscles on the Radius, and the other over those on the Ulna, to join the Lymphatics on the anterior part of the Fore-Arm.

The Lymphatics of the Fore-Arm run over the bending of the Elbow, and afterwards ascend upon the fore and inner part of the Arm, the greater number of them running near the Basilic Vein.

Some of them frequently pass through small Glands placed along the Humeral Artery, one of which is commonly found a little above the inner Condyle of the Os Humeri, others do not appear to enter any Glands till they reach those of the Axilla.

A few Lymphatics accompany the Cephalic Vein, and receive Branches from the outer part of the Arm, and, after passing between the Pectoral and Deltoid Muscles, penetrate Glands at the under side of the Clavicle.

Of the deep-seated Lymphatics, two commonly accompany each principal Artery in the Fore-Arm, and these uniting at the Elbow, form two principal Lymphatics, which accompany the Trunk of the Humeral Artery.

Having reached the upper part of the Arm, they enter the Axillary Glands, where they are joined by Lymphatics which come from the Mamma and lateral parts of the Thorax, after passing through small Glands placed upon the under edge of the former and of the large Pectoral Muscle.

The *Axillary Glands* vary in number and size in different persons. They are somewhat smaller, and fewer in number than those of the Groin. They are generally surrounded by a considerable quantity of Fat, and are situated in the hollow between the large Pectoral and Latissimus Dorsi Muscles, adhering closely to the Trunks of the Axillary Blood-vessels and Nerves.

From the Axillary Glands large Branches go under the Clavicle, and form a Trunk, which, in the left side, commonly joins the Thoracic Duct near its termination. In the right side, they join the short Trunk which forms the second general termination of the Absorbent System. Sometimes this Trunk, proceeding from the Superior Extremity, terminates in the Subclavian Vein, at a little distance from the general termination.

The Axillary Glands receive also the Subcutaneous Lymphatics from the back-part of the Thorax, and likewise the Lymphatics from the Integuments and Muscles of the Scapula.

The Lymphatics on the *outside of the Head* accompany the Blood-vessels, and pass through Glands in their way to the Neck.

Thoſe paſſing down with the Temporal Artery go through ſmall Glands connected with the Parotid Gland, and alſo through others ſituated immediately under the root of the Zygoma.

The Lymphatics which accompany the Occipital Blood-veſſels penetrate one or two minute Glands placed a little behind the root of the Ear, over the Maſtoid Proceſs of the Temporal Bone.

The Lymphatics proceeding from the different parts of the *Face* accompany the Branches and Trunk of the Facial Artery.

Some of them paſs through Glands ſituated upon the outſide of the Buccinator Muſcle, while the principal Trunks go through a number of large Glands placed upon the outer, and alſo at the under part of the Lower Jaw, at the anterior edge of the Maſſeter Muſcle, and about the Inferior Maxillary Gland.

The Lymphatics from the *inner part of the Noſe* run principally with the internal Maxillary Artery, and paſs through Glands ſituated behind the Angle of the Lower Jaw, where they are joined by thoſe which belong to the inner parts of the Mouth.

The Lymphatics of the *Tongue*, and likewiſe of the *Muſcles* and other parts about the Os Hyoides, enter the Glands placed behind the angle of the Lower Jaw.

Lymphatics have been frequently ſearched for in the *Brain*, but their exiſtence in that Organ is not yet fully aſcertained, though rendered highly probable,—from an appearance of Lymphatics having been now and then obſerved upon the Surface of the Dura Mater, and between the Tunica Arachnoides and Pia Mater,—from Lymphatics and Glands being occaſionally found in, or immediately on the outſide of the Paſſages of the Blood-veſſels of the Brain,—from ſwellings in the Lymphatic Glands of the Neck, following diſeaſes of the Brain,—from the Abſorption of Water, which has ſometimes happened in Hydrocephalous caſes, and—from their having been found on the Brain of Fiſhes.

From the Superficial and deep parts of the Head in general, the Lymphatics accompany the External and Internal Jugular Veins and the Carotid Arteries, receiving at the ſame time Branches from the Muſcles and other parts of the Neck.

The principal part of theſe Lymphatics go along with the Internal Jugular Vein and Carotid Artery, and in their paſſage form a remarkable Plexus, which goes through the numerous Glands ſeated near the Blood-veſſels, compoſing a chain, from which they are termed *Concatenatæ*.

The *Glandulæ Concatenatæ* are more numerous than any other ſet of Glands in the Body, excepting thoſe which belong to the Meſentery.

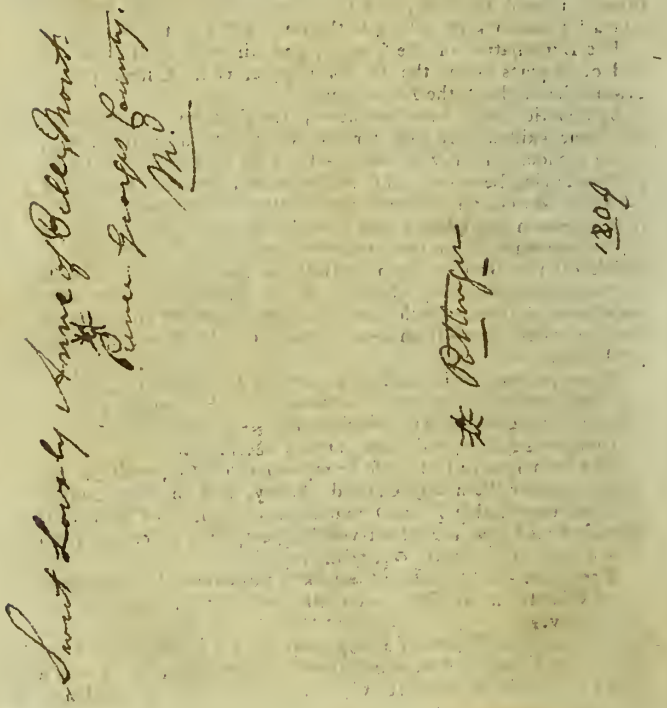
The Cervical Plexus of Lymphatics having paſſed through the Glandulæ Concatenatæ, unite at the bottom of the Neck into a Trunk, which, in the left ſide, enters the Thoracic Duct near

its termination, and in the right, goes into the Trunk, which forms the general termination of that side.

The Trunk which forms this general termination is only from a quarter to half an inch in length, but its size not much less than that of the thoracic Duct.

It is formed by Lymphatics from the right side of the Liver, Diaphragm, Heart, and the right Lobe of the Lungs, by those of the right Arm, right side of the Head, Neck, and Thyroid Gland; the Lymphatics of the left side of the Thyroid Gland forming a trunk which ends in the Thoracic Duct.

Besides this common Termination, some of these Lymphatics occasionally open into the Internal Jugular, or into the Subclavian Vein, at a little distance from the angle formed by these two Veins.



PART VI.

OF THE

BLOOD-VESSELS IN GENERAL.

THE BLOOD-VESSELS are divided into *Arteries* and *Veins*.

ARTERIES.

The *Arteries* are elaſtic Canals, which convey the Blood from the Heart to the different parts of the Body, and are diſtinguiſhed from the Veins by their *Pulſation*.

They have obtained their name from the Ancients, ſuppoſing that they carried the finer parts of the Blood mixed with *Air*,—forming what they conſidered the *Animal Spirits*.

The Original Trunks of the Arteries, or thoſe which ariſe from the Heart, are two in number, viz. the *Pulmonary Artery* and Aorta,—all the others being derived from theſe.

They are diſperſed over the whole Body, and are every where ſurrounded with Cellular Subſtance.

The principal Trunks run in the *Centre* of the Body, or of the Extremities, where they are leaſt expoſed to danger,—deriving ſupport or defence from the Bones along which they paſs.

The largeſt Arteries go to the *Viſcera*, within the great Cavities, the ſmaller ones to the *Skin* and *Muſcles*, and thoſe ſtill ſmaller to the *Bones*,—and, in a few places, they become ſo extremely minute as altogether to exclude the red Blood, carrying a colourleſs Fluid only.

The Arteries are diſtinguiſhed, in the Subject, from the Veins, by the *whiteneſs* of their Colour and *thickneſs* of their Coats.

They are compoſed of different *Layers* or *Coats*, which are readily ſeparated by Diſſection.

In several parts of the Body, as in the *Posterior Mediastinum*, they are surrounded by a *Membrane*, common to them and to the neighbouring Viscera.

In other parts of the Body, especially in young Subjects, they are surrounded with so much Cellular Substance, as to give them the appearance of being inclosed in *Sheaths*.

The first of the proper Coats is the *External Membranous*, or *Cellular*, called also by some Authors the *Nervous Coat*.

In the large Arteries, this Coat is frequently furnished with *Fat*, and is of a very *elastic* nature. Owing to this elasticity, the Arteries, in receiving the Blood from the Heart, become dilated and elongated, and start from their place, in consequence of which they form the *Pulse*, called also the *Diastole* of the Arteries.

The *Second*, or *Middle Coat*, is composed of Fibres running in a transverse direction,—of a pale red colour,—each Fibre appearing to form only the Segment of a Circle, although the whole constitute a Cylinder round the Artery.

By the Contractility of this, and the elastic nature of the former Coat, the Arteries are enabled to drive the Blood to the Veins, in proportion as they receive it from the Heart;—and this Contraction is called the *Systole* of the Arteries.

The *Third*, or *Inner Coat*, is formed of a transparent Membrane, remarkably thin, smooth, and dense, by which the Blood is prevented from transuding.

The different Coats of the Arteries are connected to each other by fine Cellular Substances, which some Authors have considered as so many Lamellæ.

The Arteries are supplied with their own Blood-vessels, termed *Vasa Vasorum*, which come from the nearest small Branches, and are every where dispersed upon their external Surface.

They have also their *Lymphatics*, which, on the large Arteries, as the Aorta, are so numerous as sometimes to cover them.

They are likewise furnished with *small Nerves*, forming, in some parts of the Body, a Plexus, which vanishes in their external Coat.

There are no *Valves* belonging to the Arteries, excepting those which are placed at the mouths of the Pulmonary Artery and Aorta.

Where the Arteries run a certain way without sending off Branches, they are observed to be of a *Cylindrical* form; but where Branches come off, their Capacity is diminished, and this in proportion to the number of their Ramifications.

Whenever an Artery divides into two Branches, the Areæ of these two Branches, taken conjunctly, are found to be nearly one half larger than that of the Trunk from which they issue.

When the Trunk and Branches of an Artery are regarded collectively, they appear evidently of a *Conical* figure, the point of

the Cone being formed by the Trunk, and the Baſis by the Branches of the Artery.

The Section of the Arteries is circular;—when empty, they become flat, but recover their round form upon being diſtended by injection.

The angles at which the Branches go off from their Trunks are in general in proportion to their vicinity to the Heart, and are ſuch as are moſt favourable to the parts they have to ſupply.

In the Trunk of the Body, or where they belong to tender and delicate Viſcera, the angels are more obtuſe;—in the Extremities, they are more acute, the former circumſtance tending to diminiſh, and the latter to increaſe the force of the Blood.

The Arteries form many Diviſions and Subdiviſions before they reach their Terminations, and at laſt become inviſible to the naked eye.

The Diviſions formed by any particular Artery have been variouſly enumerated by different Authors,—one reckoning them at forty, and another, of equal reſpectability, at twenty only;—the number of them, however, is ſuch as to allow them to ſupply the moſt minute parts of the Body.

The ſtrength of the Arteries depends upon the thickneſs of their Coats, which is found to vary in different Arteries.—In the Aorta, the Coats are thick and ſtrong;—In the Arteries of the Brain and Spleen, they are thin and tender;—but the thickneſs and conſequent ſtrength are proportionably greater in the ſmall Branches than in the large Trunks.

The Arteries run more or leſs in a waving direction, which breaks the force of the Blood in them, and prevents them from being ſtrained by the motions of the parts to which they belong.

The Flexions are moſt frequent in Arteries belonging to parts the ſize and ſituation of which are changeable.

The windings of many of the Arteries are in proportion to the degree in which they are diſtended, thoſe which are nearly ſtraight in their natural ſtate, frequently becoming ſerpentine when their diſtenſion increaſes.

Several of the large Arteries form communications with each other, termed by Anatomiſts *Anaſtomoſes*; but the Anaſtomoſes are more frequent among the ſmall Branches, where they form a Plexus which leſſens the danger of obſtruction.

The Anaſtomoſes are moſt frequent in the Skin and Membranous Parts. In the ſolid Viſcera, the Arteries run in a different manner, being in ſome crowded together in the form of Trees or Buſhes, in others having a ſerpentine appearance, and in ſeveral forming Penicilli, or little Bruſhes, according to the diſpoſition of the part.

The Arteries obtain their particular names from their ſituations, place of deſtination, &c. and the term *Capillary*, as expreſſive of their ſmallneſs, is applied to their minuteſt Branches.

The Diameters of the different Trunks and Branches of the Arteries, vary much in different parts of the Body; but those of the Capillaries are more nearly equal to each other.

The Arteries terminate in the following manner, viz.

In red Veins, as is observed by the assistance of the Microscope and by Injections:

In Glands or Follicles by Secretory Ducts, which separate a Fluid from the general Mass of Blood.

In Exhalent Vessels, which discharge their contents into the internal Cavities, or upon the external Surface of the Body.

In colourless or Lymphatic Branches, which are afterwards continued to the circulating Veins, as in the Cartilages and Cornea.

The *Use* of the Arteries is:

To convey Blood from the Heart to the different parts of the Body:

To assist in converting the Chyle into Blood:

To nourish the Body, and promote its growth:

To assist in preserving the fluidity of the Blood, and the heat and life of the Body:

To form the different Secretions: and

To renew the growth of parts destroyed by accident or disease.

Veins.

The *Veins* are elastic flexible Tubes, returning the Blood from the different parts of the Body to the Heart,—and have no Pulsation.

The *Coats* of the Veins are the same in number with those of the Arteries, but are thinner, denser, and less elastic.

In the large Veins, as the Vena Cava, the Coats can be separated from each other;—but in the small Branches their separation is difficult.

The *Muscular Coat* of the Veins being much thinner, loose like Cellular Substance, and more indistinct than that of the Arteries, has occasioned its existence to be denied by many Authors.

The Veins are also furnished with their *Vasa Vasorum*, similar to and from the same source with those of the Arteries.

The *Colour* of the Veins is somewhat blue, and when full of Blood they appear of a purple tinge, in consequence of their thinness.

Their *Size* is more than double that of the Arteries to which they belong, excepting the Pulmonary Veins, the size of which scarcely surpasses that of their corresponding Arteries.

In the fleshy parts of the Body, particularly in the Extremities, they consist of *Two Sets*, one deep-seated accompanying the Arteries, the other running immediately under the Skin, and termed Subcutaneous.

The Veins of the Thoracic and Abdominal Viſcera in general, accompany their Arteries; and the ſame is obſervable in the ſmall Branches belonging to Membranous parts.

The *Figure* of the Veins is ſimilar to that of the Arteries; and, upon comparing the Area of their Trunks with the collective Areæ of their Branches, like them too, they are perceived to be Conical, the Baſe of the Cone being formed by the Branches, and the Apex by the Trunks.

The ſize and number of the Veins is ſo much greater than that of their correſponding Arteries, that when the Veſſels of a Membranous part are diſtended by an Injection of different colours, the Veins are obſerved in a great meaſure to conceal the Arteries: —In the Inteſtines however, the number of the Arteries and Veins is nearly equal.

There is much greater variety among the Trunks of Veins, with reſpect to ſituation and diviſion into Branches, than is obſervable among the Arteries.

The variety in Nature is ſuch, that the Veins of every Subject differ a little from thoſe of another.

The Veins are capable of ſuffering greater diſtenſion than the Arteries, yet are more frequently ruptured.

The Anaſtomoſes are greater and more frequent in Veins than in Arteries, thoſe of the former being frequently by large Trunks, whereas thoſe of the latter, excepting in a few places, are by ſmall Branches only.

Where the Veins are expoſed to Muſcular action, they are furniſhed with *Valves*, which are ſemilunar Folds continued from the inner ſide of the Veſſels, and placed in pairs at irregular diſtances, their nature being ſimilar to thoſe of the Abſorbents.

The Valves are concave towards the Heart, and when cloſed or applied to each other, repreſent a figure ſomewhat like that of the ſhut end of a thimble.

Between the Valves and Sides of the Veins next the Heart, the Blood inſinuates, and Cavities are formed, termed *Sinuſes* of the Valves, which appear externally in the form of Varices.

The Valves are found in the fleſhy parts of the Body in general, but are chiefly ſituated in the Veins of the Extremities.

They are awanting in the Veins of the deep-ſeated Viſcera, viz. in thoſe of the Cranium, Thorax, and Abdomen, excepting the Spermatic Veins, and ſometimes the Internal Mammary Veins, and the Branches of the Vena Azygos.

The Valves direct the Blood towards the Heart, and prevent Regurgitation.

The *Uſe* of the Veins is:—

To convey the Blood from the extremities of the Arteries, with the Chyle and Lymph, from the Abſorbents to the Heart.

DISTRIBUTION OF THE BLOOD-VESSELS.

Of the PULMONARY ARTERY *and* VEINS.

THE *Pulmonary Artery* ariſes from the right Ventricle of the Heart, and aſcends behind the Sternum, and within the Pericardium, inclining a little to the left.

Having run as high as the concave ſide of the Arch of the Aorta, it divides into right and left lateral Branches, which terminate in the correſponding ſides of the Lungs.

The right Branch paſſes behind the curvature of the Aorta and the ſuperior Vena Cava, and is of courſe the longer of the two.

The two Branches are diſperſed throughout the ſubſtance of the Lungs, by ramifications which accompany thoſe of the Bronchi.

From the extreme Branches of the Pulmonary Artery, the Blood is returned by correſponding Veins.

The *Pulmonary Veins* run contiguous to the Arteries, and unlike the other Veins in general, are nearly of the ſame ſize with their Arteries.

In their courſe, they unite into larger Branches, which at length form four principal Trunks,—two from the right, and two from the left Lung,—which after perforating the Pericardium, terminate in the left Auricle of the Heart.

General Courſe of the AORTA *and* VENA CAVA.

THE *Aorta* ariſes from the left Ventricle of the Heart, and ſends off, at its Origin, the Coronary Arteries formerly deſcribed.

Where it takes its origin, it turns a little to the right, and is afterwards directed upwards, backwards, and towards the left ſide.

It aſcends as far as the top of the Thorax, under the name of *Aorta Aſcendens*, and is afterwards reflected obliquely backwards over the root of the left Branches of the Trachea, forming what is termed *Curvature*, or *Arch* of the Aorta.

It then commences *Aorta Deſcendens*, which runs down cloſe upon the Spine, till it reaches the fourth Vertebra of the Loins, where it divides into the two Iliac Arteries.

The Thoracic portion of the Aorta Deſcendens is ſituated on the fore and left part of the Spine, between the Layers of the Poſterior Mediaſtinum.

Where it paſſes from the Thorax to the Abdomen, it goes between the long Crura of the Diaphragm, after which it deſcends more immediatly upon the fore-part of the Vertebræ.

The Aorta ſends off Arteries which carry Blood to the different parts of the Body, from whence it is returned by Veins to the Inferior and Superior Vena Cava,—excepting what paſſes to the Coronary Veſſels.

The *Inferior Cava* is formed by the union of the two Venæ Iliacæ, upon the laſt Vertebra of the Loins, a little below the Termination of the deſcending Aorta.

It is ſituated upon the fore-part of the Spine, and at the right ſide of the Aorta, which it accompanies for a conſiderable way through the Abdomen.

Near the upper end of the Abdomen, it recedes from the Aorta, and paſſes behind the large Lobe of the Liver.

It perforates the Diaphragm in its Tendinous part, and having entered the Pericardium, it goes immediately into the right Auricle of the Heart.

The Inferior Cava receives the Blood from the Inferior Extremities, from the Pelvis and Abdomen, and carries it to the Heart.

The *Superior Cava*,—formed by the union of the two great Venæ Subclaviæ, with the addition of the Vena Azygos,—is ſituated in the upper part of the Thorax, upon the right ſide of, and a little more anteriorly than the aſcending Aorta.

It begins behind the Cartilage of the firſt Rib, ſomewhat higher than the Arch of the Aorta, and has at firſt a ſmall inclination towards the right ſide.

After deſcending about an inch, it perforates the Pericardium, and having run down nearly twice this ſpace, it enters the Right Auricle, oppoſite to the termination of the Inferior Cava.

The Superior Cava receives the Blood from the Head, Neck, Arms, and containing parts of the Thorax, and alſo carries it to the Heart.

BLOOD-VESSELS OF THE HEAD, AND PART OF THOSE OF THE NECK.

ARTERIES.

From the upper ſide of the Arch of the Aorta, *three large Arteries* ariſe, which ſupply the Head, Neck, and Superior Extremities.

Of theſe three Arteries, one on the right ſide, termed *Innominata*, ſoon divides into the *Right Carotid*, and *Right Subclavian Artery*.

The other two are the *Left Carotid*, and *Left Subclavian*, which come off in ſeparate Trunks.

Carotid Arteries: The Carotid Arteries, after emerging from the Thorax, run up on each ſide of the Neck, between the Trachea and Internal Jugular Veins, and behind the Sterno-maſtoid Muſcles, gradually receding from each other.

In the Neck, they do not ſend off any Branches till they reach the top of the Larynx, where each, oppoſite to the Os Hyoides, divides into *External* and *Internal Carotid Arteries*; the former ſupplying the outer parts of the Head, the other the Brain.

The External Carotid is placed more anteriorly, and nearer the Larynx, than the *Internal*, which lies deeper, and is, at its Root, the larger of the two.

The External, though ſmaller than the other, appears as a continuation of the common Trunk.

It runs up behind the angle of the Lower Jaw, and in its paſſage before the Ear towards the Temple, is ſunk deep in the ſubſtance of the Parotid Gland, which it ſupplies with Blood, and is divided into the following principal Branches, viz.

The Arteria Laryngea Superior, Gutturalis Superior, or Thyroidea Superior, which comes off from the Root of the External Carotid, and ſometimes from the top of the common Carotid.

It paſſes downwards and forwards in a winding direction, and ſends

Branches to the Muſcles about the Os Hyoides;—

To the Muſcles, Jugular Glands, and Skin near the Larynx;—and

To the different parts of the Larynx itſelf, the continuation and principal part of the Artery terminating in the Thyroid Gland.

The Arteria Lingualis, which is ſent off immediately above the former.—It goes forwards and upwards over the correſponding Cornu of the Os Hyoides, and under the Hyo-gloſſus Muſcle, in a direction towards the under and fore-part of the Tongue.—It gives

A ſmall Branch to the Pharynx;—

A Branch, termed *Ramus Hyoideus*, to the Muſcles placed between the Tongue and Larynx;—

The *Dorſalis Linguæ* to the Fauces, Amygdala, Epiglottis, &c.—

The *Ramus Sublingualis*, which comes off under the middle of the Tongue, and is diſperſed upon the Sublingual Gland and adjacent Muſcles;—and

The *Ramus Raninus*, which is the principal Branch of the Lingual Artery, running at the under and lateral part of the Tongue, and terminating near its point.

The ARTERIA FACIALIS, MAXILLARIS EXTERNA, LABIALIS, or ANGULARIS, which alſo runs forwards, and goes under the Stylo-hyoid, and Tendon of the Digaſtric Muſcles. It perforates the Submaxillary Gland, mounts ſuddenly over the angle of the Lower Jaw, at the under and fore-part of the Maſſeter Muſcle, from whence it proceeds in a tortuous manner towards the inner corner of the Eye.

In this courſe, it ſends the following Branches to the adjacent parts.

The *Palatina Inferior*, which runs upwards upon the ſide of the Pharynx.—

A Branch to the Tonſil, &c.—

Branches to the Inferior Maxillary Gland;—

Small Branches to the root of the Tongue, to the Skin, Muſcles, &c. near the angle of the Jaw;—

The *A. Submentalis*, which runs forwards under the Baſe of the Lower Jaw, furniſhing Branches to the parts near it, and terminating on the middle of the Chin;—

Upon the outſide of the Jaw,—a Branch to the Maſſeter Muſcle;—

While upon the Buccinator Muſcle,—Branches to the Cheek and to the lower part of the Under Lip;—

Near the corner of the Mouth,—the *A. Coronaria Inferior* to the Under Lip; and a little higher,—

The *Coronaria Superior* to the Upper Lip, from whence Branches run to the under part of the Partition and Point of the Noſe.

The Coronary Arteries run near the edge of the Lips, where meeting with their fellows of the oppoſite ſide, they form an *A. Coronaria Labiorum*.

Frequently one or both Coronary Arteries are larger than ordinary, in which caſe thoſe on the oppoſite ſide are proportionally ſmaller.

After ſending off the Coronary Branches, the Facial Artery runs near the wing and ſide of the Noſe.

From this part of the Artery Branches are ſent inwards to the Noſe, and outwards to the Cheek.

The Facial Artery is at laſt loſt upon the parts about the inner corner of the Eye, and middle of the Fore-head.

The PHARYNGEA INFERIOR, which is a ſmall Artery ariſing near the Lingual Artery, and frequently from the root of the Occipitalis.

After aſcending ſome way, it divides into Branches, which are diſperſed upon the Pharynx, Fauces, and Baſe of the Skull, where ſome of them enter the large Foramina, and ſupply part of the Dura Mater.

The A. OCCIPITALIS, which ariſes from the back-part of the External Carotid, and at its origin is concealed by the other original Branches ſent off from that Artery.

It runs over the beginning of the Internal Jugular Vein, and afterwards paſſes under the Maſtoid Proceſs, and poſterior Belly of the Digaſtric Muſcle.

It goes likewiſe under the upper ends of the Trachelo-maſtoideus, Splenius, and Complexus Muſcles; after which, it becomes more ſuperficial, where it runs near the middle of the Occiput.

In its courſe, it is very tortuous, and gives off different Branches to the ſurrounding Muſcles: viz.

One which deſcends along the Sterno-maſtoid Muſcle, and communicates with the Thyroid, Cervical, and Vertebral Arteries:

Another which paſſes, with the Jugular Vein, to the under and back-part of the Dura Mater;

A Twig, through the Foramen Stylo-maſtoideum, to different parts of the Internal Ear:

A Branch which proceeds to the back-part of the Ear, under the name of *Auricularis Poſterior*;—and

Another, of conſiderable ſize, which deſcends between the Trachelo-maſtoideus and Complexus Muſcles, and, after beſtowing Twigs upon ſeveral Muſcles of the Neck, communicates with the Cervical and Vertebral Arteries.

The Artery is at laſt diſperſed upon the beginning of the Occipito-frontalis Muſcle, and Skin of the Occiput, where it communicates with its fellow, and with the Temporal Artery.

Sometimes, a Twig of this Artery paſſes to the Dura Mater, through that ſmall Hole occaſionally found near the Maſtoid Proceſs of the Temporal Bone.

The A. Maxillaris Interna, which goes off from that part of the Trunk which is covered by the Parotid Gland, and at its origin lies behind the middle of the upright Plate which divides into the Condyloid and Coronoid Proceſſes of the Lower Jaw.

It paſſes firſt between the Jaw and External Pterygoid Muſcle, and afterwards runs, in a very winding manner, towards the back-part of the Antrum Maxillare, ſending numerous Branches to the Parts belonging to both Jaws.

At its origin, it furniſhes Twigs to the fore-ſide and adjacent parts of the outer Ear.

It then ſends off the *A. Duræ Matris Media Maxima, Meningea*, or *Spheno-ſpinalis*, which runs between the External and Internal Carotids, paſſes through the Foramen Spinale of the Sphenoid Bone, and ſpreads over the ſurface of the Dura Mater and inſide of the Parietal Bone, like the Branching of a Tree.

The *Inferior Maxillary* Branch, which runs in the Inferior Maxillary Canal, ſending Branches to the ſubſtance of the Bone, and to the Teeth;—the remainder of it paſſing out at the Ante-

rior Maxillary Foramen, and communicating upon the Chin with Branches of the Facial Artery.

Branches to the Pterygoid, Maſſeter, and inner part of the Temporal Muſcle, under the names of *A. Pterygoideæ*, *Maſſetericæ*, and *Temporales Profundæ*:

The *A. Buccales* to the Buccinator Muſcle and other ſoft parts of the Cheek.

The *A. Alveolares*, which run behind the Antrum, and ſend Branches to the ſoft parts ſurrounding the Upper Jaw.—The Maxillary Artery ſends other Branches which enter by ſmall Holes to the Antrum, and to the Subſtance and back-teeth of the Jaw; one of which is larger than the reſt, and is the *Proper Alveolaris*.

The *Infra-orbitar*, which paſſes in the Canal under the Orbit, giving, at its entrance, Twigs to the ſoft parts in the bottom of the Orbit, and in its progreſs, other Twigs to the Antrum, Subſtance of the Jaw, and Fore-Teeth; after which it goes out at the Foramen Infra-orbitarium, and terminates on the Cheek by ſmall Branches which communicate with thoſe of the Facial Artery.

The *Palato-maxillary* Branch, which paſſes through the Foramen Palatinum Poſterius, and runs between the Oſſeous and Fleſhy parts of the Palate, ſupplying theſe with Branches, and frequently proceeding through the Foramen Inciſivum to the inner part of the Noſe.

The *Superior Pharyngeal*, which is a ſmall Branch terminating in and about the upper part of the Pharynx.

The *Large Lateral Naſal*, which enters the Foramen Sphenopalatinum, and divides into many Branches which ſupply the greater part of the inſide of the Noſe.

A. Temporalis.—The Trunk of the External Carotid, having given off the Arteries already mentioned, paſſes up between the Meatus Auditorius and root of the Zygoma, and forms the *Temporal Artery*, named alſo *Temporalis Externa*, or *Superficialis*;—from the root of which are ſent off,

The *Tranſverſalis Faciei*, which proceeds forwards under the Zygoma, ſupplying a large portion of the Cheek, and communicating with the Facial and Infra-orbitar Arteries:

Some ſmall Branches to the Articulation of the Jaw:

Several ſmall Branches to the root of the Ear, part of which are diſperſed upon the External Meatus and Membrana Tympani,—ſome Twigs penetrating as far as the inner Ear.

A little above the root of the Zygoma, where the Pulſation of the Temporal Artery can be felt, and frequently even ſeen, it divides into two large Branches, an *Anterior*, and *Poſterior*, which are placed ſuperficially between the Integuments of the Head and Aponeuroſis of the Temporal Muſcle.

The ANTERIOR BRANCH proceeds forwards, in a ſerpentine direction, to the ſide and upper part of the Forehead, ſupplying the Skin and Muſcles near it, and communicating with Branches of the Facial and Occular Arteries, and with thoſe of its Fellow on the oppoſite ſide of the Head.

The POSTERIOR aſcends obliquely backwards, giving a few Branches to the upper part of the Ear, but is chiefly diſperſed on the Integuments and Muſcles upon the lateral part and crown of the Head, communicating with its fellow of the ſame and of the oppoſite ſide, and alſo with the Occipitalis, by numerous Ramifications.

INTERNAL CAROTID ARTERY.

THE INTERNAL CAROTID,—ſometimes termed *A. Cerebralis*,—is arched back at its origin, and then aſcends in a waving direction on the fore-part of the Rectus Capitis Anterior Major Muſcle, as far as the Foramen Caroticum, without giving off any Branches.

At the Baſe of the Cranium, it makes a ſudden turn forwards, and enters the Carotic Canal of the Temporal Bone: While in the Canal, it paſſes upwards and forwards, like the Canal itſelf, and is ſurrounded by a conſiderable quantity of Cellular Subſtance, and by the Dura Mater, which form a Cuſhion between it and the Bone.

After leaving the Canal, it again bends upwards and then forwards, by the ſide of the Sella Turcica; and perforating the Dura Mater, at the root of the Anterior Clinoid Proceſs, it is ſuddenly reflected obliquely backwards and upwards, after which it divides into Branches.

Through the whole of its courſe, it runs in a ſerpentine manner, which prevents the Blood in it from ruſhing too quickly and forcibly upon the tender Subſtance of the Brain, and,—contrary to the nature of other Arteries,—it is of a Conical form, though it does not ſend off any Branches, till it enters the Cranium.

While at the Side of the Sella Turcica, it furniſhes ſmall Twigs to the Dura Mater and parts adjacent, one of which paſſes through the Foramen Lacerum to the Orbit, and another, accompanied by a ſimilar Twig from the Meningeal Artery, through the Pars Petroſa, to the Tympanum,

As ſoon as the Carotid perforates the Dura Mater, at the root of the Clinoid Proceſs, it tranſmits

The ARTERIA OPHTHALMICA, which is the principal Artery belonging to the Eye and its Appendages.

The Ophthalmic, or Ocular Artery, immediately after it comes off from the Carotid, enters the Foramen Opticum, and creeps under the Optic Nerve, included in the Dura Mater, towards the outer part of the Orbit.

After proceeding some way through the Orbit, it traverses its Cavity, taking a Spiral direction towards the Nose, between the Optic Nerve and Muscles in the upper part of the Orbit.

In this course, it first transmits Filaments to the Dura Mater and Substance of the Optic Nerve, and to the beginning of the Muscles in the bottom of the Orbit, after which it gives off the following Branches, viz.

The *Arteria Lacrymalis*, which runs at the outside of the Orbit, and is chiefly dispersed upon the Lacrymal Gland, some Threads advancing to the Eye-lids:

The *A. Centralis Retinæ*, which penetrates the Optic Nerve a little behind the Ball of the Eye,—runs in the centre of the Nerve, and spreads out into many small Branches upon the inside of the Retina.

When the Nerve is cut across, the orifice of the divided Artery is observable, which, before its nature was understood, was long known by the name of *Porus Opticus*.

In the Adult, the Central Artery appears to terminate entirely upon the Retina; but in the Fœtus, after furnishing, at the bottom of the Orbit, the Branches proper to the Retina, the Trunk is continued forwards through the axis of the Vitreous Humour, supplying its Cells and Membrane with delicate Filaments, and afterward spreading out upon the back-part of the Capsule of the Lens.

Its Branches are dispersed upon the Lens in a radiated manner, and after surrounding it, some of them are sent forwards to the Membrana Pupillaris.

The *Arteriæ Ciliares*,—two or sometimes more in number,—which divide into Branches running in a serpentine direction along the opposite sides of the Optic Nerve, and dividing into the Ciliares Breves, and Ciliares Longæ.

The *Ciliares Breves*, or *Posteriores*,—formed not only of Branches from the original Ciliary Trunk, but also of Twigs from the Muscular Branches,—are numerous. They perforate the Sclerotica, near the insertion of the Optic Nerve, give Twigs to that Coat, and dividing into still smaller Branches, creep forwards upon the Tunica Choroides,—forming many Communications with each other as they advance, and retiring gradually from the convex to the concave surface of this Coat to supply the Iris and Ciliary Processes.

The *Ciliares Longæ*,—which seldom consist of more than two Trunks,—perforate the Sclerotica a little farther forwards than the former, pass along the Choroid Coat to its anterior part, and then separate into Branches.

Besides the Ciliares Breves et Longæ, there is another Set, termed *Ciliares Anteriores*, which are a few Arterious Filaments from the Muscular Branches, entering the Eye where the Straight Muscles are inserted.

At the root of the Iris, the different ſets of Ciliary Arteries unite into Arches, which form an irregular Circle, called *Circulus Iridis*.

From this Circle, many Arteries run upon the Iris, in a radiated ſerpentine manner, towards the Pupil, near which ſeveral of them alſo unite into Arches; and from theſe, Twigs are ſent, along with the reſt of the radiated Branches, to the inner edge of the Iris.—In the Fœtus, they are continued to the Membrana Pupillaris.

The *Muſcularis Superior*, and *Inferior*, which are diſperſed upon the Muſcles and Fat of the Eye.

The *Oſthmoidalis Anterior*, and *Poſterior*, two extremely ſmall Twigs, eſpecially the latter, which paſs through the Foramina Orbitaria Interna,—Anterius, et Poſterius,—to the Bones and Membranes of the Noſe.

The *Supra-orbitalis*, or *Frontalis*, which, emerging from the Socket, paſſes through the Foramen Supra-orbitarium, and is divided into two parts;—one diſperſed upon the Periosteum of the Fore-head, the other running to the Skin and Muſcles on the Fore-head and upper Eye-lid, and communicating with the anterior Branch of the Temporal Artery.

The remains of the Occular Artery are continued to the inner angle of the Eye, and are diſperſed upon the Eye-lids, Lacrymal Sac, ſide of the Noſe, and Frontal Muſcle, communicating with the upper end of the Facial Artery.

Arteries of the Brain.

The Arteries of the Brain conſiſt of the two *Internal Carotids*, and the two *Vertebrals*.

Each Internal Carotid, after ſending forwards the Ocular Artery, gives a Branch backwards to the Vertebral, termed *A. Communicans*, and then divides into the *A. Anterior*, and *A. Media Cerebri*.

The A. Anterior Cerebri, turns towards its fellow of the oppoſite ſide, and commonly ſends Filaments to the Firſt and Second Pair of Nerves.

A little before the union of the Optic Nerves, the right and left anterior Cerebral Arteries become almoſt contiguous, and anaſtomoſe by means of a ſhort, but large tranſverſe Branch, which forms part of that Communication of Veſſels termed *Circus Arterioſus* Willisii.

From this tranſverſe Branch, but more frequently from the Anterior Cerebral Artery near it, a Branch is ſent off, which paſſes into the Third Ventricle, and furniſhes Twigs to the Septum Lucidum, and fore-part of the Fornix.

The Anterior Cerebral Artery aſcends upon the inner ſide of the anterior Lobe of the Brain, and ſends off a principal Branch,

and commonly another ſoon after, both of which arch backwards upon the inner flat ſurface of the Hemiſphere.

The continuation of the Anterior Cerebral Artery is termed *A. Corporis Calloſi*, and is reflected back upon the union of the Corpus Calloſum and Hemiſphere, as far as the poſterior Lobe of the Brain.

The Branches of the Anterior Cerebral Artery are divided into minute Ramifications, which are firſt ſpread out upon the flat ſurface of the Hemiſphere, and afterwards upon its upper part.

The Ramifications form numberleſs Anaſtomoſes with each other upon the ſurface of the Brain, and afterwards paſs, by minute Filaments, into its Cortical and Medullary Subſtance.

Beſides the Anaſtomoſes of the different Branches of this Artery on the ſurface of the Hemiſphere, ſmall Branches run acroſs the Corpus Calloſum, and inoſculate with thoſe of the oppoſite ſide.

The Arteria Media Cerebri,—which is larger than the former,—runs outwards in a lateral direction through the *Foſſa* of Sylvius, to the outer part of the Brain.

It gives firſt Filaments to the Glandula Pituitaria and parts adjacent to it, and then divides into principal Branches, of which one ſet go to the Anterior, and the other to the Lateral and part of the Poſterior Lobe of the Brain.

From this Artery, one or two Twigs run up into the anterior Cornu of the Lateral Ventricle, and aſſiſt in forming the Choroid Plexus of that Cavity.

Upon the outer ſurface of the Brain, the Branches of this Artery inoſculate with each other, and with thoſe of the Anterior Cerebral Artery, and then plunge into the ſubſtance of the Brain, where they meet with the deep Branches of that Artery.

Vertebral Arteries.

The two *Vertebral Arteries*,—which are only a little ſmaller than the Internal Carotids,—ariſe from the Subclavian Arteries at the bottom of the Neck.

Each of them, at a ſmall diſtance from its origin, enters the Canal formed for its reception by the ſix uppermoſt Cervical Vertebræ.

It aſcends through the Neck, nearly in a ſtraight direction, ſending Twigs outwards between the Vertebræ to the deep Muſcles of the Neck, and others which paſs inwards to the Spinal Marrow and its Membranes, by the Holes which tranſmit the Spinal Nerves.

Immediately below the Head, it gives out more conſiderable Branches to the deep Muſcles at the back part of the Neck, which inoſculate with the Occipital Artery.

At the upper part of the Neck, it forms Contortions ſomewhat ſimilar to, and anſwering the ſame purpoſe with thoſe of the Internal Carotid Artery.

One turn is formed upwards and outwards, in paſſing from the third to the ſecond Vertebra; and another outwards and forwards, in going between the ſecond Vertebra and Atlas.

After perforating the Atlas, it bends ſuddenly back, and runs in an horizontal direction in a Notch upon that Bone.

Having reached the Foramen Magnum Occipitis, it turns upwards, perforates the Dura Mater, and enters the Cavity of the Cranium.

After entering the Cranium, it paſſes with the Medulla Oblongata, upon the Cuneiform Proceſs of the Occipital Bone, inclining towards its fellow on the other ſide, and at the beginning of the Medulla, the two Vertebrals unite into the Trunk called *Baſilar Artery*.

Upon entering the Skull, each Vertebral Artery ſends a ſmall Branch, termed *A. Meningea Poſterior*,—to the poſterior part of the Dura Mater.

It then diſperſes Twigs to the Medulla Oblongata, and frequently gives off the ſmall Branch which forms the *Poſterior* Artery of the Spinal Marrow.

Near the part where it unites with its fellow, it ſends down the *Anterior* Artery of the Spinal Marrow.

From the Vertebral, or from the Baſilar, or ſometimes from each, a principal Branch is ſent off, named *A. Cerebelli Poſterior*, or *Inferior*, which paſſes between the Cerebellum and Medulla Oblongata, and furniſhes Branches to the under part of the Cerebellum, to the back-part of the Medulla Oblongata and Tuber Annulare, and forms the Choroid Plexus of the Fourth Ventricle.

The BASILAR ARTERY runs along the middle of the Tuber Annulare, which it ſlightly impreſſes, and lies upon the Cuneiform Proceſs of the Occipital Bone.

From the ſides of this Artery, numerous Filaments run tranſverſely, to be diſperſed upon the Tuber and adjacent parts

One Branch, larger than the reſt, called *Auditoria Interna*, paſſes between the two portions of the Seventh Pair of Nerves to the Internal Organ of Hearing.

At the extremity of the Cuneiform or Baſilar Proceſs of the Occipital Bone, and at the upper and fore-part of the Tubar Annulare, the Baſilar Artery divides into four principal Branches, two to each ſide, and theſe go off almoſt at right angles from the Trunk, viz.

The *A. Superior*, or *Superior Cerebelli*, which turns round the Crura Cerebri, expands its Branches upon the upper part of the Cerebellum, and ſinks into its ſubſtance, ſupplying alſo the Nates, Teſtes, and Parts near them.

The *Arteria Poſterior Profunda Cerebri*, which ſends Twigs to the Tuber and to the Crura Cerebri, and unites with the Internal Carotid by the Arteria Communicans.

It supplies also Parts lying near the Third Ventricle, and afterwards turning round the Crura Cerebri, passes back between the Cerebrum and Cerebellum.

It distributes its numerous Branches chiefly to the Posterior Lobe of the Brain, one Branch in particular penetrating into the posterior Cornu of the Lateral Ventricle, and with Branches of the Internal Carotid, forming the Arterious part of the Choroid Plexus.

The Branches of this Artery anastomose with those of the anterior part of the Internal Carotid, at the inside of the Hemisphere,—and with those of the lateral part of that Artery, at the outside of the Hemisphere, in the manner these do with each other in the other parts of the Brain.

The *Arteria Communicans*, which unites the posterior Cerebral Branch of the Vertebral Artery to the Trunk of the Internal Carotid, and is nearly of the same diameter, but longer than that transverse Artery which connects the anterior Branches of the Internal Carotid.

It sends minute Threads to the Crura Cerebri, &c. and contributes to the formation of the *Circle of* Willis,—or that kind of Communication by which the blood or Injected Matter can pass readily across from one Internal Carotid to the other,—or from these backwards to the Basilar Artery.

Veins of the Head and of Part of the Neck.

The Veins which return the Blood from the Arteries of the Head and Neck, unite into the following Trunks, viz.

The *Facial Vein*, which is formed by the Frontal Vein, and by an intricate Plexus of Branches upon the Face.

It winds obliquely downwards and outwards, at a distance from the Artery; but in crossing the Jaw, it goes close by the outside of it, and terminates in the External Jugular Vein.

The *Temporal Vein*, formed by superficial and deep Branches from the sides and upper part of the Head, and running down upon the Temple at some distance from the Artery.

The Branches of the Temporal Vein form large Anastomoses, before, with those of the Frontal Vein; above, with their fellows on the other side; and behind, with the Branches of the Occipital Vein.

The Trunk descends at the fore-part of the Ear, and, along with the Artery, is sunk in the substance of the Parotid Gland.

In its descent before the Meatus Auditorius Externus, it receives Branches from the Ear, Parotid Gland, and Cheek, corresponding with the Arteries sent to these Parts from the Carotid or Temporal Artery.

At the under part of the Lower Jaw, the Facial and Temporal Veins commonly unite and form the External Jugular.

The *External Jugular Vein* receives the following branches at the upper part of the Neck, viz.

Branches of the *Internal Maxillary Vein*, the principal part terminating in the Internal Jugular.

The *Lingual Vein*, one Branch of which, termed *Ranina* from its complexion, is seen under the Tongue, and is that Vein which is opened in the Venefection of this Organ.

Branches of the *Occipital Vein*, the reft paffing to the Internal Jugular, and Verte ral Veins, and fometimes alfo communicating by a Foramen Maftoideum with the Lateral Sinus.

The Trunk of the External Jugular Vein defcends in the Neck, between the Platyfma Myoides and Sterno-maftoid Mufcles, receives in its courfe Branches from the adjacent parts, and terminates in the Subclavian Vein.

In the formation and termination of this Vein, there is great variety in different Subjects.

It frequently happens that moft of the Ramifications, which commonly run from the Face and Throat into this Vein, go to the Internal Jugular.

Often the Facial Vein goes into the Internal Jugular, and the Temporal continued forms the External Jugular.

Sometimes one of the External Jugulars terminates in the ufual way, and the other in the Internal Jugular.

In fome rare cafes, the External Jugulars have both been found terminating in one fide of the Neck.

Anterior External Jugular Vein. Befides the Vein commonly called External Jugular, a fmall Subcutaneous Vein, termed *Anterior External Jugular*, defcends in the fore-part of the Neck, receiving Branches from the adjacent parts, and terminating in the Subclavian Vein.

Veins of the Eye and its Appendages.

The Blood fent to the Contents of the Orbit is returned partly to the Facial Vein at the inner corner of the Eye, but chiefly to the proper Ocular Vein, which terminates in the Cavernous Sinus by the following Veins, viz.

The *Vena Centralis Retinæ*, which is formed by many fmall Branches expanded upon the inner furface of the Retina along with thofe of the correfponding Artery.

The Vena Centralis enters the Optic Nerve, where the Artery leaves it; and a little behind the Ball of the Eye, it emerges from the Nerve, and runs between it and the Sheath which covers it, receiving many Twigs from the Nerve and its Membranes.

It paffes afterwards under the Fafciculus of Nerves which belongs to the Eye, and terminates, fometimes in the Ocular Vein, but, in general, directly in the Cavernous Sinus.

From the Iris and Choroid Coat, the Blood is returned by the *Short* or *Anterior Ciliary Veins*, and by the *Long* or *Poflerior*

Ciliary Veins, and alſo by a principal ſet of Ciliary Veins, termed *Vaſa Vorticoſa*.

Small Veins return from the Iris, which go under the Arterious Circle to the Veins of the Choroid Coat, and communicate with each other;—but without forming any Circle, ſuch as is found in the Eyes of Oxen, and which correſponds, in them, with the Arterious Circle.

The *Anterior Ciliary Veins* paſs from the Iris through the Sclerotic Coat, near the ſame part where the Anterior Ciliary Arteries enter.

The long *Ciliary Veins* are commonly two in number, like the Arteries, and of a ſmaller ſize than the Vorticoſe Veins.

They run from the Iris backwards along the Choroid Coat communicate in their paſſage by minute Branches with the Vorticoſe Veins, and afterwards perforate the Tunica Sclerotica behind.

The *Venæ Vorticoſæ*, are numerous, and obtain their name from the Whirls compoſed by their Branches, the courſe of which has been compared to a *Jet d'eau*, or to the Spiral Ridges upon the points of the Fingers, &c.

Of theſe Veins, four, or ſometimes five, are by much the moſt conſpicuous, the reſt being ſmaller, and having leſs of the Vorticoſe appearance.

The Branches of each of the four principal Venæ Vorticoſæ run in a cloſe congeries, unite at acute angles into larger Branches which have a curved direction, and theſe proceeding from all ſides, meet in a point, and form the Trunk of the Vein.

The Trunks of theſe Venæ Vorticoſæ, thus placed in the center of their reſpective Whirls are ſituated at the oppoſite ſides of the Eye, and perforate the Sclerotic Coat obliquely near its middle.

The *reſt* of the *Venæ Vorticoſæ*, or ſmaller Ciliary Veins, communicate with the adjacent larger Vorticoſe Veins upon the ſurface of the Choroid Coat, and alſo perforate the Sclerotica near its middle.

After piercing the Sclerotica, the different Vorticoſe Veins unite into four or five ſmall Ciliary Trunks, receiving a number of minute Twigs, which paint the Cellular Subſtance covering the ſurface of the Sclerotica.

The Ciliary Veins run in a ſerpentine direction at the oppoſite ſides of the Eye, and paſs either ſeparately or united with other ſmall Veins in the Orbit, into the trunk of the Ocular Vein.

The other Venous Branches within the Orbit, correſpond in a great meaſure with their reſpective Arteries; ſuch as,

Branches from the Palpebræ and inner corner of the Eye.

The *Lacrymal Branch*:

The *Oſethmoidal Branches*:

Muſcular Branches,—and *Branches* from the Fat in the Orbit, and from the Membranes lining it.

The different Branches from the Eye and its Appendages form, by their union, the *Ocular Vein*, which greatly exceeds the ſize of the correſponding Artery.

The Ocular Vein forms large Anaſtomoſes, at the inner corner of the Eye, with the Facial Vein, and afterwards paſſes back at the inner ſide of the Orbit.

From the inner, it goes acroſs to the outer ſide of the Orbit, under the Attollens Muſcle; and after running back under the Anterior Clinoid Proceſs, covered by the Third and Sixth Pair of Nerves, it terminates, under the Carotid Artery, in the Cavernous Sinus.

Veins of the Dura Mater Corresponding with its Arteries.

The *Veins of the Dura Mater* accompany their Arteries, and go partly through Perforations in the Baſe of the Cranium, to terminate in Branches of the External or Internal Jugular Veins; —the reſt go into the neareſt Sinuſes of the Brain.

Veins of the Brain.

The ſmaller Veins of the Brain accompany the Arteries. Their Trunks run chiefly between the Circumvolutions of the Brain, at a diſtance from the Trunks of the Arteries.

They terminate in the differerent *Sinuſes* of the Dura Mater, and generally in an oblique direction, which prevents the Blood from returning into them.

The Sinuſes moſt commonly found are the following.

The *Superior Longitudinal Sinus*, which begins at the under part of the Spine of the Frontal Bone, runs along the upper edge of the Falx,—and becoming gradually wider, terminates upon the middle of the Occipital Bone, in the two Lateral Sinuſes.

It receives the Blood from the upper part of the Brain, by ſeveral large Venous Trunks, which enter it obliquely forwards.

The *Torcular Herophili*, or *Fourth* Sinus of the Ancients, chiefly formed by the Vena Galeni, which returns the Blood from the Choroid Plexus, Corpora Striata, Septum Lucidum, and other Internal parts of the Brain.

The Torcular paſſes back in the joining of the Falx and Tentorium, and terminates, along with the Superior Longitudinal Sinus, in the beginning of the Lateral Sinuſes.

The *Inferior Longitudinal Sinus*, a remarkably ſmall one, ſituated in the under edge of the Falx.—It receives Branches from that Membrane, and from the Corpus Callouſum and parts of the Brain near it, and terminates in the beginning of the Torcular Herophili.

The *two Lateral Sinuſes*, or *Second* and *Third* Sinuſes of the Ancients, formed by the Longitudinal and Torcular Sinus.

They run at the posterior edge of the Tentorium, along the lateral ridges of the Os Occipitis, as far as the Base of the Petrosal Processes of the Temporal Bones, from whence they wind downwards, pass through the Foramina Lacera common to the Occipital and Temporal Bones, and terminate in the Internal Jugular Veins.

Frequently one of the Lateral Sinuses is formed by the Longitudinal, and the other by the Torcular Sinus; in which case, the one is found larger than the other.

The Lateral Sinuses receive Veins from the Cerebellum and from the under and back-part of the Cerebrum; they likewise receive the Blood from the following small Sinuses, situated under the Brain, viz.

The *Circular Sinus of* RIDLEY, which is placed about the Glandula Pituitaria, and frequently surrounds it completely, receiving the Blood from it and from the adjacent Bones and Membranes, and terminating in the Cavernous Sinuses:

The *Cavernous Sinuses*, which are situated at the sides of the Sella Turcica, and receive Blood from Veins lying near the lateral Branches of the Internal Carotid Arteries, from the Ocular Veins, and from the Circular Sinus of RIDLEY:

The Cavernous Sinuses surround the Carotid Arteries and Sixth pair of Nerves, and have a Cavernous structure within, somewhat resembling that of the Penis:

The *Superior Petrosal Sinuses*, situated upon the Ridges of the Partes Petrosæ.

They receive some small Veins from the Dura Mater and Base of the Brain, and communicate backwards with the Lateral, and forwards with the Cavernous Sinuses:

The *Inferior Petrosal Sinuses*, placed at the roots of the Partes Petrosæ.—They receive the blood from the Cavernous, and discharge it into the ends of the Lateral Sinuses.

Besides the Sinuses mentioned above, the following others are frequently met with, viz.

A *Perpendicular Occipital Sinus*, situated in the Falx Cerebelli, which is sometimes single, sometimes double, and terminates in the Lateral Sinuses.—It receives Veins from the Dura Mater, and communicates with the Vertebral Veins.

Anterior Superior, and *Anterior Inferior Occipital Sinuses*, placed over the Cuneiform Processes of the Occipital Bone, and communicating with the Inferior Petrosal and Lateral Sinuses, and with the Vertebral Veins.

INTERNAL JUGULAR VEINS.

THE Lateral Sinuses, having received the Blood sent to the Brain from the Carotid and Vertebral Arteries, pass out of the Cranium, and form the *Internal Jugular Veins*; each of which, at its origin is bulged back in form of a Varix, which is termed

Diverticulum; and this is lodged in a Foſſa at the root of the Pars Petroſa of the Temporal Bone.

The INTERNAL JUGULAR VEIN deſcends behind the Sterno-maſtoid Muſcle, upon the fore and outer part of the Common Carotid Artery, with which it is included in a Sheath of Cellular Subſtance; and is frequently a good deal dilated towards its under Extremity, eſpecially in advanced life.

In its courſe in the Neck, it receives

Branches from the Pharynx and Muſcles adjacent to it:

The *Internal Maxillary Vein*:

One or more *Branches* from the Occiput:

The Lingual Vein, which ſometimes terminates in the External Jugular:

The *Superior Laryngeal*, and now and then the *Inferior Laryngeal*, which more frequently goes into the Subclavian, or to the top of the Cava.

The Internal Jugular alſo receives *Branches* from the Muſcles of the Neck, and at length terminates in the Subclavian Vein.

The remaining BLOOD-VESSELS of the NECK, with thoſe of the SUPERIOR EXTREMITY in General.

ARTERIES.

SUBCLAVIAN ARTERY. The Subclavian Artery has been already obſerved to ariſe on the right ſide, in common with the Carotid; and on the left, to come off directly from the Aorta.

After the Artery leaves the Thorax, it paſſes tranſverſely outwards at the under part of the Neck, behind the under end of the Sterno-maſtoid Muſcle, and continues its courſe outwards between the Anterior and Middle Scaleni Muſcles, and between the Subclavian Muſcle and firſt Rib.

After croſſing the firſt Rib, it goes under the Pectoral Muſcles to the Axilla, where it obtains the name of *Axillary Artery*.—In this courſe, it ſends off the following Branches, viz.

The *Vertebral*;—The *Internal Mammary*; and—The *Superior Intercoſtal Artery*.—The firſt of theſe has been already deſcribed; the two others belong to the inner part of the Thorax.

The THYROIDEA, or GUTTURALIS INFERIOR, which ariſes at the outer ſide of the Vertebral, and, aſcending obliquely inwards behind the Carotid Artery, gives Branches to the Trachea and Eſophagus, and Muſcles near them; but is chiefly diſperſed upon the Thyroid Gland, communicating by large Anaſtomoſes with the Laryngea Superior.

The CERVICALIS ANTÆRIOR, which frequently comes off from the root of the Inferior Thyroid, and aſcends in the Neck, furniſhing ſuperficial Branches to the Muſcles which

go from the Trunk of the Body to the Neck, and deep Branches to the Glands, Nerves, &c. lying on the fore and lateral parts of the Cervical Vertebræ.

The Deep Branches anaſtomoſe with the Vertebral and Occipital Arteries; and ſome paſſing through the Intervertebral Holes where the Nerves come out, communicate with the Spinal Arteries.

The CERVICALIS POSTERIOR, which ariſes in common with the Anterior Cervical, or with the Inferior Thyroid.—This is larger than the former, lies farther out, and runs in a winding direction outwards and upwards.

It ſupplies the Skin and Muſcles at the lateral and back-part of the Neck, communicates with Branches of the Occipital and Vertebral Arteries, and ſends a principal Branch downwards to the parts about the top of the Shoulder.

The DORSALIS SUPERIOR SCAPULÆ, which comes frequently from the root of the Thyroid, and running tranſverſely behind the origin of the Sterno-maſtoid Muſcle, near the Clavicle,—perforates the Notch in the ſuperior Coſta of the Scapula, and expanding its Branches upon the Dorſum of that Bone, ſupplies the Spinati and other Muſcles ſituated there, and likewiſe furniſhes Branches to the joint of the Shoulder.

The AXILLARY ARTERY, lying in the Axilla, and ſurrounded by the Lymphatic Glands and Fat, and by the large Nerves which form the Brachial Plexus. The Axillary Artery, gives ſome ſmall Branches to the parts adjacent;—but its principal Branches are,

The THORACICÆ, or MAMMARIÆ EXTERNÆ,—three or four in number,—which, by ſome Authors, are deſcribed by particular names; as,

The *Thoracica Superior*, which gives Branches to the Pectorales and Serratus, and ſome to the Intercoſtal Muſcles:

The *Thoracica Longa*, which ſends Twigs to the Axillary Glands; but goes chiefly to the large Pectoral Muſcles, Mamma, and Integuments, and inoſculates with the Branches of the Thoracica Superior.

The *Thoracica Humeralis*, or *Thoracic Artery of the Shoulder*, which goes off oppoſite the Thoracica Superior, and divides ſuddenly into Branches which run to the upper parts of the Thorax near it, and to the Muſcles and Integuments ſurrounding the Articulation:

The *Thoracica Axillaris*, which, when preſent, goes off from or near to the Thoracica Humeralis, and is beſtowed upon the Glands, Fat, &c. frequently diſperſing Branches upon the under edge of the Subſcapularis Muſcle.

The SCAPULARIS INTERNA, which ſoon divides into the *Proper Scapularis Interna* and the *Dorſalis Scapulæ Inferior*.

The Scapularis Interna runs near the inferior edge of the Scapula, ſends off many large Branches, the principal part of which are diſperſed upon the Latiſſimus Dorſi, Teres Major, and Subſcapularis Muſcles, and have large Anaſtomoſes with each other, and with the Superior Dorſal Artery of the Scapula.

The DORSALIS SCAPULÆ INFERIOR, immediately after leaving the Internal Scapulary Artery, turns round the inner edge of the Scapula, a little below its Cervix.

Upon the Poſterior Surface of the Scapula, it ſpreads out into Branches of conſiderable ſize, which are diſperſed upon the Muſcles covering the under and back-part of the Bone; while the Trunk, aſcending, inoſculates with that of the Superior Dorſal Artery of the Scapula, whereby an Arch common to the two Arteries is formed at the root of the Acromion.

The CIRCUMFLEXA ANTERIOR, or ARTICULARIS, which paſſes in a tranſverſe direction between the Heads of the Coracobrachialis and Biceps Muſcles, and Body of the Os Humeri, immediately below the Joint of the Humerus.

The CIRCUMFLEXA, or ARTICULARIS POSTERIOR, which ariſes directly oppoſite to the former, and is by much the larger of the two.

It paſſes firſt between the Subſcapularis Muſcle and Teres Major, and then turns round between the back-part of the Os Humeri, and long Head of the Triceps, and the Deltoid Muſcle, and is diſperſed upon the Deltoides and parts about the Joint;—its extreme Branches anaſtomoſing with thoſe of the Anterior Circumflex Artery, ſo as completely to encompaſs the Body of the Bone.

After giving off theſe different Branches, the Axillary Artery emerges from behind the edge of the great Pectoral Muſcle, and runs along the Os Humeri, where it is termed *Humeral* or *Brachial Artery*.

The HUMERAL ARTERY deſcends behind the inner edge of the Biceps Muſcle, covered by the Tendinous Aponeuroſis of the Arm, and having the Triceps Extenſor Cubiti behind. In this courſe, it beſtows Branches to the Muſcles and Integuments, and to the Periоſteum and Bone, viz.

The PROFUNDA HUMERI, or SPIRALIS, which ariſes near the upper part of the Arm, at the inſertion of the Latiſſimus Dorſi and Teres Major Muſcles, taking a Spiral direction downwards and outwards, between the Triceps Muſcle and Bone, and terminating at the outer Condyle of the Os Humeri.

The Arteria Profunda ſends Branches chiefly to the Coracobrachialis and Triceps Muſcles, and to thoſe at the outer part of the Elbow;—and one of them, deſcending at the inner ſide of the Arm, is ſometimes ſo conſiderable as to form—

The PROFUNDA INFERIOR or MINOR. This Artery is frequently a Branch of the Profunda Superior, but more commonly

an original Branch ſent off from the Trunk of the Artery, near the middle of the Arm.

It gives Branches to the Muſcles and other parts at the inſide of the Arm, and terminates about the inner part of the Os Humeri.

The RAMUS ANASTOMOTICUS MAGNUS, which comes off a little above the Elbow, and beſtows Branches to the Brachialis Internus, to the under end of the Triceps, and to the Parts in general about the Elbow-Joint.

Beſides theſe, there are ſeveral other Branches ſent in ſucceſſion from the Trunk of the Humeral Artery into the Muſcles and other parts adjacent.—Theſe are ſhorter than the reſt, and run more in a tranſverſe direction, eſpecially thoſe to the Biceps Muſcle.—One ſmall Branch, termed *Nutritia*, or *Medullaris*, penetrates the ſubſtance of the Bone by the paſſage near its middle, and ſupplies the Marrow and Parts which contain it.

The Trunk of the Humeral Artery having ſent of the different Branches which belong to the Arm, paſſes to the middle of the bending of the Elbow, between the Aponeuroſis and round Tendon of the Biceps Muſcle.

About an inch below the Elbow, it commonly divides into two principal Arteries, the *Radial* and *Ulnar*. It happens, however, now and then, that this Diviſion takes place about the middle of the Arm; and in certain inſtances, as high as the Axilla.

The RADIALIS paſſes over the Pronator Teres Muſcle, and follows the courſe of the Radius through the whole length of that Bone

At the upper part of the Fore-arm, it is covered by the Supinator Longus: In its deſcent, it becomes more ſuperficial, and, at the under part of the Fore-arm, it lies cloſe upon the Radius, and immediately under the Skin, in conſequence of which, the Pulſe is commonly felt in this place.

The RECURRENS RADIALIS, which is reflected to the Muſcles and Parts of the Joint near it, and anaſtomoſes freely with the Arteria Profunda Humeri at the outer part of the Elbow.

Numerous *Lateral Branches*, in the deſcent of the Artery, to the Muſcles and Integuments, and parts in general ſituated about the Radius.

A *Branch* at the Wriſt, which goes over the root of the Thumb, and ſometimes a principal Branch along one ſide of it;—at other times, it is diſperſed upon the Palm of the Hand.

Small Branches to the Ligaments, Bones and other parts about the Wriſt.

One, or ſometimes two Branches, termed *Dorſal*, to the back-part of the Metacarpus and Fingers.

At the under end of the Fore-arm, the Radial Artery turns back under the Tendons of the Extenſors of the Thumb, and

gets between the roots of the Metacarpal Bones of the Thumb and Fore-finger, where it divides into three principal Branches, viz.

The A. MAGNA POLLICIS, which runs along the ſide of the Tumb next the Fingers, and ſometimes divides at its root, into two Branches, which ſupply both ſides of it.

The RADIALIS INDICIS, which runs along the ſide of the Fore-finger next the Thumb.

The PALMARIS PROFUNDA, which croſſes the Hand between the roots of the Metacarpal Bones and Flexures of the Fingers, and forms an *Arcus Profundus*, from which Branches go off to the Interoſſei Muſcles and other deep parts of the Palm.

The ULNARIS appears at firſt as the Continuation of the Trunk of the Humeral Artery.

At its upper part, it ſinks deep behind the Flexor Muſcles of the Hand, and paſſes afterwards for ſome way between the Flexor Sublimis and Profundus Digitorum.

Near the Wriſt, it becomes more ſuperficial, and runs between the Tendons of the Flexor Carpi Ulnaris and Flexor Digitorum Profundus, to the Hand.

In this courſe, it ſends off many Branches to the Fore-arm, among which the following are the moſt conſiderable.

The RECURRENS ULNARIS, which runs deep among the Flexor Muſcles, and ſoon divides into Branches which aſcend and ſupply the Parts about the under and inner ſide of the Elbow.—In the Groove behind the inner Condyle of the Os Humeri, it communicates by diſtinct Anaſtomoſes with the Profunda Inferior, or with the Ramus Anaſtomoticus, ſent down from the Humeral Artery.

The INTEROSSEA POSTERIOR, which comes off at the upper end of the Interoſſeous Ligament, perforating it immediately at its origin, and going to the back-part of the Fore-arm.

From this place, it ſends upwards a *Recurrent Branch*, which communicates, upon the back-part of the Elbow, with the other Recurrent Arteries, and with the Branches ſent down from the Humeral Artery, and forms along with theſe a Plexus of Veſſels upon the back-part of the Joint.

The Interoſſea is afterwards continued downwards, and is chiefly diſperſed upon the Bellies of the External Muſcles of the Hand and Fingers, being commonly exhauſted before it reach the Wriſt.

The INTEROSSEA ANTERIOR, which comes off ſometimes immediately below the former, and at other times in common with it. It is conſiderably the larger of the two; but only about half the ſize of the Ulnar Artery from which it ſprings.

It runs cloſe upon the Interoſſeous Ligament, and furniſhes Branches to the Muſcles and deep Parts upon the anterior ſide of the Fore-arm.

Near the Wriſt, it perforates the Ligament, and goes to the Poſterior ſide of the Carpus and back of the Hand, dividing into Branches which inoſculate with others of the Poſterior Interoſſeous and Radial Arteries.

The Ulnary Artery, having given off its Recurrent Branch, and the Arteriæ Interoſſeæ, with many Lateral Branches to the inner ſide of the Fore-arm, paſſes by the ſide of the Os Piſiforme, and then over the Annular Ligament into the Palm, where it forms the *Arcus Volaris Superficialis*.

At the under end of the Fore-arm, it ſends off a *Dorſal Branch*, which paſſes under the Tendon of the Flexor Carpi Ulnaris to the back of the Hand, where joining with Branches of the Anterior Interoſſeous and Ulnar Arteries, it aſſiſts in forming a Plexus which ſupplies the back-part of the Wriſt and of the Hand and Fingers with a number of Branches, which are ſmall when compared with thoſe in the Palm.

The Arcus Volaris Sublimis, or Superficialis, is placed with its convex ſide downwards, and extends obliquely from the root of the Metacarpal Bone of the Little Finger towards that of the Firſt Bone of the Thumb, being covered by the expanſion termed *Aponeuroſis Palmaris*.

From the Arcus Volaris, Branches are ſent off in the following order, viz.

Several *Small Branches* to the Integuments and other Superficial parts of the Palm:

A conſiderable *Branch* which ſinks near the root of the Metacarpal Bone of the Little Finger, and inoſculating with the Palmar Branch of the Radial Artery, aſſiſts in forming the Arcus Profundus:

A *Branch* to the inner ſide of the Little Finger:

Three large Digital Branches which run oppoſite to the Interſtices of the Metacarpal Bones, to the Roots of or Clefts between the Fingers.

At theſe Clefts, each of the Three Digital Arteries is divided into two Branches, one of which Branches of each diviſion runs along the Anterior Radial margin of one Finger, and the other along the Anterior Ulnar margin of the Finger next it;—the Three Digital Arteries thus ſupplying the margins of all the Fingers, excepting the inner margin of the Little Finger, and the outer margin of the Index.

At the Roots of the Fingers, each of the Digital Arteries receives a ſmall Branch from the Arcus Profundus.

At the Roots and Joints, but more particularly at the Points of the Fingers, the Arteries communicate by croſs Arches, and ſend Branches to the parts adjacent.

The Superficial Arch of the Palm commonly ſends off one of the Arteries of the Thumb, and ultimately communicates by a large Anaſtomoſes with the Root of the Arteria Magna Pollicis.

VEINS OF THE SUPERIOR EXTREMITY AND OF PART OF THE NECK.

THE Veins of the Superior Extremities have numerous *Valves*, and are divided into a *Superficial* and a *Deep Set*; the former lying immediately under the Integuments, the latter accompanying the Arteries, and taking their names from them.

The Subcutaneous Veins have many large Anaſtomoſes with each other, particularly on the Fore-arm, where they unite, ſeparate, and re-unite ſeveral times, thus forming a Plexus by which it is ſurrounded.

The Superficial Veins from the back of the Hand (one of which, belonging to the Little Finger, was termed *Salvatella* by the Ancients) go chiefly to the *Superficial Radial*, and partly alſo to the *Ulnar Veins*.

The Superficial Radial Veins form the *Vena Cephalica*, and the Superficial Ulnar Veins the *Vena Baſilica*, at the Joint of the Elbow.

The Superficial Veins on the Anterior part of the Fore-arm communicate laterally with the Radial and Ulnar Veins, and, in their aſcent, from a Trunk termed *Mediana Longa*.

The MEDIANA LONGA, a little below the bending of the Elbow, is divided into *Mediana Cephalica* and *Mediana Baſilica*, which running obliquely upwards, terminate a little above the Elbow, the former in the Cephalic, and the latter, croſſing over the Humeral Artery, in the Baſilic Vein.

Though this deſcription correſponds with the general diſtribution of the Veins of the Fore-arm; yet, ſo great is the variety among them, that they are ſcarcely found to agree exactly in any two Subjects.

The BASILICA, in its aſcent, forms the principal Humeral Vein, which paſſes along the ſide of the Os Humeri, a little to the inſide of the Humeral Artery, and receiving Branches from the correſponding ſide of the Arm, it runs into the Arm-pit, and forms the Vena Axillaris.

The CEPHALICA aſcends at the outſide of the Biceps Muſcle, receives Branches from the adjacent parts of the Arm, and communicates in ſeveral places with the Baſilic, and paſſing in the Groove between the Large Pectoral and the Deltoid Muſcle, terminates in the Axillary Vein.

The *Deep Veins*, termed alſo *Venæ Satellites*, or *Concomites* run cloſe by the ſide of their reſpective Arteries, one lying commonly on each ſide of the Artery, and receiving the Blood from the adjacent parts.

In various places they anaſtomoſe with each other by ſhort Branches, which croſs over the Arteries.

Near the Joint of the Elbow, the *Deep Radial, Ulnar*, and *Interoſſeous Veins*, form a Plexus over the Bifurcation of the Humeral Artery.

From this Plexus, a ſhort but large Branch paſſes outwards, and forms a Communication with one of the Subcutaneous Veins, and, in general, the Communication is with one of the Median Veins.

The Vena Axillaris, formed by the Trunks of the Superficial and Deep Humeral Veins, receives the *Veins* correſponding with the *Circumflex Arteries*, and the *Internal*, and the *Inferior Dorſal Veins* of the *Scapula*.

A little higher, it is joined by the *Venæ Thoracicæ Externæ*, and about this place, changes its name for that of *Subclavian* Vein.

The VENA SUBCLAVIA paſſes betwen the Clavicle and firſt Rib, at the inner ſide of the trunk of the Artery, and afterwards goes over the fore-part of the Anterior Scalenus Muſcle, at the under end of the Neck.

After croſſing the firſt Rib, it receives the *Vein* correſponding with the *Superior Dorſal Artery* of the Scapula, *others* which belong to the *Cervical Arteries*, and alſo *ſmall Veins* from the *Skin* and *Muſcles* on the *back-part* of the *Neck*.

While ſituated in the Neck, it likewiſe receives the *External*, and then the *Internal Jugular Veins*; and near this laſt a *Vein* of conſiderable ſize, which correſponds with the Trunk of the *Vertebral Artery*.

The *Vertebral Vein* communicates within the Cranium, by ſmall branches, with the Inferior Petroſal Sinuſes, or with Occipital Sinuſes; but is chiefly formed by branches ariſing from the Spinal Marrow and its Membranes, and from the Bones and deep-ſeated Muſcles of the Neck.

Behind the top of the Sternum, the Subclavian Vein frequently receives the *Inferior Laryngeal Vein*, the *Anterior External Jugular*, and the *Internal Mammary Vein*.—Beſides theſe, the *Left* Subclavian receives alſo the *Left Superior Intercoſtal Vein*; after which, it goes acroſs the Root of the Great Arteries ſent up from the Arch of the Aorta, and joins its fellow on the oppoſite ſide to form the Superior Cava.

BLOOD-VESSELS WITHIN THE THORAX.

OF the Blood-Veſſels within the Thorax, the *Pulmonary Artery* and *Veins*, the *Aorta*, the *Coronary Veſſels*, and the other Veſſels connected with the Heart have been already noticed.

The following are those which remain to be described.

The MAMMARIA INTERNA, which arises from the Subclavian, opposite to the Inferior Laryngeal, and descends between the Pleura and Cartilages of the True Ribs, at the edge of the Sternum;—sending off

A *Small Reflected Branch* to the Integuments and Muscles adjacent to the Clavicle:

One or two small Branches, termed *Thymicæ*, to the Thymus Gland, and which, like the Gland itself, are most considerable in the Young Subject:

A minute Branch, termed *Comes Nervi Phrenici*, which accompanies the Phrenic Nerve, and after giving Twigs to the neighbouring Membranes, is distributed upon the Diaphragm:

Some small Branches, called *Mediastinæ*, and *Pericardiæ*, to the Mediastinum and Pericardium:

Several Branches outwards, to the Intercostal Muscles; and *others* between the Cartilages of the True Ribs at the edge of the Sternum, to the Pectoral Muscles, Mamma and Integuments, which communicate with those of the Thoracicæ Externæ:

A *Large Branch*, at the under end of the Thorax, which is dispersed upon the Diaphragm.

The Mammary Artery afterwards emerges from the Thorax, commonly under the Cartilage of the seventh True Rib, and runs upon the back-part of the Rectus Abdominis Muscle, upon the upper end of which it is dispersed, after sending a Branch to the Oblique Muscles of the Abdomen.

The INTERCOSTALIS SUPERIOR, which comes off a little farther out than the Mammary, and descending near the Spine, commonly divides into two or three Branches, which supply an equal number of Intercostal Spaces.—It also sends a Branch upwards to the Deep Muscles at the under and fore-part of the Neck.

The ARTERIÆ BRONCHIALES, one in the right and two or three in the left side of the Thorax, which are dispersed upon the corresponding sides of the Lungs.

The BRONCHIALIS DEXTRA, which arises most frequently from the uppermost Intercostal Artery of the Aorta; and the BRONCHIALES SINISTRÆ, which are of unequal size, from the fore-part of the Aorta at a little distance from each other.

The Bronchial Arteries send small Branches to the Esophagus, to the Posterior Mediastinum and Pericardium, and afterwards accompany those of the Trachea through the substance of the Lungs.

The ARTERIÆ ESOPHAGEÆ, which are minute Branches arising from the Aorta, and dispersed upon the Esophagus, also sending Twigs to the Posterior Mediastinum.

The INTERCOSTALES INFERIORES, which are nine or ten pairs in number, arising from the back-part of the Aorta, and

running in the Grooves at the under edges of the Ribs, between the External and Internal Intercoſtal Muſcles.

They furniſh Branches to the Spine and Spinal Marrow, to the Intercoſtal Muſcles, Pleura, &c. alſo numerous Branches to the Muſcles on the back of the Thorax, and communicate with thoſe of the Internal and External Mammary Arteries.

Veins.

The Blood ſent to the Thorax by the Arteriæ Mammariæ Internæ, Intercoſtales, and Eſophageæ, is returned to the Heart by the following Veins, viz.

The Mammariæ Internæ, which accompany their correſponding Arteries, and terminate, the Left in the Subclavian, and the Right in this, or in the top of the Vena Cava.

Some ſmall Veins, as the *Pericardiaco-Diaphragmatic*, the *Thymic* and *Pericardiac*, which, in place of joining the Mammary Trunk, commonly terminate, the Right in the Subclavian, or top of the Cava, and the Left in the correſponding Subclavian Vein.

The Venæ Intercoſtales, which are the ſame in number with their Arteries, and accompany them along the edges of the Ribs.

Several of the Lower Left Intercoſtals unite into a trunk, termed *Vena Azygos*, which croſſes over the Spine about the middle of the Thorax,—behind, but ſometimes before the Trunk of the Aorta,—to the right ſide.

The Vena Azygos, or *Vena ſine Pari*, thus originally formed by the Lower Left Intercoſtals, aſcends on the fore-part of the Spine over the Intercoſtal Arteries, at the right ſide of the Aorta.

At its lower extremity, it generally communicates with one of the Lumbar Veins, or with the Vena Renalis; and not unfrequently with the Trunk of the Inferior Cava.

Upon the Spine, it receives the *Right Intercoſtals*, and the *Right Bronchial Vein*; and turning forwards over the Root of the Great Pulmonary Veſſels of that ſide, it terminates in the Superior Cava.

The Upper Left Intercostal Veins, or ſuch as are not received by the Vena Azygos, terminate in a trunk on the left ſide, improperly called *Left Vena Azygos*.

The Left Vena Azygos, Left Bronchial, or Left Superior Intercostal Vein, beſides the Superior Intercoſtal Branches, receives the Left Bronchial Veins and Branches from the Eſophagus and other parts near it, and terminates in the Subclavian Vein.

The Vena Cava Superior,—formed by the union of the Subclavian Veins, with the addition of the Vena Azygos,—paſſes down at the right ſide of the aſcending Aorta, perforates the

Pericardium, and terminates in the upper part of the Right Auricle.

Blood-Vessels *of the* Diaphragm.

The Diaphragm is supplied with Blood-veſſels from various ſources, viz. thoſe entering its upper part from the Internal Mammary, already deſcribed; alſo ſmall Branches from the Intercoſtal and Lumbar Arteries. Its principal Branches, however, are the *Phrenic*, or *Diaphragmatic*.

The Arteriæ Diaphragmaticæ, are two in number, one on each ſide, which ariſe from the fore part of the Aorta as ſoon as it enters the Abdomen.

In general, their origin is diſtinct from each other, but ſometimes by a common Trunk; and now and then, one or both, originate from the root of the Cœliaca.

They afterwards go obliquely upwards and outwards over the Crura of the Diaphragm, ſpread out into many Branches which are chiefly diſperſed upon its Fleſhy ſides, and inoſculate with thoſe which enter at its upper ſurface.

They likewiſe give ſmall Branches to the Glandulæ Renales, to the Cardia, and parts in general which lie near them.

The Venæ Diaphragmaticæ, like their correſponding Arteries, run upon the under part of the Diaphragm, and terminate in the Inferior Cava, behind the Liver,—the right being commonly a little lower than the left.

BLOOD-VESSELS of the CHYLOPOETIC, and ASSISTANT CHYLOPOETIC VISCERA.

Arteries.

The Arteries of theſe Viſcera, conſiſt of the *Cœliac*, and the *Superior* and *Inferior Meſenterics*; all of which are *Azygous* or ſingle Arteries ariſing from the fore part of the Aorta.

Arteria Coeliaca.

The Arteria Coeliaca, ariſes from the Aorta, immediately after it emerges from between the Crura of the Diaphragm into the Abdomen; and is ſituated at the upper edge of the Pancreas.

The Trunk of the Cœliac Artery is remarkably ſhort, being little more than half an inch in length, before it divides into its three principal Branches, called from their deſtination, *Superior Gaſtric*, *Hepatic*, and *Splenic*.

The GASTRICA SUPERIOR, or CORONARIA VENTRICULI SUPERIOR, is the ſmalleſt of the three. It goes upwards, and a little towards the left, to reach the right ſide of the upper Orifice of the Stomach.

Here it ſends Branches to the Cardia, which encircle it, and aſcending ſomeway upon the Eſophagus, communicate with the Arteriæ Eſophageæ.

The Trunk of the Artery afterwards divides upon the ſmall Curvature of the Stomach, into principal Branches, ſome of which run acroſs the upper and under Surfaces, and others obliquely towards the right ſide; ſupplying a large portion of the Stomach, and ſending Twigs to the Omentum Minus,—while the Trunk is frequently extended as far as the Pylorus.

The ARTERIA HEPATICA, the largeſt of the three, paſſes obliquely upwards, towards the Pylorus,—before, and a little to the right ſide of the *Lobulus* SPIGELII,—till it arrives at the Cavity of the Liver called *Porta*.

Where it approaches the Porta, it divides into the *Gaſtroica-Inferior Dextra*, and the *Proper Hepatic Artery*.

The GASTRICA DEXTRA, or GASTRICA INFERIOR DEXTRA, or GASTRO-EPIPLOICA DEXTRA, ſends out—

The *Arteria Pylorica*, which, however, is frequently produced immediately from the Hepatic Artery. It gives Branches to the Pylorus and other parts about the ſmall end of the Stomach, and afterwards runs ſome way along its ſmall Curvature, inoſculating with the Superior Gaſtric Artery.

Beſides this principal Branch, there are a few ſmaller ones ſent from the Gaſtrica Inferior to the Pylorus.

The *Duodenalis*, which is diſperſed upon the beginning and right portion of the Duodenum, along with other Branches coming from the ſame ſource, but of inferior ſize.

Rami Pancreatici, diſtributed to the right end of the Pancreas.

After furniſhing the Branches already mentioned, the Inferior Gaſtric Artery paſſes under the Pylorus to the great Curvature of the Stomach, along which it runs; being included, to near its large extremity, in the Layers of the Anterior Portion of the Omentum.

In this courſe, it ſends off—

The *Rami Epiploici*, which are long and ſlender Branches diſperſed upon the Epiploon or Omentum.

The *Rami Gaſtrici*, which plunging ſuddenly into both ſides of the Stomach, communicate with the Pyloric and Superior Gaſtric Arteries.

The Hepatic Artery, having given out the Inferior Gaſtric, and frequently, the Pyloric Artery, ſoon divides into two principal Branches, a right and left, of unequal ſize, which run

into the Porta;—the one,—under the Hepatic Duct,—to ſupply the great, and the other the ſmall Lobe of the Liver.

From the Right Branch, before it plunges into the Liver, is ſent off the *Arteria Cyſtica* afterwards dividing into two ſmaller Branches, termed *Gemellæ*, which are diſperſed upon the Gall-bladder.

Frequently, beſides the Hepatic Artery ſent of from the Cœliac, there is another, coming ſometimes from the Superior Gaſtric, at other times from the Superior Meſenteric Artery, to be ſent into the Liver. In ſuch caſes, the Trunk which gives origin to this additional Artery is greater than uſual, and the Hepatic Branch which it accompanies is proportionally ſmaller.

The ARTERIA SPLENICA, nearly equal in ſize to the Trunk of the Hepatica, takes a long and ſerpentine courſe acroſs the left ſide of the Body; running firſt behind, then at the upper part of the Pancreas in its way to the Spleen. Its Branches are,——

The *Rami Pancreatici*, which are few in number and ſmall. They run from the Splenic Artery nearly at right angels, and ſupply the greater part of the Pancreas.

The *Gaſtrica Siniſtra*, *Gaſtrica Inferior Siniſtra*, or *Gaſtro-Epiploica Siniſtra*, which is conſiderably inferior in length and ſize to the Gaſtrica Dextra. It communicates by its Branches with the Gaſtrica Superior, and Inferior, while its Trunk runs a little way towards the right ſide along the great Curvature of the Stomach.

It ſends ſome *Rami Pancreatici*, and *Gaſtro-Epiploici*, and *Meſo-colici Siniſtri*, to the Pancreas, left portions of the Omentum and Meſocolon; while its Trunk frequently forms a common Arch with the Gaſtrica Dextra.

Three or four conſiderable Branches, termed *Vaſa Brevia*, or *Arteriæ Breves*, which run to the left part of the great Curvature of the Stomach, to be diſtributed upon its large extremity; their Ramifications anaſtomoſing with thoſe of the Superior and of the Left Inferior Gaſtric Arteries.

The *Rami Splenici*, ſeveral in number and of conſiderable ſize, which go at the concave ſide of the Spleen, to be diſtributed throughout the whole of its ſubſtance.

MESENTERICA SUPERIOR.

The MESENTERICA SUPERIOR ariſes from the Aorta, immediately below the Cœliac Artery, which it equals in ſize; and running under the Pancreas, and then over the Duodenum, it paſſes between the Layers of the Meſentery towards the under ſide of the Abdomen.

In its deſcent, it is bent a little to the left ſide, its lower extremity turning towards the beginning of the Colon.

From the convex ſide of the Artery, many large Branches are ſent off to the ſmall Inteſtines; while others proceed in the oppoſite direction to the right ſide of the Colon.

The *Firſt Arteries* ſent off from the Trunk are very inconſiderable, running to the Pancreas and to the left portion of the Duodenum, and communicating there with Branches of the Cœliac Artery.

The principal Branches from the left ſide of the Trunk are diſperſed upon the Jejunum and Ilium, ſupplying, in their courſe, the Layers of the Meſentery with the parts it contains.

The firſt of theſe Branches are ſhort and ſmall, thoſe which ſucceed gradually increaſe in length and ſize to the middle of the Arch, after which they diminiſh again ſomewhat in the ſame proportion towards the lower part of the Ilium.

In their courſe through the Meſentery, the principal Branches communicate, firſt by reciprocal Arches, then by Areolæ of different figures, which increaſe in number, but diminiſh in ſize as they approach the Inteſtines.

From theſe Areolæ, many Branches are detached, which take a ſtraight courſe to the Inteſtines, and are afterwards ramified through their ſubſtance, forming numberleſs Anaſtomoſes with each other.

The Branches produced from the right or concave ſide of the Trunk are ſituated between the Layers of the Meſo-colon,—their length being almoſt equal to the breadth of that Membrane.

Near the Inteſtines, they communicate by large and then by ſmaller Arches: Theſe laſt, however, are leſs frequent than thoſe which belong to the ſmall Inteſtines.

The principal Branches are the following:—

The *Ileo-colica*, which ariſes near the under part of the Trunk, ſupplies the end of the Ilium and beginning of the Colon, and communicates with the Branches ſent from the extremity of the Trunk of the Artery.

A *Short Trunk*, which divides into—

The *Colica Dextra*, for ſupplying the right ſide of the Colon,—its Branches communicating with thoſe of the Ileo-colica: And

The *Colica-Media*, or *Media Anaſtomotica*, which proceeds to the great Arch of the Colon.

Near the Colon, the Colica Media divides into two large Branches; one forming an Arch with the Dextra, the other with a Branch of the Meſenterica Inferior.

From the oppoſite ſide of the Colon, Branches of this Artery run to the Omentum, and communicate with the Gaſtro-Epiploic Arteries.

Beſides the Colic Branches already deſcribed, there is frequently an additional one, which ariſes from the beginning of the Superior Meſenteric Artery, and in its aſcent ſplits into two others, one of which, uniting with the Colica Media, forms the large Meſocolic Arch, and the other a ſimilar Arch with the aſcending Branch of the Inferior Meſenteric Artery.

Mesenterica Inferior.

The Mesenterica Inferior ariſes from the Aorta ſomewhat lower than half way between the Superior Meſenteric and the Bifurcation of the Aorta.

It deſcends obliquely upon the left Pſoas Muſcle, and ſoon divides into principal Branches.

Theſe near the Inteſtine join with each other, and form Arches, from which others go off compoſing Areolæ in ſome meaſure ſimilar to thoſe which belong to the right ſide of the Colon.—The principal Branches are:—

The *Ramus Aſcendens*, which divides near the Inteſtine, into two Branches; one of which joins the Colica Media, to form the great Meſocolic Arch, the other is reflected upon the left portion of the Colon.

The *Colica Siniſtra*, which is frequently double from its origin, or at other times ſplitting intwo two Branches, one joining the Ramus Aſcendens, the other paſſing down by the Sigmoid Flexure of the Colon.

The *Hemorrhoidalis Interna*, which is the Trunk continued. It anaſtomoſes with the Colica Siniſtra, and afterwards deſcends upon the back-part of the Rectum to near its under extremity.

Veins.

The Veins which return the Blood from the Chylopoetic and Aſſiſtant Chylopoetic Viſcera, accompany their reſpective Arteries,—the Hepatic Branch excepted.—They have, like their Arteries, large and frequent Communications with each other, are much ſuperior in ſize, and, as well as the other Veins of the Viſcera ſituated in the great Cavities, are deſtitute of Valves.

The following are the Principal Trunks.

The Mesenterica, or Mesaraica Minor, or Hæmorrhoidalis Interna.

The Mesenterica Minor, running up at the left ſide of the Spine, receives—

The *Proper* Vena Hæmorrhoidalis Interna, which returns the Blood from the Inteſtinum Rectum;—the name obtained from the Vein being ſuppoſed to be connected with the Tumours called *Hæmorrhoids* or *Piles*.

The *Venæ Colicæ Siniſtræ*, which return the Blood from the left portion or ſide of the Colon.

A *Vena Duodenalis*, which returns the Blood from the left portion of the Duodenum.

The Meſenterica Minor commonly terminates in the Vena Splenica, though not unfrequently in the Meſenterica Superior.

Vena Splenica.—The Vena Splenica, ſituated at the under ſide of its Artery and immediately behind the Pancreas, receives—

The *Rami Splenici*, which return the Blood from the Spleen:

The *Rami Pancreatici*, which paſs from the under end of the Pancreas:

The *Vena Breves*, or *Vaſa Brevia*, which come from the left or great end of the Stomach:

The *Vena Gaſtrica Siniſtra*, or *Epiploica Siniſtra*, which comes from part of the great Arch of the Stomach, and correſponding portion of the Omentum:

The *Gaſtrica Superior*, which comes from the ſmall Curvature of the Stomach and Omentum Minus, and goes into the Splenic near its termination, or into the beginning of the Vena Portæ.

The Splenic and Inferior Meſenteric Veins, after receiving their reſpective Branches, form a ſhort Trunk which joins the Superior Meſenteric.

VENA MESENTERICA SUPERIOR, or MAJOR. The Great Meſenteric Vein, ſituated at the under ſide of the Artery, receives—

The *Rami Meſenterici*, which are very large and numerous, returning the Blood from the Jejunum and Ilium,—the Branches going into the left ſide of the general Trunk.

The *Ileo-Colica*, which comes from the end of the Ilium and beginning of the Colon.

The *Colica Dextra*, which belongs to the right ſide of the Colon, and terminates in the right or concave ſide of the Meſenteric Trunk.

The *Colica Media Anaſtomotica*, which comes from the right portion of the Great Arch of the Colon, forming, with the deſcending Branch of the Meſenterica Minor, a large Arch ſimilar to that of the correſponding Artery, and terminating alſo in the right ſide of the Trunk.

The *Gaſtro-Epiploica Dextra*, which belongs to the right portions of the Stomach and Omentum, and frequently unites with the Veins from the ſide of the Colon, forming a ſhort common Trunk, which has the term of *Gaſtro-Colica* applied to it.

The *Pylorica* and *Duodenalis*, which ſometimes terminate in the Superior Meſenteric, at other times in the Gaſtrica Dextra.

The Great Meſenteric Vein, formed by the Branches mentioned above, paſſes over the beginning of the correſponding Artery, and joins the Vena Splenica.

The Trunk formed by theſe Veins, runs under the head of the Pancreas, and here obtains the name of *Vena Portæ*, or *V. Portarum*.

VENA PORTÆ.

THE VENA PORTÆ, formed by the two Meſenteries, and by the Splenic Vein, returns the Blood from the Stomach and Inteſtines, and from the Spleen, Pancreas, and Omenta.

The under part of the Vena Portæ is termed by ſome Authors *Vena Portæ Abdominalis*, or *Ventralis*; while the upper part,—being of great ſize, but without having any particular Dilatation in it,—is called *Sinus* of the Vena Portæ.

The Vena Portæ, at its beginning, frequently receives the Vena Gaſtrica Dextra, the Gaſtrica Superior, the Pylorica, and the Duodenalis, which at other times terminate in one of the great Trunks which form it.

It paſſes upwards, inclining a little to the right in its courſe to the Liver, having the Trunks of the Biliary Ducts before, and the Hepatic Artery on the left ſide of it,—and is about three or four inches in length.

When it reaches the Porta of the Liver, it receives the Venæ Cyſticæ into its Trunk, or into its right diviſion, either by two ſeparate Branches, or theſe united into a ſingle Vein.

In the Porta, it divides into two great Branches, a right and left, ſometimes termed *Venæ Portæ Hepaticæ*, which go off nearly at right angles, to be diſperſed, through the ſubſtance of the liver, after the manner of an Artery, the ſubordinate Branches accompanying thoſe of the A. Hepatica.

From the extremities of the Vena Portarum, and likewiſe from the extremities of the Hepatic Artery, a ſet of Veins ariſe, termed *Venæ Hepaticæ*, and ſometimes *Venæ Cavæ Hepaticæ*, which accompany the Branches of the Hepatic Artery and Vena Portarum.

The Branches of the Venæ Hepaticæ afterwards unite into large Trunks, which recede from the Hepatic Artery and Vena Portæ, and terminate in the Inferior Cava.

Their termination in the Cava is by two, and frequently by three Trunks, at the place where it perforates the Diaphragm; but commonly, below this, a few ſmall Hepatic Branches go into the Cava where it is ſituated behind the Liver.

BLOOD-VESSELS OF THE ORGANS OF URINE AND GENERATION.

ARTERIA RENALIS. The Arteria Renalis, called alſo *A. Emulgens*, ariſes from the ſide of the Aorta, a little below the root of the Superior Meſenteric Artery.

It commonly comes off by one large Trunk, though frequently by two or more, in which caſe, each of theſe is ſmaller than when the Artery is ſingle.

It runs acroſs the Spine and Pſoas Muſcle, nearly in a tranſverſe direction. The Artery of the right ſide goes behind the

Vena Cava, and is longer than the left, in conſequence of the Cava being ſituated between the Aorta and the Right Kidney.

At the concave edge of the Kidney, the Artery divides into three or four Branches, which ſometimes ſend Twigs to the Glandula Renalis and Tunica Adipoſa of the Kidney.

The Renal Branches then plunge into the ſubſtance of the Kidney, ſurround its Pelvis, and afterwards ramify chiefly in its Cortical Subſtance ;—forming Arches with each other, but few in number, at the roots of the Papillæ.

The VENA RENALIS, or EMULGENS, terminates in the Inferior Cava; and is more ſuperficial than its correſponding Artery. It is the largeſt Vein received by the Cava from its origin to the part where it reaches the Liver.

The left Renal Vein is the longer of the two ;—the Aorta, before which it paſſes, being ſituated between the Cava and Left Kidney.

ARTERIÆ CAPSULARES. The Arteriæ Capſulares, or *Arteries of the Renal Capſules or Glands*, are ſmall but numerous.

They are derived from the Renal and Diaphragmatic Arteries; and, in general, the left Renal Gland receives additional Branches from the Trunk of the Aorta.

The VENÆ CAPSULARES commonly unite into a large Trunk, which, in the left ſide, terminates in that of the Kidney, while in the right it frequently goes into the Cava.

ARTERIÆ ADIPOSÆ. The Arteries which ſupply the Tunica Adipoſa of the Kidney are numerous Twigs proceeding from the Diaphragmatic, Capſular, and Renal Arteries, or from others near it.

The *Veins* which return from the extremities of theſe Arteries paſs into the Trunks adjacent.

ARTERIA SPERMATICA. The Spermatic Artery, the diameter of which is ſmall when compared with its great length, ariſes oppoſite to its fellow, from the fore-part of the Aorta, a little below the Renal Arteries.

Sometimes it ariſes from the A. Renalis, at other times a little higher from the Aorta, and in rarer inſtances from the Diaphragmatic Artery.

It deſcends, in a waving direction, on the ſurface of the Pſoas Muſcle, covered by the Peritoneum ; the right paſſing obliquely over the Cava, the left behind the Colic Arteries of the ſame ſide, and both before the Ureters to the under part of the Abdomen.

After this, it perforates the Ring of the Obliquus Externus, and runs in the Spermatic Cord, where it divides into Branches which are diſperſed in a very convoluted manner upon the Teſticle and Epididymis.

In the deſcent of the Artery it imparts—

Twigs to the Tunica Adipoſa of the Kidney.

To the Peritoneum and Cellular Subſtance near it ;—and

To the Ureters,—which are alſo ſupplied with other Arteries from the adjacent Veſſels, viz. from the Renal and Capſular Arteries, from the Aorta, the Iliacæ and Veſicales.

The VENA SPERMATICA is much larger than its correſponding Artery, and is furniſhed with Valves within, but more particularly without the Abdomen.

It forms a Plexus which accompanies the Artery, and about the place where it recedes from it, which is nearly oppoſite the under end of the Kidney, it forms a ſingle Trunk, which in the right ſide goes into the Cava a little below the Emulgent Vein, and in the left into the correſponding Vena Renalis.

Beſides the Artery commonly termed Spermatic, the Teſticle generally receives a *Minute Branch*, which ariſes from the Hypogaſtric, and accompanies the Vas Deferens to the Body of the Teſticle upon which it is diſperſed,—communicating there with the Branches of the Spermatic Artery.

The *Vein* proper to this Artery, terminates in the Vena Hypogaſtrica.

The *Spermatic Artery*, in the Female, has the ſame kind of Origin, and the ſame courſe through the Abdomen as in the Male;—but in place of perforating the Abdominal Ring, as it does in the latter, it deſcends into the Pelvis, between the Lamina of the Ligamentum Latum, to be diſperſed firſt upon the Ovarium and Uterine Tube, and then upon the Body of the Uterus itſelf,—paſſing in at its corner, and communicating with the Artery of the oppoſite ſide.

The Spermatic Vein has the ſame termination in the Female as in the Male,—but is conſiderably larger.

ARTERIÆ ILIACÆ. The Iliac Arteries conſiſt of the *Two Common Iliacs*, which are formed by the Bifurcation of the Aorta; and of the *External* and *Internal Iliacs* of each ſide, which are formed by the Bifurcation of the Iliacæ Communes.

The *External Iliac* paſſes out of the Abdomen behind the *Ligament of* POUPART; the *Internal*, termed alſo *A. Hypogaſtrica*, deſcends obliquely into the Pelvis.

At the ſide of the Pelvis, the Internal divides into many Branches, ſome of which belong to the Organs of Urine and Generation, the reſt to other parts of the Pelvis and adjacent parts of the Thigh.

The following are the Branches ſent from the Hypogaſtric Artery to the Organs of Urine and Generation.

ARTERIA UMBILICALIS. The Arteria Umbilicalis appears in the Fœtus, as the continued Trunk of the Internal Iliac; but in the Adult, is ſhrivelled in the form of a Ligament, excepting at its beginning or under part.

The beginning of the Umbilical Artery gives off—

One or more *Arteriæ Veſicales*, which run to the under part of the Bladder, and extend along its ſides as far as the Fundus Ve-

ſicæ. At their origin, they furniſh Twigs to the Veſiculæ Seminales, Proſtate Gland, and Rectum.

In the Female, the Umbilical Artery ſends minute Branches to the Uterus and Vagina.

ARTERIA UTERINA. The Arteria Uterina, termed alſo *Uterina Hypogaſtrica*, is much larger than the Spermatic Artery.

It ariſes from the Hypogaſtric, near the origin of the A. Pudica, and runs into the Uterus at its under extremity.

It is afterwards reflected upwards along the edge of the Uterus, towards its Fundus or upper part, where it meets with the Spermatic Artery, with which it forms frequent Anaſtomoſes, and afterwards many Communications with the Uterine Artery of the oppoſite ſide.

The Uterine Artery ſends Branches downwards to the ſubſtance of the Vagina, and others forwards to be diſperſed upon the Bladder.

ARTERIA VAGINALIS. The Arteria Vaginalis is frequently awanting.—When preſent, it ariſes from ſome of the Branches of the Hypogaſtric,—as that common to the Iſchiadic and Pudic,—or from the Hæmorrhoidalis Media; and is diſtributed upon the under part of the Vagina.

Beſides this, there are other Vaginal Branches from the neighbouring Arteries; as from the *Veſicales*, *Uterina*, and *Pudica*, which communicate with each other, and with the proper Vaginalis, upon the ſubſtance of the Vagina.

ARTERIA PUDICA, or PUDENDA COMMUNIS.—The Arteria Pudica, named from its belonging to the Parts of Generation in both ſexes, comes off either immediately from the Trunk of the Hypogaſtric, or from the A. Iſchiatica.

It paſſes out of the Pelvis, through the under part of the Notch of the Os Ilium, at the lower edge of the Pyriform Muſcle.

It then turns between the Sacro-ſciatic Ligaments, to get to the inner ſide of the Tuber Iſchii, where it is lodged deep in the Cellular Subſtance.

From the Tuber, it proceeds along the inner ſide of the Crus of the Os Iſchium and of the Os Pubis, and behind the Crus of the Penis, till it approaches the Symphyſis of the Pubis.

In its courſe, it ſends off many Branches, of which the following are the principal, viz.—

Branches to the Veſiculæ Seminales, Proſtate Gland, Neck of the Bladder, and Rectum.

Branches to the Muſcles and parts adjacent to the Sacro-ſciatic Ligaments; ſome of them extending as far as the Joint of the Thigh-bone.

Branches to the Muſcles, Membranes, and Fat about the Tuber of the Os Iſchium.

The *Arteria Hæmorrhoidalis Externa*, which ſoon divides into Branches, to ſupply the Muſcles and Integuments about the verge of the Anus.

The *A. Perinei*, which paſſes under the Tranſverſalis Perinei Muſcle, in the ſpace between the Crus of the Penis and Bulb of the Urethra, and gives Branches to the Skin and Muſcles at the fore-part of the Anus and root of the Penis, and to the Scrotum; while the Artery itſelf terminates on the under ſide of the Penis.

After diſperſing the Branches already mentioned, the Pudic Artery divides, at the root of the Penis, into three principal Branches, viz.—

The *Firſt Branch*, which paſſes into the Bulb of the Urethra, and is continued forwards in the Corpus Spongioſum Urethræ, into the Cells of which many of its Branches open.

The Second Branch, termed *Profunda Penis*, which goes into the Crus Penis, and directs its courſe in the Corpus Cavernoſum; its Branches communicating with the Artery of the oppoſite ſide, and with the Cells of the Penis.

The Third Branch, called *Dorſalis Penis*, which turns between the Symphyſis of the Pubis and root of the Penis, and proceeds along the Dorſum, as far as the Glans, adhering cloſely to the Ligamentous Subſtance which incloſes the Corpora Cavernoſa, and ſending Branches to it and to the Integuments.

In the Female, the Pudic Artery has the ſame general courſe as in the Male.

After reaching the inner ſide of the Tuber of the Os Iſchium, it is extended forwards, and ſends Branches to the Anus, Perineum, end of the Vagina, and Labia Externa, and terminates in the Clitoris, ſomewhat in a ſimilar manner as in the Penis.

The Blood is returned from the Branches of the Hypogaſtric Artery diſperſed upon the Organs of Urine and Generation, by the following Veins, viz.—

The *Vena Veſicalis*, which returns the Blood from the Bladder.

The *Vena Uterina Hypogaſtrica*, which comes from the Uterus.

The *Vena Magna Ipſius Penis*, which runs along the middle of the Dorſum, and is often double to near the root of the Penis; after which it paſſes between this and the Arch of the Pubes, forming a Plexus which ſurrounds the Neck of the Bladder, and ſending out Branches which terminate in others at the ſides of this Viſcus.

The *Vena Pudica*, which communicates anteriorly with the Branches of the Vena Magna at the root of the Penis, and afterwards paſſes back with the correſponding Artery.

The *Vena Tegmentorum Penis*, which is formed by ſmall Subcutaneous Branches, and ends in the top of the Femoral Vein.

The Veins above-mentioned, the laſt excepted, terminate in the Hypogaſtrica, along with other Veins belonging to the Pelvis, to be afterwards deſcribed.

BLOOD-VESSELS OF THE CONTAINING PARTS OF THE ABDOMEN, AND OF THE PELVIS AND INFERIOR EXTREMITY.

ARTERIÆ LUMBARES.—The Lumbar Arteries, which are commonly four in number on each side, arise in pairs from the back-part of the Abdominal Aorta, in the same manner as the Intercostals do from the Aorta in the Thorax.

They run first over the fore-part of the Bodies of the four uppermost Lumbar Vertebræ, and afterwards go between them and the Psoæ Muscles, in their way towards the sides of the Abdomen.

They give Branches to the Spine, to the Spinal Marrow and its Membranes; are particularly dispersed upon the Lumbar Muscles, and upon the Transversus and Obliqui Abdominis; and perforating these, they also furnish Branches to the large Muscles and the Integuments in the back-part of the Loins.

Superiorly, they communicate with the lower Intercostal and Diaphragmatic Arteries.

SACRA MEDIA. The Sacra Media is a small Azygos Artery, which arises from the under and back-part of the Aorta, immediately at its Bifurcation.

It generally sends off a Branch over each side of the last Vertebra of the Loins, which takes nearly the same course backwards with the Arteriæ Lumbares.

The Sacral Artery afterwards descends along the middle of the Sacrum, as far as the Os Coccygis, sending Branches to the Membranes and Substance of these Bones, and to the back-part of the Rectum.

ILIACÆ COMMUNES. After giving off the Arteries of the Contents and of the containing parts of the Abdomen, the Aorta, upon the under part of the Fourth Lumbar Vertebra, divides into the Two Common Iliac Arteries, which are of equal size.

They pass obliquely downwards and outwards; and at the under and lateral parts of the last Vertebra of the Loins, *i. e.* opposite to the posterior Symphyses of the Pelvis, each divides into two others, an Anterior, termed *Iliaca Externa*, and a Posterior, termed *Iliaca Interna*, or *Hypogastrica*.

ILIACA EXTERNA. The Iliaca Externa, which appears in the Adult as the continuation of the common Trunk, descends along the Brim of the Pelvis, taking a curved direction by the side of the Psoas Muscle, and afterwards passes behind the *Ligament of* POUPART, to form the Femoral Artery.

In this course, it does not send off any Branches, excepting sometimes a Twig or two to the Peritoneum, Psoas Muscle, &c.

till it is about to leave the Abdomen, where it gives rise to two principal Arteries,—the *Epigastrica*, and *Circumflexa Ossis Ilii*.

The Arteria Epigastrica, obtaining its name from its situation in the fore-part of the Belly, goes off from the inner side of the Femoral Artery, immediately before that Vessel gets behind the *Ligament of* Poupart.

At its origin, it is a little bent downwards, and about half an inch from the place where it first comes off, it crosses obliquely upwards and inwards, behind the Spermatic Cord in the Male, and round Ligament in the Female.

It proceeds in this oblique manner behind the Tendon of the Transversus, till it reaches as high as the point of the Pyramidalis, after which it takes a perpendicular direction along the back-part of the Rectus Abdominis Muscle.

It furnishes Branches to the Muscles, Integuments, and Membranes of the fore-part of the Abdomen, communicates in several places with the Lumbar Arteries, and terminates a little above the Umbilicus, where it forms several distinct though small Anastomoses with the under end of the Mammaria Interna.

Circumflexa Ossis Ilii.—The Circumflex Artery of the Ilium, almost as large as the Epigastric Artery, arises nearly opposite to it, though frequently a little lower,—immediately behind the under end of the Fallopian Ligament.

It runs at the under edge of the Os Ilium, till it arrives near the Vertebræ of the Loins.

It gives Branches to the Psoas and Iliac Muscles, to the under end of the Obliqui and Transversus Abdominis, and at length communicates with the Epigastric, and with the Inferior Arteries of the Loins.

Iliaca Interna. The Iliaca Interna, or Hypogastrica passes downwards and backwards in the posterior and lateral part of the Cavity of the Pelvis, for about a couple of Fingers-breadth, after which it generally divides into a Posterior and Anterior Set of Branches; the former supplying the parts nearest the Sacrum and Ilium, the latter belonging more immediately to the parts about the Anterior region of the Pelvis.

Posterior Branches.

Ileo-lumbaris, or Iliaca Interna Minor. The Ileolumbar is a small Artery, arising sometimes from the end of the Hypogastric, at other times from the beginning of the Glutea.

It passes outwards under the Psoas Muscle, and divides suddenly into Branches, one of which frequently forms a kind of *Lumbalis Ima*.

The other Branches go to the Psoas, and Iliacus Internus Muscles, communicating there with the Lumbar Arteries and Circumflex Branches of the Ilium;—a particular Twig constituting an *A. Nutritia*, or *Medullaris* of the Os Ilium.

Sacræ Laterales. Theſe are generally two or three in number, ariſing from the common Trunk, or frequently from the Gluteal Artery;—though ſometimes, there is only a ſingle Artery, which deſcends by the ſides of the Sacral Holes, giving Branches, which ſupply the place of the Sacræ Laterales, and ſometimes alſo of the Sacra Media.

They furniſh Branches to the Membranes on the ſurface of the Os Sacrum, and inoſculate by croſs Twigs with the Sacra Media.

Their principal Trunks enter the Anterior Sacral Holes, to be diſtributed upon the Cauda Equina and the Membranes and Bones incloſing it.

Arteria Glutea.—This is ſometimes termed *Iliaca Poſterior*, and is the largeſt Branch of the Hypogaſtric Artery.

Soon after it ariſes, it paſſes through the upper part of the great Notch of the Os Ilium, and is reflected over the edge of the Bone, in the manner of the Inferior Scapulary Artery.

At the under edge of the Gluteus Medius, it is divided into two ſets of Branches, one of which runs in a radiated direction cloſe upon the Bone, and is chiefly diſperſed upon the two ſmaller Glutei, while Branches of inferior ſize run ſome of them downwards to the Muſcles and Ligaments about the Joint of the Thigh, and others backwards to the parts about the Sacrum, communicating with the Lateral Sacral Arteries through the Poſterior Foramina of the Os Sacrum.

The other ſet of Branches of the Gluteal Artery creeps in between the Gluteous Medius and Maximus Muſcles, upon the latter of which it is chiefly diſperſed.

Anterior Branches.

Arteria Obturatoria, or Obturatrix.—The Obturator Artery has its origin from the Trunk of the Hypogaſtric, or from the Ileo-lumbar or from the Iſchiatic, and ſometimes from the end of the Iliaca Externa.

It deſcends in the Pelvis by the ſide of the Pſoas Muſcle, and afterwards paſſes through the Hole at the upper part of the Obturator Ligament.

While in the Pelvis, it frequently gives Twigs to the Bladder and other parts near it.

After perforating the Ligament, it divides into Branches, one ſet of which are diſperſed upon the parts about the Hip-joint, while another belong to the Obturator Muſcle, and to the Muſcles which are ſituated at the upper and inner part of the Thigh,—the two ſets of Branches inoſculating with each other.

Arteria Umbilicalis.—The Umbilical Artery ſends off Rami Veſicales from its under part or beginning; the reſt of it, in the Adult, being ſhrivelled into Ligament, as already obſerved.

Vesicalis Ima of *Haller*.—This is a long and ſlender Branch which frequently comes off from the root of the Pudica, and runs to the under part of the Bladder, and to the Proſtate Gland.

Arteria Uterina. The Uterine or Uterine-Hypogaſtric Artery, is diſperſed upon the Uterus, as has been already deſcribed.

Hæmorrhoidalis Media. The middle Hæmorrhoidal Artery is ſometimes ſent off from the original Trunk, and at other times from ſome of its Branches, as the Pudic in the Male, or Umbilical in the Female.

It is chiefly diſtributed upon the lower end of the Rectum, where it anaſtomoſes with the Hæmorrhoidalis Interna. It frequently ſends Branches to the under part of the Bladder, to the Veſiculæ Seminales and Proſtate in the Male; and to the Vagina and Bladder in the Female.

Pudica Communis.—The Pudica Communis, termed by ſome Authors *Hæmorrhoidalis Externa*, belongs to the parts of Generation and Anus, as was formerly taken notice of.

Arteria Sciatica. The Sciatic, or Iſchiatic Artery is the largeſt of the Iliac Branches, the Glutea excepted.

It goes through the under part of the *Sciatic* Notch, accompanied by the Nerve of that name having the Pyriform Muſcle between it and the Gluteal Artery.

It afterwards deſcends ſomeway down the Thigh, in company with the Sciatic Nerve, in the hollow between the great Trochanter of the Thigh bone and Tuber of the Iſchium,—covered by the Gluteus Maximus Muſcle.

It ſends an Artery backwards, termed *A. Coccygea*, which creeps along the Sacro-Sciatic Ligaments, furniſhing Branches to the parts about the Os Coccygis, and others which aſcend from it, and anaſtomoſe with ſome of the lateral Sacral Arteries through the Holes in the back-part of the Os Sacrum.

The principal Branches of the Sciatic Artery, however, are diſperſed upon the under part of the Gluteus Maximus Muſcle, and upon thoſe at the upper and back-part of the Thigh, where they communicate with the Obturator and Pudic Arteries.

Arteria Femoralis.

The Femoral or Crural Artery,—the continuation of the External Iliac,—paſſes out of the Abdomen between the Ligament of Poupart and Brim of the Pelvis.

At its firſt exit, it is ſituated ſuperficially over the Ball of the Os Femoris, having the Flexors of the Thigh between it and the Joint.

Farther down, it is lodged deep in a hollow at the upper and inner part of the Thigh, having the Rectus and Sartorius upon the outer, and the Adductores Femoris upon the inner ſide of it.

Here, it is covered by the Glands of the Groin, and by the general Aponeuroſis and Fat; and from this part it deſcends at the inſide of the Thigh turning gradually backwards till it reaches the Ham.

From the top of the Femoral Artery, a few ſmall Branches are ſent off to the Superficial Muſcles and Inguinal Glands, and to the common Integuments at the upper part of the Thigh; alſo one or two others termed *Pudicæ Externæ*, to the External Parts of Generation and Integuments of the inſide of the Thigh.

About two Fingers-breadth below the Ligament of POUPART, the Femoral Artery divides, ſomewhat like the Common Iliac, into Anterior and Poſterior parts:—The former is the Femoral Artery ſtrictly ſo called, the latter is termed *Profunda Femoris*.

PROFUNDA FEMORIS.

THE ARTERIA PROFUNDA, alſo called VASTA, POSTERIOR, or MUSCULARIS FEMORIS, immediately at its origin from the Femoral Artery, gives off two large Branches,—the *Circumflexa Interna*, and *Cicumflexa Externa*,—which run in oppoſite directions at the upper part of the Thigh.

The CIRCUMFLEXA INTERNA, though moſt frequently coming off from the beginning of the Profunda, often ariſes higher than it, from the top of the Femoral; and there are now and then two of them, one a little lower than the other.

It paſſes between the under end of the Pſoas, and the Pectinalis Muſcle, and afterwards turns round the inner part of the Joint of the Thigh.

It ſends off—

Large Branches to that portion of the Adductor Muſcles which belongs to the upper part of the Thigh.

Small Branches to the Muſcles in the vicinity of the Trochanters.

A *Branch*, termed *Articularis Acetabulia* to the Capſular Ligament of the Joint.

A *Twig*, which enters the breach at the under and fore part of the Acetabulum, to be diſperſed upon the Ligamentum Rotundum and the ſubſtance called *Gland of the Joint*.

A conſiderable *Branch*, which anaſtomoſes with the Trunk of the Obturator Artery:—And

Smaller Branches which communicate with the Arteria Sciatica.

CIRCUMFLEXA EXTERNA.—The Circumflexa Externa ariſes for the moſt part nearly oppoſite the former, but frequently a little lower.—Now and then this artery has a double Origin, one of the Trunks coming off higher than the other.

It paſſes outwards between the upper ends of the Rectus, Tenſor Vaginæ Femoris, and Vaſtus Externus Muſcles, and over the Great Trochanter of the Os Femoirs.

It ſends Branches upwards to the under part of the Glutei and to other Muſcles placed at the inferior and back part of the Pelvis, which anaſtomoſe with thoſe running down from the Arteria Sciatica.

Others which have more of a lateral direction, and are diſtributed upon the Muſcles at the upper and back part of the Thigh, and upon thoſe more immediately about the Joint,—communicating with the Branches of the Circumflexa Interna.

The largeſt Branches deſcend between the Rectus Femoris and Vaſtus Externus; one, longer than the reſt, reaching almoſt as far as the outer part of the Knee.

The Profunda Femoris, having detached the Circumflex Arteries, ſinks deep behind the Trunk of the A. Femoralis, and is ſituated upon the Adductor Muſcles of the Thigh.

In its deſcent it is divided into principal Branches, termed *Rami Perforantes*, which, after ſending off ſmall Branches to the Triceps Muſcle, perforate it to be diſperſed upon the Flexors on the back part of the Thigh.

The Perforantes come off in the following ſucceſſion, viz.

The *Perforans Prima*, which ariſes near the Small Trochanter, perforates the Triceps a little farther down, and furniſhes Branches to the Muſcles in the upper and back part of the Thigh.

It forms numerous Communications with the Circumflex Arteries, about the root of the Great Trochanter, and anaſtomoſes in particular with the under end of the Sciatica.

The *Perforans Secunda* or *Magna*, which comes off ſome-way below the former, and is the largeſt of the perforating Arteries.

It gives Branches to the Muſcles in general about the middle of the back-part of the Thigh, particularly to the Flexors of the Leg; and communicates above with Arteries of the Perforans Prima, and with the Circumflex Arteries.

Beſides theſe, there is one, and ſometimes two other perforating Branches, which are greatly inferior in ſize to the two former, and are loſt upon the Flexors at the under and back part of the Thigh; one Twig ſent off from theſe ſometimes forming a *Nutritia* or *Medullaris* of the Os Femoris.

The Femoral Artery, after giving off the Profunda Femoris, paſſes down between the Vaſtus Internus and inſertion of the Triceps, giving only ſmall Branches to the adjacent Muſcles and Integuments.

About the middle of the inſide of the Thigh, it is ſituated behind the Sartorius Muſcle; and nearly two-thirds down upon the Os Femoris, it perforates the Triceps, paſſing between that Muſcle and the Bone, in its way to the Leg.

Having paſſed through the Triceps, it is found in the back-part of the Thigh, where it ſends Branches, ſometimes termed

Perforantes, to the Flexors and Integuments, one Branch, the principal *Medullaris*, to the ſubſtance of the Bone, and others to each of the Vaſti Muſcles, the Muſcular Branches communicating above with Branches deſcending from the ſuperior parts of the Thigh. In this part of the Thigh it lies cloſe upon the Bone, and adheres firmly to it, till it reaches the Ham, where it is termed *A. Poplitea.*

Arteria Poplitea.

The Arteria Poplitea is lodged deep in the hollow between the Ham-ſtrings, and between the Condyles of the Os Femoris, covered by its aſſociate Vein and Nerve, and generally by a great deal of Fat.

It gives off ſeveral Branches, termed *Articulares Superiores* and *Inferiores*, to the Joint of the Knee.

Four of theſe, ſituated, two above and two below the Joint, are more regular and conſtant than the reſt, viz.

The *Articularis Superior Interna*, which turns round the Os Femoris, above the Inner Condyle, paſſes under the Semimembranoſus and Semitendinoſus; and, after perforating the Tendon of the Triceps Muſcle, is diſperſed upon the upper and inner part of the Knee, anaſtomoſing above with Branches ſent down from the Femoral Artery.

The *Articularis Superior Externa*, which ariſes nearly oppoſite to the former, paſſes outwards between the Tendon of the Biceps and Body of the Os Femoris, immediately above its outer Condyle, and is loſt upon the upper and outer part of the Knee; its Branches anaſtomoſing with thoſe of its fellow, and particularly with the long deſcending Branch of the Circumflexa Externa.

The *Articularis Inferior Interna*, which ariſes oppoſite the bending of the Joint, paſſes downwards, and then turns round the Tibia, immediately below its Inner Condyle.

It ſends Branches firſt to the back-part, then to the inner ſide of the Knee; ſome of them inſinuating by the Semilunar Cartilages into the inner part of the Joint.

It communicates above with the Branches of the Articularis Superior Interna.

The *Articularis Inferior Externa*, which comes off near the former, and paſſes firſt downwards, then outwards, between the External Lateral and the Capſular Ligament, to be diſperſed upon the under and outer part of the Knee and inner part of the Joint; communicating with its fellow of the oppoſite ſide, and above, with the Branches of the Articularis Superior Externa.

The other leſs conſtant Articular Branches are diſperſed upon the Muſcles a little above the Joint.

The Arteria Poplitea, having furniſhed Branches to the Joint of the Knee, gives others to the Muſcles at the upper and back part of the Leg, two of which, termed *Surales*, more conſiderable than the reſt, paſs into the heads of the Gaſtrocnemius Externus.

The Trunk of the Artery paſſes afterwards between the heads of the external Gaſtrocnemius, and commonly from two to three inches below the bending of the Knee, and at the under and outer edge of the Popliteus divides into two large Arteries, the *Tibialis Antica*, and *Tibialis Poſtica*.

Tibialis Antica.—The Tibialis Antica paſſes directly through the upper end of the Interoſſeous Ligament to the fore-part of the Leg.

In its deſcent in the Leg, it adheres cloſely to the anterior ſurface of the Interoſſeous Ligament; and has the Tibialis Anticus on the inner ſide, and the Long Extenſors of the Toes on the outer.

A little above the Ankle, it paſſes upon the outer and fore-part of the Tibia, and getting under the Annular Ligament and Extenſor Pollicis, it goes along the convex ſurface of the Foot.

It ſupplies, in general, the Muſcles and Integuments, which belong to the outer and fore-part of the Foot, and ultimately paſſes into the Deep Muſcles of the Sole.

Its Branches come off in the following order, viz.—

A *Small Branch* ſent off before the Trunk perforates the Interoſſeous Ligament, to be diſperſed upon the parts near the Joint; the ſuperior Twigs running in a retrograde direction.

The *Recurrens Anterior*, which ariſes from the Artery after it has perforated the Ligament, and is diſtributed upon the Muſcles at the upper part of the Leg, and upon the Ligaments at the under part of the Knee, anaſtomoſing there with the Inferior Articular Arteries.

Numerous Branches ſent off in a lateral direction to the Muſcles and Integuments on the outer and fore-part of the Leg.

The *Malleoli Interna*, which comes off near the lower end of the Tibia, and is diſperſed on the parts about the inner Ankle.

The *Malleoli Externa*, which ariſes a little lower than the former, and is diſtributed to the parts near the outer Ankle.

The *Arteria Tarſea*, which takes its origin a little anteriorly to the bending of the Ankle-joint, and is more conſiderable in ſize than the Malleolar Branches.

It paſſes obliquely outwards and forwards under the Extenſor Brevis Digitorum, and ſends Branches to the Joint of the Ankle, where it communicates with the Malleolar Arteries.

It ſupplies the greater part of the Muſcles, Integuments, &c. on the upper and outer part of the Foot, and ſends Branches termed *Interoſſei*, to the Muſcles between the Metatarſal Bones of

the ſmall Toes,—which, however, are frequently derived from the Metatarſal Artery.

The *Arteriæ Metatarſea*, which goes off about the middle of the Dorſum Pedis, aad paſſes obliquely towards the root of the Little Toe, aſſiſting the former Artery in furniſhing Branches to the upper part of the Foot and Toes, and ſometimes, in part or entirely, ſupplying the place of that Artery.

The remaining part of the Anterior Tibial Artery afterwards advances between the Extenſor of the great, and long Extenſor of the ſmall Toes, ſending Twigs to the adjacent parts, and dividing, between the Metatarſal Bones of the Great Toe and that next it, into a *Large Poſterior* and a *Small Anterior Branch*.

The *Poſterior Branch*, which may be conſidered as the continuation of the Trunk, ſinks between the Metatarſal Bones of the two firſt Toes, and anaſtomoſes with a deep Artery in the Sole.

The *Anterior Branch* runs forwards, under the name of *Dorſalis Pollicis*, to be diſperſed upon the Great and Second Toes.

TIBIALIS POSTICA—The Tibialis Poſtica divides about a finger's breadth under the origin of the Tibialis Antica, into the Fibularis, and Tibialis Poſtica ſtrictly ſo called.

The FIBULARIS, termed alſo *Peronea*, which is ſmaller than either of the Tibial Arteries, runs down at the inner ſide of the Fibula, for a conſiderable way along the Leg, and is ſituated, firſt under the Soleus, and then under the Flexor Longus Pollicis.

Its Branches are diſtributed to the Muſcles at the outer part of the Leg in the neighbourhood of the Fibula,—a ſmall Medullary Branch alſo penetrating the ſubſtance of that Bone.

A little above the inferior Articulation of the Tibia and Fibula, it ſends a Branch forwards, termed *Peronea Anterior*, which perforates the Interoſſeous Ligament, and is diſperſed upon the fore-part of the Ankle, where it anaſtomoſes with the External Branch of the Tibialis Antica.

The continuation of the Trunk, ſometimes termed *Peronea Poſterior*, deſcends behind the Malleolus Externus, to the outer and back-part of the Foot, anaſtomoſing with the External Malleolar and Tarſal Branches of the Tibialis Antica.

The TIBIALIS POSTICA, properly ſo called, paſſes down at the back-part of the Tibia, and runs over the Tibialis Poſticus and Flexor Digitorum, and under the Gaſtrocnemius Internus, in its deſcent through the Leg.

Behind the inner Ankle, it becomes more ſuperficial, and has the Tibialis Poſticus and Flexor Digitorum Longus on the inner, and the Flexor Longus Pollicis on the outer ſide of it.

From the Ankle, it runs in the Hollow of the Os Calcis, and behind the Abductor Pollicis, to the Sole of the Foot.

Its Branches ſupply the Muſcles at the back and inner part of the Leg, and the different parts of the Sole; forming many Inoſculations with the Branches of the anterior Tibial and the Fibular Artery.

In its courſe along the Leg, it gives off—

Numerous Branches, ſimilar to thoſe of the Tibialis Antica, to the ſurrounding Muſcles:

The *Arteria Nutritia Tibiæ*, which begins a little below the upper end of the Trunk, deſcends for ſome way in the Leg, and gives Branches to the deep Muſcles and Membranes near it, and one Branch termed *A. Medullaris*, which enters the Hole near the middle of the Bone.

Several Branches to the parts behind, and at the inner ſide of the Ankle and Heel, which communicate with others of the Anterior Tibial Artery.

The Trunk of the Artery divides in the Hollow of the Os Calcis, at the place where it is about to go behind the Abductor Pollicis, into two principal Plantar Branches,—the *Interna* and *Externa*.

The Plantar Arteries run forwards under the Aponeuroſis Plantaris, having the Flexors of the Toes between them.

The *Plantaris Interna* paſſes near the inner ſide of the Sole, between the Aponeuroſis Plantaris and Abductor Pollicis.

It gives *Branches* which run in a retrograde direction to the back-part of the Ankle and adjacent parts of the Heel:

Several Branches from each ſide, which go forwards to the Muſcles and Integuments, and other parts at the concave edge of the Sole.

At the root of the Great Toe, it ſends a principal Branch to its inner ſide; it then paſſes under the Flexor Longus Pollicis, and after anaſtomoſing with the Arcus Plantaris, gives off a large Branch which ſplits into two,—one to the outer ſide of the Great Toe, and the other to the adjacent ſide of the Toe next it.

The PLANTARIS EXTERNA,—which may be conſidered as the continuation of the Trunk, being in general much larger than the Interna,—paſſes obliquely outwards between the Flexor Brevis Digitorum, and Flexor Acceſſorius, till it reaches the Baſe of the Metatarſal Bone of the Little Toe.

It is afterwards arched forwards between the Flexors of the Toes and Matatarſal bones, the Trunk being continued to the root of the Great Toe, under the name of *Arcus Plantaris*.

The External Plantar Artery ſends off—

A *Conſiderable Branch*, firſt to the under, then to the outer part of the Heel, which communicates externally with Branches of the anterior Tibial and the Fibular Arteries:

Several Branches to the Flexors of the Toes, and to other parts in the outer portion of the Sole, which communicate, on the in-

ner ſide, with the Branches of the Plantaris Interna, and at the outer with thoſe of the anterior Tibial Artery.

The ARCUS PLANTARIS gives out—

Several Branches to the deep Muſcles of the Sole, particularly,

Rami Interoſſei to the Muſcles between the Metatarſal Bones:

A *Branch* to the outer ſide of the Little Toe:

Three Large Digital Arteries, which are forked at the roots of the Toes, and run along the edges of theſe, in the manner the Digital Arteries do along the Fingers.

Between the Metatarſal Bones of the Great Toe and the one next it, the Plantar Arch anaſtomoſes with the poſterior or perforating Branch of the anterior Tibial Artery, forming a free communication between the Arteries of the upper and under ſide of the Foot. Frequently it ſends off here a Digital Artery, which forks and runs along the outer ſide of the Great Toe, and inner ſide of the Toe next it, ſo as to ſupply the place of one of the Branches of the Internal Plantar Artery.

At the roots of the Toes, the Interoſſeous Arteries of the upper part of the Foot, alſo form diſtinct anaſtomoſes with the anterior extremities of the Trunks of the Digital Arteries.

VEINS.

The VEINS of the INFERIOR EXTREMITIES, like thoſe of the SUPERIOR, conſiſt of a *Subcutaneous* and *Deep* ſet, and, like them alſo, are furniſhed with numerous Valves.

SUBCUTANEOUS VEINS.—The Subcutaneous Veins are ſituated between the Common Integuments and General Aponeuroſis, and, in many parts, are entirely concealed by the Fat. They anaſtomoſe frequently with each other by large Branches, and have ſeveral communications alſo with the deep-ſeated Veins.

They form two principal Trunks, called *Saphæna Major* and *Saphæna Minor*;—the term *Saphaæna* applied, from the Vein being ſuppoſed to be always *viſible*.

The SAPHÆNA MAJOR begins upon the upper ſide of the Foot, runs over the fore-part of the inner Ankle, and aſcends in the Leg at the inner edge of the Tibia.

From the Leg, it paſſes up by the inſide of the Knee, and afterwards, from the inner to the upper and fore-part of the Thigh.

It is at firſt compoſed of Veins, derived from the upper and inner part of the Dorſum Pedis, which have frequent anaſtomoſes with each other, and are of conſiderable ſize.

In its aſcent it is joined by Branches from the ſuperficial parts of the Leg, and is frequently ſplit into a Plexus, ſome way below the Knee.

It receives Branches from the ſuperficial parts of the Thigh, and ſmall Twigs from the Inguinal Glands.

It terminates in the top of the Femoral Vein, nearly oppoſite to, or a little higher than, the origin of the Arteria Profunda.

The SAPHÆNA MINOR ariſes upon the outer ſide of the Foot, and afterwards paſſes behind the Malleolus Externus.

From this, it aſcends in the back-part of the Leg, upon the ſurface of the Gaſtrocnemius Externus, and goes into the Ham.

It is formed by the Veins of the upper and outer part of the Foot, and is joined to the Saphæna Major, over the Metartarſal Bones, by one or more Arches, which receive a Plexus of Branches into their lower or convex part.

It is joined by the ſuperficial Veins of the outer and back-part of the Leg, which have frequent anaſtomoſes with each other, and with the Branches of the Saphæna Major.

It terminates in the Vena Poplitea, and communicates conſtantly by a ſmall Branch with the Saphæna Major, a little above the Knee.

DEEP VEINS. The Deep Veins of the Leg, like thoſe of the Fore-arm, run cloſe at each ſide of their Arteries, and are double their number, but differ a little from the Radial and Ulnar Veins, in being proportionally larger.

The TIBIAL and FIBULAR VEINS anaſtomoſe in ſome places with each other, and alſo communicate with the Subcutaneous Veins.

At the upper part of the Leg, they are united together, to form the Vena Poplitea, and the union is nearly at the ſame place where the correſponding arteries come off

The VENA POPLITEA adheres cloſely to the upper ſurface of the Artery, which it in a great meaſure conceals, and is commonly ſingle, excepting a ſmall Vein which ſometimes accompanies and communicates with it.

The Popliteal Vein receives the Venæ Surales and Articulares, and the Saphæna Minor; after which it forms the Femoral Vein.

THE VENA FEMORALIS receives the Veins which correſpond with the perforating Branches of the Femoral Artery, and paſſes in through the Triceps, where the Artery comes out.

In the middle of the Thigh, it lies deeper than the Artery, afterwards turning gradually to its inner ſide; and at the upper part of the Thigh, it is joined by the Vena Profunda.

The VENA PROUNDA receives the Veins correſponding with the Branches of the Artery of that name, and is ſometimes of a large ſize, being then in a great meaſure the continuation of the Vena Poplitea, a ſmall Vein only in ſuch caſes accompanying the Trunk of the Femoral Artery.

Beſides the Vena Profunda, the Femoral Vein takes in ſmall Veins from the External parts of Generation, from the Inguinal Glands, and from the other ſuperficial parts of the Groin: —and, in particular, it receives a Branch of conſiderable ſize, which deſcends from the Integuments of the fore-ſide of the Abdomen.

The Trunk of the Femoralis, having received the different Veins of the Inferior Extremity, paſſes into the Abdomen, behind POUPART's Ligament, being ſtill ſituated at the inner ſide of the Artery,—after which it forms the Iliaca Externa.

The ILIACA EXTERNA receives into its beginning the Epigaſtric, and Circumflex Vein of the Os Ilium, and ſometimes the V. Obturatrix.

It is ſituated at the inſide of the External Iliac Artery, and afterwards croſſes behind it on the right, and behind the Internal Iliac Artery on the left ſide of the pelvis, to join the Trunk of the Hypogaſtric Vein.

The VENA HYPOGASTRICA, or ILIACA INTERNA, is ſituated at the outer ſide of the Artery and receives the different Veins which correſpond with the Branches of the Hypogaſtric Artery, and which are furniſhed with Valves where they are ſituated among the Fleſhy parts of the Pelvis.

The External and Internal Iliacs unite and form the Common Iliacs, a little below the diviſion of the correſponding Arteries.

The ILIACÆ COMMUNES aſcend by the right ſide of their reſpective Arteries, and a little below the the Bifurcation of the Aorta,—or upon the fore part of the Fifth Lumbar Vertebra,—unite to form the Inferior Cava, ſituated, as formerly mentioned, at the right ſide of the Aorta.

The VENA CAVA INFERIOR,—which is much larger than the Cava Superior, and greatly exceeds in ſize the deſcending *Aorta*,—receives, at its beginning, the Vena Sacra, and higher, the Venæ Lumbares, which, in the left ſide, paſs behind the Trunk of the Aorta.

It likewiſe receives the Venæ Renales, and the Spermatica of the right ſide.

At length it takes in the Venæ Hepaticæ and Diaphragmaticæ, and perforating the Diaphragm at the root of the Liver, it terminates in the Right Auricle of the Heart.

PART VII.

OF THE

NERVES IN GENERAL.

THE NERVES are firm, white Cords, which are generally considered as being directly continued from the Medullary Substance of the Brain and Spinal Marrow;—although instances have been frequently met with, where the Brain, and even the Spinal Marrow, have been found nearly obliterated in the Fœtus, and yet the Nerves retained their usual appearance.

They are composed of *Funiculi* closely connected, and each of these again of smaller *Fibrillæ* which may be subdivided into parts so extremely minute, as almost to elude the naked Eye, but which may be readily seen by the assistance of the Microscope:—No Cavity, however, has been yet observed in them.

The *Medullary Part* of the Fibrillæ appears to be furnished with Cineritious Substance derived from their Pia Mater; in proof of which, they are observed to be in general of a browner colour than the Medullary Substance of the Brain, and larger in their course than at their supposed origin.—MONRO's *Obs. on Nerv. Syst.*

The Medullary Substance of the Fibrillæ is *pulpy* and tender, but rendered thicker and stronger by the coverings they receive from the Tunica Arachnoidea, and Pia Mater, while within the Bones, and more particularly by the additional covering given them by the Dura Mater upon their exit.

The Dura Mater, in its passage through the Base of the Cranium, and between the different Vertebræ, is connected by its External Surface to the Pericranium and Periosteum; while the inner part of it, together with the Tunica Arachnoidea and Pia Mater, is continued along the Nerves.

The *Involucra*, or *Coverings*, incloſe each of the Nerves in general, and likewiſe the ſeveral Fibrillæ of which they are compoſed, whereby their ſize, as well as ſtrength, is greatly increaſed.

The Nerves, ſoon after leaving the Bones, have the Dura Mater ſo intimately connected with them, that it has been conſidered by ſome Authors, as degenerating into condenſed Cellular Subſtance, notwithſtanding it ſtill retains the general appearance of the Dura Mater.

Upon examining the Nerves, eſpecially the ſmall ones, in a living or recently dead animal, they are obſerved to have numerous *White Lines* placed tranſverſely, or in a ſerpentine direction. —*Obſ. on Nerv. Syſt.* Tab. XIII.

When the Nerves are moderately ſtretched, this appearance becomes leſs evident; and when extended conſiderably, or when macerated in water, it vaniſhes entirely.

PROCHASKA (*De Carne Muſculari*) ſuppoſes theſe Serpentine Lines to be owing to a decuſſation of Veſſels and Fibres of Cellular Subſtance ſtraitening the Nerves.

Dr. MONRO conſiders them as Folds or Joints allowing the Nerves to accommodate themſelves to the various ſtates of Flexion and Extenſion.

The Nerves are ſupplied with *Arteries* from the neighbouring Blood-veſſels, to which they ſend correſponding *Veins*.

Theſe, however, are ſmall, and difficult of injection, excepting in the large Nerves, where the Veſſels are more conſiderable, and where, after a minute injection, the Nerve receives the colour of the matter injected.

Upon dividing the Nerves, they are not found to poſſeſs much *contractility*; while the Arteries, upon being cut are obſerved to retract very conſiderably.

They are generally lodged in the common Cellular Subſtance and Fat, and in the Interſtices of the Viſcera and Muſcles, where they are prevented from being compreſſed; though in ſeveral parts they are expoſed to the hardneſs of Bones, or to the action of Muſcles, over or through which they paſs.

In their courſe through the different parts of the Body, they generally run as ſtraight as is conſiſtent with the nature of the particular part over which they paſs, and their own ſafety.

In their progreſs, they divide into *Branches*, which become gradually ſmaller, and which, though taken collectively, are inferior in ſize to the Trunks from which they iſſue.

The Branches generally run off at acute angles; but in ſeveral places they have a retrograde direction.

They have commonly the ſame kind diſtribution in the oppoſite ſides of the ſame Subject, and vary little in this reſpect in different Subjects.

In ſome parts of the Body, ſeveral Nerves unite together, and form a *Plexus* or *Net-work*; in others, they unite into a *Common Trunk*; and in many, by ſuch an union, a hard knot, termed *Ganglion*, is formed.

When the *Plexuſes*, or the *Common Trunks*, are minutely examined by ſlitting open their coverings, it is found, that their Fibrillæ are intermixed in ſuch a manner, that each of the Nerves paſſing out from the Plexus, or from the Common Trunk, is compoſed of Fibrillæ from ſeveral, or from all the Nerves which entered it, in conſequence of which, the Organs in general are furniſhed with Nerves from various ſources. *Obſ. on Nerv. Syſt.*

The *Ganglia* differ from each other in ſize and figure: They have thicker Coats and are more Vaſcular than the Nerves; and are larger than the whole of the Nerves, taken conjunctly, which enter into or go out from them.—They are ſuppoſed to ſerve as freſh ſources of Nervous Influence.

They are compoſed of Nervous Fibrillæ, covered by ſomething like a Cineritious Matter, and are ſo divided, multiplied, and intermixed, that each of the Nerves paſſing out from a Ganglion is found to be compoſed of Fibrillæ derived from the greater part of the Nerves which enter it.—*Obſ. on Nerv. Syſt.*

Where Nerves paſs out from the ſide of a Ganglion, they are compoſed of Fibrillæ which come off in contrary directions; —the one ſet from the beginning, the other from the oppoſite extremity of the Ganglion.

The Nerves which go out from the different Ganglia have the ſame ſtructure with thoſe which enter them, but are found, with only a few exceptions, to be rather larger.

In the Trunk of a Nerve, the Cords appear to run parallel to each other; but when macerated in water, ſo as to diſſolve the Cellular Subſtance, or when otherwiſe accurately examined, they are ſeen evidently to intermix ſomewhat after the manner of the Fibrillæ in the Plexus, or in the Ganglia.—*Obſ. on Nerv. Syſtem.*

The Termination of the Nerves is ſoft, pulpy, and pellucid, as is diſtinctly ſeen in the Retina of the Eye or Ear; the external Covering being entirely laid aſide, while the Pia Mater, in particular, accompanies them throughout.

The Nerves preſerve the motion of the Muſcular Fibres.

They conſtitute the immediate Organs of Senſation, and convey Impreſſions made upon them to the Mind.

The manner in which theſe Impreſſions are produced,—whether by a Vibration communicated to the Nerves; or by a Liquid called *Nervous Fluid*, contained and moving in them;—or by an electric Matter common to them and many other ſubſtances; or in what manner that power acts, termed *Animal Electricity*,

which has been lately discovered to take place in the Animal Kingdom, upon the application of certain Metals; is not yet understood.

DISTRIBUTION OF THE NERVES.

THE NERVES are distinguished into two Classes; one arising from the Brain, termed *Cerebral*; the other from the Spinal Marrow, termed *Spinal Nerves*.

The Cerebral Nerves are generally reckoned *Nine* or *Ten Pairs* in number, besides a particular Pair, which has the name of *Sympathetic*.

They pass through the Holes in the Base of the Cranium, and receive their respective Names according to their order; or from their Functions; or from the Parts on which they are dispersed, &c.

The Spinal Nerves consist of *Twenty-Nine* or *Thirty Pairs*, which pass out between the different Vertebræ, besides a Pair called *Accessory*, which enter the Cranium from the top of the Spinal Marrow, and afterwards pass out with one of the Cerebral Nerves.

NERVES WHICH PASS THROUGH THE BASE OF THE CRANIUM.

The FIRST PAIR, or OLFACTORY NERVES,—arise, on each side of the Brain, by three separate Striæ, from the Corpora Striata, at the under and back-part of the Anterior Lobes, near where the Carotid Arteries enter the *Fissures of* SYLVIUS.

They are more tender than the other Nerves, and also differ from them in not being composed of Fasciculi.

They run each in a Furrow, upon the under Surface of the Anterior Lobes of the Brain, converging a little and becoming somewhat larger, till they reach the Cribriform Plate of the OEthmoid Bone.

Upon this Plate, each forms an *Oblong Bulb*, which, in colour and consistence, resembles the Cortical part of the Brain, but is mixed with streaks of Medullary Matter.

From this Bulb, numerous Nervous Filaments are sent off, which pass through the Holes of the Cribriform Plate, and now become firm and strong like the other Nerves, by receiving a covering from the Dura Mater.

After entering the Nose, they divide into two Portions or Planes,—one passing on the Septum, the other upon the Ossa Turbinata, and other parts opposite to the Septum, and both running at first in Grooves of the Bones.

They form a beautiful Plexus, which is ſpread out upon that ſide of the Membrane of the Noſe which is contiguous to the Bones, and may be traced a conſiderable way upon it in diſtinct Threads, which becoming gradually ſmaller, ſink into the Membrane, and are ſuppoſed to terminate on the ſurface next the Cavity of the Noſe, there conſtituting the Organ of Smell.

The SECOND PAIR, or OPTIC NERVES,—which are of great ſize, ariſe from the Thalami Optici, and are connected in their paſſage to Tubercles at the root of the Infundibulum, which furniſh them with an addition of Medullary Subſtance.

They are of a purer white than other Nerves, having leſs Cineritious Matter entering their compoſition, and differ alſo in the Pia Mater furniſhing them with a general Covering, before it inveſts the ſeveral Faſciculi of which they are formed.

At the fore part of the Sella Turcica, they unite, and have their Medullary Parts intimately intermixed.

From this union, they go obliquely outwards and forwards through the Foramina Optica into the Orbits; and advancing in the Orbits in a waving direction,—to prevent them from being over-ſtretched in the motions of the Eye,—they perforate the Balls, to be expanded into the Retinæ, which have been already deſcribed.

The THIRD PAIR, or MOTORES OCULORUM,—ſmaller than the Optic Nerves,—ariſe at the under, inner, and back-part of the Crura Cerebri, or between the Corpora Albicantia and Tuber Annulare, by numerous Threads which are ſoon collected into their reſpective Trunks.

They paſs outwards, perforate the Dura Mater at the ſides of the Poſterior Clinoid Proceſs, and running along the upper part of the Cavernous Sinus, at the outſide of the Carotid Arteries, they get through the Foramina Lacera into the Orbits.

Upon entering the Orbits, they divide into ſeveral Branches, which ſupply the greater number of the Muſcles of the Eye, in conſequence of which the Nerves have obtained their particular name.

A Branch runs to each of the Muſcles within the Orbit, excepting the Trochlearis and Abductor; and the Nerve likewiſe aſſiſts in forming a ſmall Ganglion, termed *Opthalmic*, from which Twigs are ſent off to ſupply the Ball of the Eye.

The FOURTH PAIR, or PATHETIC.—have their origin the higheſt of the Cerebral Nerves, and are the moſt ſlender of the Body, being generally formed of one Faſciculus only on each ſide.

They ariſe by a ſingle, and ſometimes by a double root, behind the Teſtes, from the Medullary Expanſion which lies over the paſſage to the Fourth Ventricle, and which unites the Proceſſus ad Teſtes to each other.

They afterwards turn round the Crura Cerebri, and perforate the Dura Mater at the edges of the Tentorium, ſome way behind the entrance of the Third Pair.

They run afterwards along the Cavernous Sinuſes, at the outer ſide of the Third Pair, then croſs over that Pair, and paſſing out of the Cranium through the Foramina Lacera, they go obliquely over the Muſcles at he upper part of the Orbits, to be entirely diſperſed upon the Pathetic or Trochlearis Muſcles.

The FIFTH PAIR, or PAR TRIGEMINUM,—which are the largeſt Nerves of the Brain, ariſe, each by an anterior ſmall, and a poſterior large Portion, from the ſide of the Tuber Annulare, where the Crura Cerebelli join it.

They enter the Dura Mater a little below the Tentorium, over the points of the Partes Petroſæ of the Temporal Bones, and form a Plexus on each ſide, in which upwards of fifty Faſciculi have frequently been enumerated.

The Plexus ſinks cloſe by the outſide of the Cavernous Sinus, concealed by a doubling of the Dura Mater, and forms a Ganglion ſometimes called *Gaſſerion*, after GASSER, who, if not the Diſcoverer, was the firſt who illuſtrated it.

The Ganglion is of a ſemilunar form, and placed tranſverſely with reſpect to the Trunk of the Nerve.

From the oppoſite and curved edge of the Ganglion, three large Branches come out; the firſt and Anterior, termed *Ophthalmic*, —the ſecond and Middle, the *Superior Maxillary*, and the third and Poſterior, the *Inferior Maxillary*.

The FIRST BRANCH of the FIFTH PAIR,—at the ſide of the Sella Turcica, is ſituated lower than the Third Pair, and afterwards croſſes over it, being previouſly connected by Nervous Matter to the Trunk of the Fourth Pair.

It goes through the Foramen Lacerum into the Orbit, and is there divided into the following Branches, viz.

The *Supra-Orbitar*, which is the largeſt of the whole, being a continuation of the Ophthalmic.

It paſſes immediately under the Membrane which lines the upper part of the Orbit, and ſplits into two branches of unequal ſize.

The ſmaller Branch termed *Supratrochlearis*, runs under the Superciliary Ridge to the Upper Eye-lid and Fore-head.

The larger paſſes through the Foramen Supra-Obitarium,—or over the Superciliary Ridge when the Foramen is awanting,—ſends Branches to the Upper Eye-lid, and divides into ſeveral others, which run back partly above, but chiefly under the Frontal Muſcle, to ſupply the fore and upper part of the Head in general, while minute Fibres appear to penetrate the Bones.

The *Naſal Branch*, which runs obliquely over the Optic Nerve, where it detaches a Filament or two to the Eye, then under the Levator Muſcles of the Eye-lid and Eye; and getting

between the Abductor Oculi and Trochlearis, passes to the inside of the Orbit.

It sends a Branch, which after entering the Foramen Orbitarium Internum Anterius, re-enters the cavity of the Cranium, and gets upon the Cribriform Plate of the OEthmoid Bone.

From thence it passes down through one of the anterior Holes of this Plate, and sends Twigs to the membrane at the anterior part of the Nostril, while the Nerve descending at the fore part of the Septum Narium, is dispersed upon the point and Wing of the Nose.

The continuation of the Nasal Branch, now called *Infratrochlearis*, passes forwards to the inner Corner of the Eye, and is distributed upon the Lacrymal Sac and parts adjacent.

The *Lacrymal Branch*, which runs along the Abductor Oculi Muscle, sends Twigs to the Membranes and Fat near it, likewise one or two through the Substance of the Cheek-bone, and one in particular to the Substance of the Lacrymal Gland, while another passes over the Gland, and vanishes in the neighbouring parts.

A *Branch* to the Ophthalmic Ganglion, which is sometimes sent off from the Nasal, at other times from the Ophthalmic Trunk.

The *Ophthalmic Ganglion*,—termed also *Lenticular*, from its shape, is formed by this Branch from the Fifth, and by another from the Third Pair, and is commonly the smallest in the Body.

It is of an oblong form and compressed, is situated at the outside of the Optic Nerve a little before its entrance into the Orbit, and is concealed in Fat. Sometimes, though rarely, the Filaments which form it take their origin entirely from the Third Pair.

From the Ganglion, about a dozen of Filaments arise, termed *Ciliary Nerves*, collected into two Portions, which creep along the opposite sides of the Optic Nerve, separated a little from each other and running in company with the Ciliary Arteries.

Besides the Ciliary Nerves from the Ganglion, one and sometimes two Filaments arise from the Ramus Nasalis, and pass along with the other Ciliary Branches.

The Ciliary Nerves, running with scarcely any division, reach the back-part of the Eye; and a little before the Insertion of the Optic Nerve, enter the Sclerotic Coat, pass obliquely through it, and about the middle of the Ball, appear upon the Surface of the Tunica Choroides.

Upon this Coat, they run flat, and in a parallel direction, sending very few evident Branches, either to it or to each other, till they reach the Ciliary Circle, where they divide into numerous minute Filaments.

Upon the Choroides, five or six are larger than the rest, some being so minute as almost to escape the naked Eye.

At the Ciliary Circle, each commonly divides into two Branches, which are covered by the Cellular Substance of the Circle; and these, at the root of the Iris, are subdivided into still smaller Branches, which run in a radiated and waving direction, the Ciliary Vessels being interposed.

Near the inner edge of the Pupil, they are united into Arches, from which very minute Twigs run to the interior margin of the Iris.

The SECOND BRANCH, or SUPERIOR MAXILLARY NERVE, —is larger than the Ophthalmic, and is principally dispersed upon the Parts belonging to the Upper Jaw, from which it has its name.

It goes through the Foramen Rotundum of the Sphenoid Bone, and at its exit divides into numerous Branches, viz.

The *Spheno-Palatine*, or *Lateral Nasal Nerve*, which sends a reflected Branch through the Foramen Pterygoideum of the Sphenoid Bone, to join the Sympathetic Nerve in the Canalis Caroticus, and a Branch which enters the Foramen Innominatum of the Pars Petrosa, to join the Portio Dura of the Seventh Pair.

The Lateral Nasal Nerve goes afterwards into the Spheno-palatine Hole, to be dispersed upon the under and back-part of the Septum, and opposite side of the Nose, and upon the Membrane of the Sphenoidal Sinus and Eustachian Tube: One Branch in particular, after passing along the Septum, goes through the Foramen Incisivum to the Roof of the Mouth.

The *Palato Maxillary*, or *Palatine Branch*, which descends through the Canal leading to the Foramen Palatinum Posterius; and running near the Alveoli with corresponding Blood-vessels, sends Branches to the Velum Palati and Roof of the Mouth, and Minute Filaments which penetrate into the Palate-plate of the Superior Maxillary Bone.

Small Branches, which pass round the Upper Jaw, and vanish in the Cheek.

A *Twig*, which goes through the Hole in the Os Malæ, along with a Branch of the Ocular Artery, to the [illegible].

Small Filaments, which run down into the back part of the Superior Maxillary Bone, and supply the substance of the Upper Jaw, the large Dentes Molares, and Membrane lining the Antrum Maxillare.

The Second Part of the Fifth Pair after sending off these different Branches, goes into the Canal under the Orbit, and forms the Infra-orbitar Nerve, which, while in the Canal, gives off Filaments passing through minute Conduits in the Upper Jaw, to the Antrum, to the Substance of the Bone, to the small Molares, Caninus, Incisores, and Fore-Teeth; and sometimes a Twig, the companion of a small Branch of the Internal Maxillary Artery, to the Membrane lining the Orbit.

The Infra-Orbitar Nerve paſſes afterwards out of the Foramen Infra-Orbitarium, and divides into many large branches, to be diſtributed upon the Cheek, Under Eye-lid, Upper Lip, and ſide of the Noſe.

The THIRD BRANCH, or INFERIOR MAXILLARY NERVE, goes though the Foramen Ovale of the Sphenoid Bone, and ſupplies the parts belonging to the Under Jaw, and the Muſcles ſituated between it and the Os Hyoides, by the following Branches, viz.

One, or ſometimes two *Deep Temporal Branches*, to the inner part of the Temporal Muſcle.

Branches, to the Maſſeter, Pterygoideus, and Buccinator Muſcles.

A *Branch* which paſſes behind the Cervix of the Lower Jaw, and gives off Filaments to the fore-part of the Ear, and afterwards accompanies the Temporal Artery upon the ſide of the Head, where it terminates.

A *Branch*, to the Buccinator Muſcle and other parts of the Cheek.

A Nerve of conſiderable ſize, termed *Lingual* or *Guſtatorius*, which paſſes between the Pterygoid Muſcles, to the inner of which it gives ſome Filaments. It then ſends off, from its under ſide, a Ganglion which tranſmits Nerves to the Inferior Maxillary Gland.

The Lingual Nerve alſo tranſmits ſeveral Branches to the Sublingual Gland, and to the Muſcles of the Tongue.

It terminates, at length, near the Point of the Tongue, by many Branches which belong chiefly to the Papillæ; in conſequence of which this Branch is conſidered as the principal Nerve of the Organ of Taſte.

The Trunk of the Inferior Maxillary Nerve, having parted with the Lingual Nerve, directs its courſe between the Pterygoid Muſcles to the Poſterior Foramen of the Inferior Maxillary Canal.

Before entering the Canal, it ſends off a long and ſlender Branch, which is lodged at firſt in a Furrow of the Bone, and goes afterwards to be diſperſed chiefly upon the Mylo-hyoideus Muſcle and Sublingual Gland.

The Trunk of the Nerve is afterwards conducted along the Canal of the Jaw under the Alveoli, where it diſtributes Filaments to the different Teeth of the correſponding ſide, and to the Subſtance of the Bone: and coming out of the Canal by the Anterior Maxillary Foramen, ſomewhat diminiſhed in ſize, it ſcatters its remaining Branches upon the Chin and under Lip.

The SIXTH PAIR, or ABDUCENTES, ariſe from the beginning of the Medulla Oblongata, at the part common to the Tuber Annulare and Corpora Pyramidalia, and are the ſmalleſt of the Cerebral Nerves, the Fourth Pair excepted.

They perforate the Dura Mater at the inner side of the entrance of the Fifth Pair, and run forwards within the Cells of the Cavernous Sinus; but so surrounded by Cellular Substance, as to seem to be protected from the Blood of that Receptacle.

While in the Sinus Cavernosi, they are situated between the Ophthalmic Nerves and Carotid Arteries, upon the surface of the latter of which they send off two or three Filaments on each side of the Head, to assist in forming the Great Sympathetic Nerves.

The Trunks of the Sixth Pair afterwards go through the Foramina Lacera, to be dispersed entirely upon the Abductor Muscles of the Eyes.

The SEVENTH PAIR is composed, on each side, of two portions,—the *Nervus Auditorius*, *Nervus Acusticus*, or *Portio Mollis*; and the *Communicans Faciei*, or *Portio Dura*.

The PORTIO MOLLIS, is the softest of the Nerves, excepting the Olfactory.

It arises by transverse Medullary Striæ from the anterior part of the Fourth Ventricle, and is separated from its fellow of the opposite side only by the Crena of the Calamus Scriptorius.

The Striæ, turning round the Medulla Oblongata, apply themselves to the Tuber Annulare, from which they receive an addition of substance, and then get to the side of the Portia Dura.

The PORTIO DURA, sometimes also called *Sympatheticus Minor*, arises from that part of the Brain which is common to the Pons VAROLII, Crura Cerebelli, and Medulla Oblongata; and at its origin, is situated upon the inner side of the Portio Mollis.

Between the origin of the Portio Dura and Trunk of the Portio Mollis, a small Nerve arises, termed by WRISBERG, *Portio Media inter P. Duram et P. Mollem*.

It comes off by minute Fibrillæ, which soon unite into a Trunk, from the posterior part of the Pons VAROLII, or from the adjoining part of the Medulla Oblongata, and is an Accessory Nerve of the Portio Dura.

The Portio Dura, considerably smaller than the P. Mollis, gets into the Meatus Auditorius Internus, and is there lodged in a kind of half-sheath, formed by that Nerve, to which it is connected by fine Cellular Substance; the Dura Mater, which lines the Passage, giving here a general Covering to both Nerves.

PORTIO MOLLIS.—The Portio Mollis is formed of two Fasciculi, nearly of equal size, one of which belongs to the Cochlea, the other to the Vestible and Semicircular Canals.

Each of these Fasciculi passes by numberless Fibrillæ through the Cribriform Plate in the bottom of the Meatus Auditorius Internus, to the inner parts of the Labyrinth.

The Fibrillæ deſtined for the Cochlea go through the Holes in the ſides of the Modiolus.

Some paſs between the Plates which form the Septa of the Gyri ; others go through Holes between the Oſſeous Plates of the Lamina Spiralis ; but by much the greateſt number perforate the ſides of the Modiolus, between the Septum of the Gyri and the Lamina Spiralis.

The larger Fibrillæ run upon the Membrane covering the Lamina Spiralis ; while the ſmaller go from the Modiolus, between the Oſſeous Septa and on the inner ſides of the Gyri, to be diſperſed upon the Membrane lining them.

The remaining Fibrillæ perforate the Plate common to the Modiolus and Infundibulum, and vaniſh upon the laſt half-turn of the Lamina Spiralis and the Cupola of the Cochlea.

Upon the Oſſeous part of the Lamina Spiralis, the Nerves have the common appearance ; but upon the Membranous Portion, they are of the colour of the Retina of the Eye.

In the whole of their courſe upon the Lamina Spiralis, they form a real Retina ; though the reticulated ſtructure becomes much leſs apparent upon the outer part of this Lamina, and upon the continuation of the Membrane lining the Gyri,—the Nerves ſeeming to terminate in a ſemipellucid Pulpy Membrane reſembling the Retina of the Eye.

The Membrane upon which the Nerves are expanded, is but ſlightly connected to the Perioſteum which lines the inner ſide of the Cochlea, and which, though thin, may be readily perceived, being painted with Blood-veſſels ;—nor does it differ from the Perioſteum lining the Tympanum.—See Dr. MONRO'S *Treatiſe on the Ear*.

The Faſciculus which belongs to the Veſtible and Semicircular Canals, forms at firſt a Plexus, then a Gangliform Enlargement, previous to its entrance into the Labyrinth.

The Nerves which belong to the Veſtible and Semicircular Canals paſs through the Macula Cribroſa, or Holes ſubdivided into ſmaller Holes by Cribriform Plates in the bottom of the Meatus Auditorius Internus.

Of theſe Branches, ſmall Filaments paſs through the Macula Cribroſa in the Inferior Foſſula of the Meatus Auditorius Internus, to the Alveus Communis or Sacculus Veſtibuli.

A ſmall Branch goes through another Cribriform Hole in the Inferior Foſſula, to the Ampulla of the Poſterior Membranaceous Semicircular Canal.

A Branch, larger than any of the former, enters the Poſterior Hole in the upper Foſſula of the Meatus Internus, to be diſperſed upon the Ampullæ of the Superior and Exterior Membranaceous Canals.

The Nerves, after reaching the Sacculus Veſtibuli and the different Ampullæ, are ſpread out upon them, as in the Cochlea,

in the form of a Net-work, the Fibres of which, by degrees becoming pellucid, disappear upon the beginning of the Membranaceous Canals.

PORTIO DURA.—The Portio Dura separates from the Portio Mollis, at the bottom of the Meatus Auditorius Internus, and enters the *Canalis* or *Aquæductus* FALLOPII, by the anterior Hole in the upper Fossula at the bottom of the Meatus.

After getting into the Canal, it receives the retrograde Nerve from the Second Branch of the Fifth Pair, which enters by the Foramen Innominatum on the fore-side of the Pars Petrosa.

It sends Twigs through Foramina in the sides of the Aqueduct, to the Mastoid Cells and to the Muscle of the Stapes.

A little before its exit from the Aqueduct in the Adult, but at the outer end of it in the Fœtus, it gives off a reflected Branch, termed *Chorda Tympani*, which passes between the long Processes of the Malleus and Incus, and over the Membrana Tympani.

The Chorda Tympani goes afterwards in a Fissure at the outside of the Eustachian Tube, and joins the Lingual Branch of the Fifth Pair, soon after that Nerve has got out of the Cranium.

In its passage, it supplies the Muscles of the Malleus, and the Membranes, &c. of the Tympanum.

The Portio Dura afterwards passes out of the Aqueduct by the Foramen Stylo-mastoideum, and is at first lodged deep, being situated in a hollow behind the Parotid Gland.

Here it gives a small Occipital Branch, which sends Twigs to the back part of the Ear, and terminates in the Oblique Muscles of the Head.

It sends a Branch to the Digastric, and another to the Stylohyoid Muscle; gives off a Filament which joins the Auricular Branch of the Inferior Maxillary Nerve, and goes to the forepart of the Ear; and is connected by another small Filament at the under part of the Ear, with Branches of the Sympathetic Nerve which run along the External Carotid Artery.

It also furnishes Filaments to the Parotid Gland, and then perforates it, dividing into large Branches, which join, separate, and rejoin, different times, on the side of the Face.

This Plexus is expanded in such a manner as to constitute what has been called by some the *Pes Anserinus*, and is divided into the following sets of Branches, viz.

The *Temporal Branches*, which ascend upon the side of the Head, to be distributed upon the Temple; some running over, others under the Branches of the Temporal Artery, and forming several joinings with the Frontal Branches of the first part of the Fifth Pair of Nerves:

The *Superior Facial Branches*, which are dispersed upon the Orbicularis Oculi Muscle, and the parts in general about the

outer angle of the Eye, communicating in various places above and below the Orbit, with the firſt and ſecond Branches of the Fifth Pair:

The *Middle Facial Branch*, or the *Great Facial Nerve*, which runs acroſs the Maſſeter Muſcle, and divides into many Branches, to be diſperſed upon the Cheek, and ſide of the Noſe and Lips.

They are connected with the Branches of the Superior Facial, and near the corner of the Mouth, with others of the ſecond and third parts of the Fifth Pair. They have likewiſe ſome communications with deep Branches of theſe two Nerves which paſs outwards between the Maſſeter and Buccinator Muſcles.

The *Inferior Facial Branches*, which proceed along the ſide of the under Jaw, to be diſperſed upon the parts covering it, and upon the Under Lip; and connect themſelves with ſome of the Middle Facial Branches, and with others belonging to the third part of the Fifth Pair:

The *Deſcending*, or *Subcutaneous Cervical Branches*, ſome of which run forwards under the Lower Jaw, and others downwards, near the External Jugular Vein, to the Superficial Muſcles, and to the Integuments at the ſide and upper part of the Neck, where they form communications with the Inferior Facial Branches, and with different Branches of the upper Spinal Cervical Nerves.

The EIGHTH PAIR ariſes from the Medulla Oblongata, at the ſides of the Baſes of the Corpora Olivaria, and conſiſt in each ſide, of the Nervus Gloſſo-pharyngeus, and Pars Vaga.

The GLOSSO-PHARYNGEUS is the ſmaller of the two, being only a little ſuperior in ſize to one of the Nerves of the Fourth Pair.

The PARS VAGA comes off immediately under the former, and is compoſed of ſeveral ſeparated Faſciculi, which are ſoon collected into a ſingle Cord.

The two Nerves, paſſing outwards, go through the Baſe of the Cranium, immediately before the end of the Lateral Sinus, by the Hole common to the Occipital and Temporal Bone, and are ſeparated from each other and from the Sinus by ſmall Proceſſes of the Dura Mater.

The *Gloſſo Pharyngeus*, termed alſo *Lingualis Lateralis*, upon its exit from the Cranium, ſends a Branch backwards, which joins the Digaſtric Branch of the Portio Dura.

A little lower, it gives off Branches, which, with others from the Pharyngeal Branch of the Eighth Pair, and from the Great Sympathetic Nerve, form a Plexus which embraces the Internal Carotid Artery, and afterwards ſends Branches along the Carotis Communis to the Heart.

Still lower, it gives Branches which communicate with others belonging to the Pharyngeal Nerve, and go to the upper part of the Pharynx and to the Stylo-Pharyngeus Muſcle.

The Gloſſo-Pharyngeus, after ſending a Twig or two to the Tonſil, to the upper part of the Pharynx, and Membrane of the Epiglottis, divides into many Branches, which run partly to the margin and partly to the middle of the root of the Tongue, ſupplying, eſpecially, the Papillæ Majores and the parts in their neighbourhood.

The *Pars Vaga*,—upon emerging from the Cranium, frequently becomes a little increaſed in diameter for about an inch downwards; forming what ſome authors have termed its *Gangliform Enlargement*.

It deſcends in the Neck at the outer and back-part of the common Carotid Artery, to which it is cloſely united, being included along with it in the ſame common ſheath of Cellular Subſtance.

At the upper part of the Neck, it tranſmits a Branch to the Pharynx; and immediately afterwards, a large one to the Larynx; and near the top of the Thorax, it ſends a Filament, and ſometimes two, to the Heart.

The *Pharyngeus*,—chiefly formed by the Pars Vaga, but partly alſo by a Branch from the Acceſſorius, is afterwards joined by Branches from the Gloſſo-Pharyngeus, and deſcends obliquely over the Internal Carotid Artery.

Near the origin of this Artery, it ſends Filaments which join others from the upper part of the Great Sympathetic, and creep along the Common Carotid, to be united with the Carotid Artery.

Upon the middle of the Pharynx, it expands into a Gangliform Plexus, from which many ſmall Branches are ſent out, to be diſtributed upon the three Conſtrictors of the correſponding ſide of the Pharynx; one or two Filaments uniting above with the Gloſſo-Pharyngeus, and others below with the Laryngeus Superior.

The *Laryngeus Superior*,—deſcends obliquely forwards between the Carotid Arteries and Pharynx; and behind the origin of the Carotids, is divided into a large Internal or Superior, and a ſmall External or Inferior Branch.

The *Internal Branch* paſſes forwards between the Os Hyoides and Superior Cornu of the Thyroid Cartilage.

It divides into numerous Branches, ſome of which go to the Arytenoid Gland, and to the Oblique and Tranſverſe Arytenoid Muſcles, and others to the Glandular Membrane of the Epiglottis; while the greater number and the larger of theſe Branches are diſperſed upon the Glandular Membrane lining the upper portion of the Larynx and parts adjacent.

The *External Branch*,—which SCARPA conſiders as more properly termed *Pharyngo Laryngeus*,—is originally compoſed of a Branch from the Internal Laryngeal, and another from the Great

Sympathetic; and is connected by a Filament to the Pharyngeal, and ſometimes alſo by one to the Internal Laryngeal Nerve.

It imparts Twigs to th Middle and Lower Conſtrictors of the Pharynx, and afterwards terminates in the Thyroid Gland and inner part of the Larynx.

The *Filament*, ſent from the Pars Vaga at the bottom of the Neck, joins the Great Cardiac Branch of the Sympathetic Nerve in the upper part of the Thorax, to be diſperſed upon the Heart.

The NINTH PAIR,—frequently termed *Linguales*, and ſometimes *Linguales Medii*,—ariſe from the under and lateral parts of the Corpora Pyramidalia, on the fore ſide of the Medulla Oblongata, by numerous Filaments which are collected into Faſciculi.

They paſs out at the Superior Condyloid Foramina of the Occipital Bone, after which they adhere, for ſome way, to the Eighth Pair, by Cellular Subſtance.

A little below the Cranium, each of the Trunks of this Pair of Nerves is conjoined by a croſs Branch with the Suboccipital Nerve, or with an Arch which connects that Nerve and the Firſt Cervical together.

The Trunk then deſcends between the Internal Jugular Vein and Internal Carotid Artery, and at the root of the Occipital Artery croſſes over both Carotids to its place of deſtination.

Where it begins to croſs over the Carotids, it ſends down a Branch of conſiderable ſize, termed *Deſcendens Noni*.

The *Deſcendens Noni* paſſes down a certain length along with the common Carotid Artery, and, in its courſe, furniſhes Branches to the upper ends of the Omo-hyoid and Sterno-thyroid Muſcles, after which it unites with Branches from the Firſt and Second, and with ſmall Filaments from the Second and Third Cervical Nerves, forming an Arch, from which long and ſlender Twigs go to the under portions of the Sterno-thyroid, and to the Omo-hyoid and Sterno-hyoid Muſcles.

The Ninth Pair paſſes afterwards behind the Facial Trunk and Temporal Veins, or the Trunk formed by theſe, and over the root of the Facial Artery,—ſending a Nervous Twig to the Hyo-thyroid Muſcle.

Upon the Hyo-gloſſus Muſcle, the Trunk of the Nerve is ſpread into a great number of Branches, which go to the middle of the Tongue, and terminate chiefly in its Fleſhy parts; a Twig extending as far as the Genio-hyoid Muſcle, and two or ſometimes only one Filament anaſtomoſing with the Lingual Branch of the Fifth Pair.

The GREAT SYMPATHETIC NERVE,—obtaining its name from its numerous Connections with moſt of the other Nerves of the Body,—is either formed originally by the reflected Branch from the ſecond of the Fifth Pair, and by one or two and ſometimes three ſmall Filaments, ſent down from the Sixth Pair while

in the Cavernous Sinus; or, according to the opinion of ſome Authors, the Sympathetic ſends off theſe ſmall Nerves to join the Fifth and Sixth Pairs.

Upon the Surface of the Internal Carotid Artery, while in the Carotic Canal, the Branches of the Fifth and Sixth Pairs and Great Sympathetic making this connection, are pulpy and tender, and form a Plexus which ſurrounds the Carotid, and from which the Trunk of the Sympathetic is moſt frequently conſidered as being ſent out.

After eſcaping from the Carotic Canal, the Trunk which is of ſmall ſize, is cloſely connected, for a ſhort ſpace, with the Trunks of the Eighth and Ninth Pairs; and, ſeparating from theſe, it expands into a large Ganglion,—termed *Ganglion Cervicale Superius*,—of a long oval form, and ſituated oppoſite to the Second Cervical Vertebra.

From this Ganglion, the Nerve comes out very little increaſed in ſize,—and deſcends on the anterior Vertebral Muſcles of the Neck,—behind the Eighth Pair of Nerves, with which, and with the Carotid Artery, it is connected by a Sheath of Cellular Subſtance.

At the under part of the Neck, and nearly where the Inferior Laryngeal Artery turns over towards the Larynx, the Sympathetic forms another Ganglion, termed by ſome Authors *Cervicale Medium* and by others *Cervicale Inferius*.

The Ganglion Medium is ſomewhat ſimilar in ſhape and ſize to the Ganglion Superius; though it varies conſiderably in theſe reſpects in different Subjects.

From this Ganglion, principal Branches are ſent down, one of which, larger than the reſt, and conſidered as the continuation of the Trunk, turns outwards between the Inferior Laryngeal and Vertebral Arteries to another Ganglion.

This third Ganglion,—is placed at the head of the firſt Rib, and is termed by ſome Authors *Ganglion Cervicale Inferius*, or *Imum*, while others conſider it as the firſt of the Thoracic Ganglia.

The Cervical part of the Great Sympathetic is connected with other Nerves, and diſperſed upon different parts by the following Branches, viz.

One or two ſhort, but thick Branches, which connect the beginning of the Superior Ganglion with the root of the Suboccipital Nerve:

One or two Pulpy Nerves, which run forwards behind the Internal Carotid Artery, and divide into many others. Theſe, together with Filaments from the Gloſſo-pharyngeus, form a Plexus which ſends Branches to the Ganglifform Expanſion of the Pharyngeus, and afterwards embraces the external Carotid Artery, ſending Plexuſes of Filaments along its different Branches:

One or two other ſoft Nerves, going behind the Internal Carotid, and with a Branch of the Laryngeus Internus of the Eighth Pair, forming the Laryngeus Externus :

Thick ſhort Roots connecting the Firſt, or Conjugation of the Firſt and Second Cervicals, with the ſuperior Ganglion of the Spmpathetic Nerve.

From the Superior Ganglion alſo, are ſent off ſmall Branches, which uniting with Filaments from the Laryngeus Superior, form the *Rumus Cardiacus Supremus*, or *Superficialis Cordis*.

The *Superficial Cardiac Nerve* of the Sympathetic, in the Right Side, divides into Branches at the bottom of the Neck, which ſend a Filament or two along the Inferior Laryngeal Artery to the Thyroid Gland and afterwards unite with the Superficial Cardiac Nerve of the Eighth Pair before the Subclavian Artery, and with the Laryngeal Nerve behind it.—In the left ſide, it terminates in the Cardiac Plexus of Nerves.

From the Second, Third, and Fourth Cervical Nerves, an equal number of Cords deſcend behind the Scaleni and Rectus Major Muſcle, to the middle Ganglion of the Great Sympathetic.

From the oppoſite ſide of the Ganglion, Branches are ſent down, which join and form the *Nervous Magnus Profundus* ; others are fixed to the Superficial Cardiac and to the Recurrent of the Eighth Pair ;—the reſt go partly over and partly behind the Subclavian Artery, to the Inferior Cervical, and to the firſt Thoracic Ganglion.

Nervi Accessorii ad Par Octavum.—The Acceſſory Nerves ariſe by ſmall Filaments from the lateral Parts of the Medulla Oblongata and upper portion of the Spinal Marrow.

The Filaments from the Spinal Marrow come off between the anterior and poſterior Bundles of the Cervical Nerves,—the firſt of them frequently extending as far as the ſpace between the Sixth and Seventh Pairs.

The different Filaments unite by degrees into their reſpective Trunks, and often have connections while within the Dura Mater, with one or two of the Bundles of the upppermoſt Spinal Nerves.

The Trunk of the Nerve paſſes out, on each ſide of the Cranium, in company with the Nerve of the Eighth Pair; but forms no part of that Nerve, being included in its own peculiar Sheath received from the Dura Mater.

After perforating the Cranium, it ſeparates from the Eighth, and deſcends obliquely outwards through the Sterno-maſtoid Muſcle to the Shoulder.

At its exit, it ſends off a Branch, termed by ſome *Ramus Minor*, (the Trunk itſelf being then called *Ramus Major*), which aſſiſts in forming the Pharyngeal Nerve ; and gives another,

ſmaller than the former, to be connected to the Pars Vaga of the Eighth Pair.

At the fore-part of the Sterno-maſtoid Muſcle, it is joined by an Arch to the Suboccipital, and frequently by another to the Firſt Cervical Nerve.

In its paſſage through the Sterno-maſtoideus, it ſends ſeveral Branches to the ſubſtance of that Muſcle, and terminates at length in the Trapezius.

SPINAL MARROW,

AND

ORIGIN OF THE SPINAL NERVES.

THE SPINAL MARROW is the continuation of the Medulla Oblongata, and obtains its name from being contained in the Oſſeous Canal of the Spine.

It is inveſted by the ſame Membranes which cover the Brain, and has an additional partial Involucrum from the Ligamentous Membrane which lines the Bodies of the Vertebræ, and which has been already taken notice of in the deſcription of the Ligaments.

On the inner ſide of the Ligamentous Lining, the Dura Mater is ſituated, which paſſes out of the Cranium by the Foramen Magnum Occipitis, and forms a Cylindrical Sheath which looſely envelopes the Spinal Marrow, and extends as far as the Os Sacrum.

It is more elaſtic than the Dura Mater of the Brain, and thereby admits more readily of the different motions of the Spine.

At its egreſs from the Cranium, it is intimately connected to the beginning of the above-mentioned common Ligamentous Lining, and is alſo united with the Pericranium at the edge of the Foramen Magnum of the Occipital Bone.

Below the Firſt Vertebra of the Neck this intimate connection between the Dura Mater and inner Ligament of the Vertebræ is diſcontinued; a *Cellular Fatty*, and *Slimy Subſtance*, which ſur-

rounds the Dura Mater throughout the reſt of the Canal, being interpoſed between the Membrane and the Ligament.

The Dura Mater is only in contact with the Tunica Arachnoidea, and this alſo only in contact with the Pia Mater, and lying ſo looſely over it as to be ſeparated from it with facility through the whole length of the Spine.

The Spinal Marrow, like the Brain, conſiſts of a cortical and Medullary Subſtance, but differs in this reſpect, that the Cineritious Matter is placed within the other.

Upon the Surface of the Spinal Marrow, while lying in its natural ſituation, many tranſverſe Wrinkles or Folds are obſerved, which allow it to be extended in the motions of the Vertebræ.

It is a little flattened on its anterior and poſterior Surfaces, and is larger near the under part of the Neck, and at the top of the Loins where the great Nerves of the Extremities are ſent off, than in the other parts of the Spine.

It is divided into two lateral Portions or Cords, which are ſeparated from each other externally by an anterior and poſterior Fiſſure continued from the Medulla Oblongata; and each of the lateral Portions is in ſome meaſure ſubdivided by a ſuperficial Furrow into a larger anterior and ſmall poſterior Cord.

The lateral Portions are firmly united together by fine Cellular Subſtance, but may be ſeparated from each other before as well as behind,—without lacerating either,—to near their middle, where they are connected by a Layer of Cineritious Matter which paſſes from the one Cord into the other.

When the Medulla Spinalis is divided tranſverſely, the Cineritious Subſtance is obſerved to have a Cruciform appearance, correſponding with the Cords of which it is compoſed.

The Body of the Spinal Marrow deſcends as far as the Second Vertebra of the Loins, and terminates there by a Conical point, which is concealed by Faſciculi of Nerves.

Each of the lateral portions of the Spinal Marrow ſends off from its anterior and poſterior parts, flat Faſciculi of Nervous Filaments, which are placed oppoſite their fellows on the other ſide.

Several of the Faſciculi of the Cervical Nerves detach Filaments to thoſe immediately above or below them; and the ſame thing is occaſionally obſerved of ſome of the Bundles of Dorſal Nerves.

The anterior and poſterior Faſciculi perforate the Dura Mater, from the inner part of which each Faſciculus is furniſhed with a proper Sheath, and is continued within it, the Sheaths connected by Cellular Subſtance only, till they get between the Vertebræ.

Between the anterior and poſterior Faſciculi or Spinal Nerves, and between the Tunica Arachnoidea and Pia Mater, a ſmall Ligamentous Cord termed *Ligamentum Denticulatum*, is ſituated,

which is attached to the Dura Mater, where that Membrane comes out from the Cranium and accompanies the Spinal Marrow to its inferior extremity.

It adheres by Cellular Subſtance to the Pia Mater, and ſends off from its oppoſite ſide ſmall Cords, in the form of *Denticuli*, which carry the Tunica Arachnoidea along with them, and running more or leſs in a tranſverſe direction, are fixed, each by minute Fibres to the Dura Mater, in the Interſtices of the Faſciculi.

The Ligamentum Denticulatum of the oppoſite ſides incorporate with the Pia Mater at the inferior extremity, or Conical point of the Spinal Marrow, and form a Ligamentous Filament which perforates the under end of the Dura Mater, and is fixed by ſmall Fibres to the Membranes covering the Os Coccygis, in the manner the Denticuli are fixed to the Dura Mater.

It was termed by ſome Authors *Ligamentum Piæ Matris.* It was conſidered by the Ancients as the *Fortieth Pair* of Nerves, and was alſo called *Nervus Imparus Sacrus.*

It aſſiſts in preventing the Spinal Marrow and the tender origin of the Nerves from being overſtretched.

Having got between the Vertebræ, each of the poſterior Bundles forms a Ganglion, from the oppoſite end of which a Nerve comes out, and is immediately joined by the anterior Bundle, thus conſtituting the beginnings of the Trunks of the Spinal Nerves.

The Nervous Cords ſent out from the Spinal Marrow, after receiving their coverings from the Dura Mater, become conſiderably larger than the Faſciculi which form them; as has been already obſerved in the general deſcription of the Nerves.

As ſoon as the Spinal Nerves emerge from between the Vertebræ, each ſends Branches backwards to the Muſcles near the Spine, and others forwards to join the Great Sympathetic Nerve, while the Trunk is continued outwards to its place of deſtination.

The Spinal Nerves are diſtinguiſhed on each ſide, by numbers, according to the Bones under which they paſs; *Thirty Pairs* are moſt commonly enumerated.—One going under the Head, and termed *Suboccipital*;—Seven paſſing under the Vertebræ of the Neck;—Twelve under the Dorſal;—Five under the Lumbar Vertebræ; and—Five under the pieces which originally compoſed the Os Sacrum.

The Faſciculi which form the Cervical Nerves are ſhort, running nearly in a ſtraight direction from their origin to the Intervertebral Holes. Thoſe which form the Dorſal Nerves are longer than the former, and run more obliquely downwards; and thoſe which form the Lumbar and Sacral Nerves are very long and run ſtill more obliquely downwards, till at length the undermoſt of them become nearly longitudinal.

The ſize of the Faſculi correſponds with that of the Nerves which they go to form.—The Faſciculi of the four loweſt Cervical and firſt Dorſal, are large and broad, giving origin to the Great Nerves which ſupply the Superior Extremity.—Thoſe of the Back are much more ſlender, while the Faſciculi of the Loins and the two upper Sacral ones are of great ſize, to form the very large Nerves which run to the Lower Extremity.

The Lumbar and Sacral Faſciculi, while included in the Dura Mater, form a Bundle of Cords, termed *Cauda Equina*, from the reſemblance it has to the Tail of a Horſe; eſpecially when the Fibrillæ of the Nerves are unravelled by ſeparating them from each other.

The Faſciculi perforate the Dura Mater, nearly oppoſite to the parts where they paſs through the Vertebræ,—of courſe the Nerves of the inferior parts of the Spinal Marrow emerge from the Spine, conſiderably lower than their different origins.

Blood-Veſſels of the Spinal Marrow.—The Arteries of the Spinal Marrow conſiſt of Anterior and Poſterior Spinal Arteries, and of many additional Branches communicating with others from the adjacent Veſſels.

The *Anterior Spinal Arteries* ariſe, one on each ſide, from the Vertebrals, near where theſe join to form the Baſilar Artery.

Upon the beginning of the Spinal Marrow, they generally unite into a common Trunk, which deſcends in that depreſſion on the Anterior Surface of the Medulla, whereby it is diſtinguiſhed into two Lateral Portions,—and the Artery continues nearly of the ſame ſize throughout, in conſequence of additions it receives from the neighbouring Arteries.

In the Neck, it communicates with the Vertebral Thyroid, and Cervical Arteries, by Branches which paſs through the ſame Holes with the Nerves.

In the Back, it receives Branches from the Intercoſtal, and in the Loins from the Lumbar Arteries; all of which alſo go through the Intervertebral Holes.

It terminates at the under end of the Spinal Marrow; the Cauda Equina being ſupplied by Branches from the Internal Iliac Artery, which enter through the anterior and poſterior Holes of the Os Sacrum.

The *Poſterior Spinal Arteries*,—ariſe commonly from the inferior Arteries of the Cerebellum, and frequently from the Trunks of the Vertebral Arteries within the Cranium.

They are equal in length to the former Artery, but conſiderably inferior to it in ſize, and continue ſeparate through the whole of their courſe.

They have conſtantly a Serpentine appearance, and form frequent Inoſculations with each other, and with Arteries, the Branches of which communicate with the anterior Spinal Artery.

The Arteries of the Spinal Marrow are divided into minute Branches, which are diſperſed upon its ſubſtance, upon the Membranes which incloſe it, and alſo upon the ſubſtance of the Vertebræ and upon the origins of the Nerves.

The *Veins* of the Spinal Marrow accompany their Arteries, and afterwards terminate in the Sinus Venoſi of the Spine.

The *Sinus Venoſi* conſiſt of one on each ſide, which runs exterior to the Dura Mater, being chiefly lodged in the Ligamentous Membrane which lines the fore and lateral parts of the Vertebral Canal.

They extend from the Foramen Magnum of the Occipital Bone, to the under end of the Os Sacrum, and are ſo irregular on their ſurface, and ſo much divided and ſubdivided within by the openings of Veins, as in many parts to have the appearance of Cells.

At the different Vertebræ, they are conjoined by croſs Branches, which have a Semilunar form, like the ſurface of the Bones which ſurround them.

They communicate at their Superior extremity with the Occipital and Lateral Sinuſes, and ſend numberleſs Branches outwards, which open into the Veins the Arteries of which anaſtomoſe with thoſe of the Spinal Marrow.

Nerves of the Neck and Superior Extremity.

Nervus Accessorius.—The Acceſſory Nerve belongs in ſome reſpects to this Claſs of Nerves;—but having part of its origin within the Head, and from its paſſing out with one of the Cerebral Nerves, it has been already deſcribed along with theſe.

Suboccipital Nerves.—Theſe were formerly called *Tenth Pair of the Head*, and by many at preſent are termed *Firſt of the Neck*.

They ariſe, on each ſide, from the beginning of the Spinal Marrow, by an Anterior and Poſterior Faſciculus, like the reſt of the Spinal Nerves; and, like theſe alſo, they have their Ganglia where they paſs out between the Bones.

They perforate the Dura Mater immediately under the entrance of the Vertebral Arteries, and paſs forwards under them, and over the tranſverſe Proceſſes of the Atlas.

They afterwards appear in the fore-part of the Neck, and are each connected above by an Arch to the root of the Ninth Pair, and below by a ſimilar Arch to the Firſt Cervical Nerve.

Anteriorly, they are joined by one or two ſhort Branches to the upper Ganglia of the Great Sympathetic Nerve.

They afterwards divide into Branches, which are diſtributed upon the Recti and Obliqui Capitis, and upon ſome of the Deep Extenſor Muſcles of the Head.

The FIRST CERVICAL NERVE,—comes out, on each side, between the Atlas and Second Vertebra of the Neck, and immediately splits into two parts; the first of which passes forwards under the transverse Process of the Atlas, and is joined by an Arch with the Nervus Accessorius, and by Branches with the Ninth Pair: It is also connected by a soft Ganglionform pellucid root with the upper Ganglion of the Sympathetic Nerve, sending a Branch downwards, to be fixed to the second Cervical Nerve, and also small Branches to the Muscles connected with the fore-part of the Vertebræ.

The other, which is the principal part, goes backwards, and, after sending Branches to the Extensor Muscles of the Head and Neck, perforates these, and forms the *Proper Occipital Nerve*.

The *Occipital Nerve* ascends upon the Head with the Artery of that name, and terminates upon the Muscles and Integuments on the upper and back-part of the Head; some of its Filaments anastomosing with others belonging to the First Branch of the Fifth, and Portio Dura of the Seventh Pair.

The SECOND CERVICAL NERVE,—after escaping from between the Bones, gives off a Branch, which perforates the Muscles connected to the fore and lateral parts of the Vertebræ, and joins the middle Ganglion of the Sympathetic Nerve.

It sends another *Branch* of considerable size downwards to the Trunk of the Third Pair.

It sends several Branches to the Sterno-mastoid Muscle, behind which it is connected by an *Arch*, and still farther out by a Filament, with the Nervus Accessorius.

It is afterwards divided into *several Branches*, one of which passes downwards some way upon the External Jugular Vein, and, together with a Branch from the First Cervical, forms an Arch with the Descendens of the Ninth Pair.

It gives off a small root which is united with others in the formation of the Diaphragmatic Nerve.

A *Large Branch* comes out from it behind the Sterno-Mastoideus, which, turning over this Muscle, sends off the following Nerves, viz.

The *Inferior Cutaneous Nerve of the Neck*, which passes forwards to the parts under the Lower Jaw:

The *Middle Cutaneous Nerve*, which runs towards the angle of the Jaw.

The *Great Posterior Auricular Nerve*, which furnishes an anterior Branch to the under part of the Ear, and a posterior Branch dividing into many others which go to the back-part of the Ear and Temple.

The Cutaneous and Auricular Nerves are dispersed upon the Platysma Myoides, Integuments of the side of the Neck and Head, the Parotid Gland, and External Ear; and have several Communications with the Portio Dura of the Seventh Pair.

The remainder of the Second Cervical is diſtributed upon the Levator Scapulæ, and the Extenſor Muſcles of the Neck and Head.

The THIRD CERVICAL NERVE,—after emerging from between the Vertebræ, ſends down a *Branch* to the Trunk of the Fourth Cervical, and another *Branch* which forms the principal root of the Diaphragmatic Nerve.

A *Third Branch* perforates the Muſcles on the ſide of the Vertebræ, and joins the middle Ganglion of the Sympathetic Nerve.

A *Small Filament* connects a Third Cervical with the Deſcendens of the Ninth Pair.

The Nerve is afterwards divided into External and Internal Branches.

The *External Branches* form Anaſtomoſes with the Nervus Acceſſorius, near the upper part of the Scapula; while the Interior, after furniſhing Twigs to the Jugular Glands, are diſperſed by ſeveral large Branches upon the Muſcles and Integuments at the under part of the Neck, and upper part of the Shoulder.

The FOURTH CERVICAL,—ſends a Branch behind the Muſcles ſituated on the fore and lateral parts of the Cervical Vertebræ, to the middle Ganglion of the Sympathetic Nerve.

It is connected by one, and ſometimes by two Filaments to the Diaphragmatic Nerve.

It gives Twigs to the Jugular Glands and deep Muſcles of the Neck, and at the outer edge of the anterior Scalenus, joins the Fifth Cervical Nerve.

The FIFTH CERVICAL,—is united with the Fourth into a Common Trunk, which, after running a little farther out, joins the Sixth Cervical Nerve.

The SIXTH CERVICAL,—joins the Seventh behind the Clavicle; and to the Seventh, the Firſt Dorſal Nerve is added over the Firſt Rib.

The Four Inferior Cervicals and Firſt Dorſal Nerve are of great ſize,—eſpecially the three intermediate Nerves.

They paſs out between the Scalenus Anticus and Medius,—and afterwards run between the Subclavian Muſcle and Firſt Rib, at the outer ſide of the Subclavian Artery, to the Axilla.

In the Axilla, they ſeparate, unite, and ſeparate again, forming an irregular Plexus, termed *Axillary* or *Brachial*,—which ſurrounds the Axillary Artery.

The *Axillary Plexus* ſends Branches to the Subſcapularis, Teres Major, and Latiſſimus Dorſi, and furniſhes the External Thoracic Nerves which accompany the Blood-veſſels of that name to the Pectoral Muſcles and Integuments.

The Plexus afterwards divides into Nerves, moſt of which are of great ſize, to ſupply the Superior Extremity.—They are as follow.

The SCAPULARIS,—which commonly arises from the combination of the Fourth and Fifth Pairs, and extending outwards, runs through the Semilunar Arch in the upper edge of the Scapula, afterwards descending between the root of the Spine and Head of the Scapula.

It furnishes Branches to the Supra-Spinatus, and is afterwards consumed upon the Infra-Spinatus Muscle.

The ARTICULARIS,—which arises, like the former Nerve, from the Trunk common to the Fourth and Fifth Cervicals.

It sinks deep in the Axilla, and getting between the under edge of the Subscapularis, and Insertions of the Teres Major and Latissimus Dorsi, it follows the course of the Posterior Articular Artery round the Body of the Os Humeri, immediately below the Articulation.

It sends Branches to the Teres Minor, and some Twigs to the Ligament of the Joint; but is chiefly dispersed upon the Deltoid Muscle.

The NERVUS CUTANEUS,—which arises from the Trunk common to the last Cervical and First Dorsal Nerve; but is chiefly formed by Fibrillæ from the latter.

It runs down at the inner and fore-part of the Arm, near the Radial Nerve.

It sometimes gives a *small Branch* to the upper part of the Coraco-brachialis and Biceps; and, farther down, it gives others to the Integuments and Coats of the Blood-vessels.

About the middle of the Arm, it splits into two Branches, an Internal and External.

The *Internal Branch*, which is rather the smaller of the two, passes before the Basilic Vein to the inner part of the Elbow, where it divides into Branches, two of which, larger than the rest, turn obliquely over the Heads of the Flexors of the Hand, to be dispersed upon the inner and back-part of the fore-arm.

The *External Branch* divides into several others, behind the Median Basilic Vein, which descend on the anterior and Ulnar side of the Fore-arm, as far as the Wrist.

They pass partly over and partly under the Subcutaneous Vessels; furnishing Twigs to these, and vanishing in the Integuments.

Besides the Nervus Cutaneus, there is another termed *Cutaneus Minor Internus* of WRISBERG, which, like the rest of the Nerves of the Superior Extremity, takes its origin from the Axillary Plexus; but is more particularly connected with the Ulnar Nerve.—It is considerably inferior in size to the Nervus Cutaneus.

It soon separates from the Ulnar, running afterwards between it and the inner side of the Arm.

A little below the Axilla, it splits into two Branches:

The ſmaller, turning to the poſterior part of the Arm, is divided into Filaments which are chiefly diſperſed upon the Triceps and its Integuments.

The larger Branch deſcends at the inner edge of the Triceps, and vaniſhes upon the under end of that Muſcle and Skin of the Elbow.

The MUSCULO-CUTANEUS, called alſo *Perforans* CASERII, —which conſiſts of Fibrillæ from almoſt all the Nerves entering the Plexus.

The Cord formed by theſe perforates, obliquely, the upper part of the Coraco-brachialis, to which it gives Branches.

It afterwards paſſes between the Biceps and Brachialis Internus, furniſhing Branches to both.

At the Elbow, it gets to the outſide of the Tendon of the Biceps, and runs behind the Median Cephalic Vein.

From thence it deſcends in the Fore-arm, between the Supinator Longus and Integuments; furniſhing Branches to the latter, as far as the root of the Thumb and back of the Hand.

The SPIRAL, or SPIRAL-MUSCULAR NERVE,—which is apparently formed by all the Nerves entering into the Axillary Plexus, and when the Sheaths of the Nerves are ſlit open, is found to be compoſed of Fibrillæ from each of the Trunks, excepting from that of the Firſt Dorſal.

It is rather larger than any other Nerve of the Superior Extremity, and is diſtinguiſhed by its Spiral direction.

It is at firſt ſituated between the Axillary Artery and the Ulnar Nerve, and paſſes obliquely downwards between the two Heads of the Triceps Extenſor Cubiti, and afterwards behind the Os Humeri, to the outſide of the Elbow.

From thence it proceeds among the Muſcles of the Radial ſide of the Fore-arm, as far as the Hand.

While paſſing behind the Os Humeri, it gives ſeveral Branches of conſiderable ſize to the different Heads of the Triceps; ſome of them accompanying the Branches of the Arteria Spiralis, and terminating on the Heads of the Extenſors of the Hand.

Immediately behind the body of the Os Humeri, it tranſmits a Subcutaneous Branch, which is diſtributed upon the Muſcles and Integuments on the poſterior part of the Fore-arm, anaſtomoſing at laſt with the Nerves on the back-part of the Hand.

The Trunk of the Nerve having arrived at the Elbow, is lodged in a Fiſſure between the Brachialis Internus and Radial Extenſors of the Carpus, and there gives off other Branches to the Extenſors of the Hand, and to the Supinator Muſcles.

At the Head of the Radius, the Trunk of the Nerve divides into two nearly equal Branches,—the *Superficialis* and *Profundus*.

The *Superficialis*, continued almoſt ſtraight from the Trunk, immediately tranſmits a Branch to the Extenſores Radiales and

Supinator Longus, and then defcends at the inner edge of this Mufcle along with the Radial Artery.

A little below the middle of the Radius, it croffes between the Tendon of the Supinator and Extenfores Radiales, and is fubdivided into a Volar and Dorfal Branch.

The Volar Branch, after fending Twigs to the Annular Ligament, is diftributed to the Mufcles and Integuments of the Thumb.

The *Dorfal Branch* is again fubdivided into numerous other Branches, fome of which go to the Mufcles in the interval of the Metacarpal Bones of the Thumb and Fore-finger, a few Filaments being diftributed to the Annular Ligament, while principal Branches run one along each fide of the Fore and Mid-finger, and likewife along the Radial fide of the Ring-finger.

The *Ramus Profundus*, after fending feveral Branches to the Extenfores Radiales and Supinator Brevis, perforates the latter, and gets to the back-part of the Fore-arm.

After quitting the Supinator, it defcends under the Extenfor Primi Internodii Pollicis and Extenfor Digitorum to the back of the Hand.

In this courfe, it fends Branches to the different Extenfors of the Thumb and Fingers, and at length degenerates into a flender Branch, which, at the Wrift, adheres clofely to the Annular Ligament, where it has a Gangliform appearance, and is difperfed partly upon this Ligament and partly upon the Membranes on the back of the Metacarpus.

The MEDIAN or RADIAL NERVE,—which comes from the middle and lower part of the Plexus, is formed by Fafciculi from all the Nerves which enter the Plexus, and is nearly of a fimilar fize with the Spiral Nerve.

It defcends in the Arm along the anterior furface of the Humeral Artery, to which, and to the Deep Veins, it adheres firmly by Cellular Subftance.

In this courfe, it does not give off any conficerable Branches; —Twigs, however, are fent from it to the Coats of the Adjacent Veffels.

At the bending of the Elbow, it flips over the Tendon of the Brachialis Internus, and perforates the back-part of the Pronator Teres Mufcle.

It afterwards paffes down between the Flexor Radialis and Mufculus Sublimis, and goes in the middle of the interval of the Radial and Ulnar Artery in its way to the Hand.

When it approaches the Fore-arm, it tranfmits Branches to the Pronator Teres and Integuments near that Mufcle.

In the Flexure of the Arm, it furnifhes Branches to the Pronator, Flexor Radialis, and Flexor Sublimis, and an Interoffeous Branch which, in fome Subjects, receives an addition from the Spiral Nerve.

The *Interoſſeous Nerve* gives Branches to the Flexor Longus Pollicis, and to the Flexor Profundus Digitorum, deſcends upon the Interoſſeous Ligament with the Veſſels of that name, and terminates in the Pronator Quadratus.

Near the Hand, it ſends a Branch dividing into others, which ſupply the Muſcles and Integuments forming the Ball of the Thumb.

The Trunk of the Nerve having given Branches to the Fore-arm, paſſes under the Annular Ligament of the Wriſt, where it divides into Branches which are ſituated behind the Aponeuroſis Palmaris, and Superficial Arch of the Arteries.

The principal Branches in the Palm come off in three diviſions, from which ſeven Nerves of conſiderable ſize are diſtributed to the Thumb and Fingers. Of theſe, two go to the Thumb, and one to the Radial ſide of the Fore-finger; the reſt come off from two-forked Trunks, near the Heads of the Metacarpal Bones, and ſupply the adjacent ſides of the Fore and Middle, and of the Middle and Ring-finger.

Theſe Branches ſend Twigs through the Aponeuroſis to the Integuments of the Palm, and others to the Muſculi Lumbricales; after which they accompany the Arteries ſent out from the Superficial Palmar Arch, beſtowing Twigs to the adjacent parts of the Fingers, at the points of which they terminate by numerous Fibres.

The ULNAR NERVE,—which, like the former, is of great ſize, comes off chiefly from the laſt Cervical and Firſt Dorſal Nerve.

It extends along the inſide of the Triceps, frequently perforating ſome of its Fleſhy Fibres, and, near the Elbow, ſlants a little backwards, to get into a Groove between the inner Condyle of the Os Humeri and Olecranon of the Ulna.

From thence it paſſes to the Fore-Arm, where, after perforating the Heads of the Flexor Muſcles, it joins the Ulnar Artery a little below its origin, and accompanies that veſſel,—running behind it all the way to the Hand.

Under the Axilla, it ſometimes receives a Branch from the Spiral Nerve; and from this connection, or from the Trunk of the Ulnar Nerve itſelf, a Subcutaneous Branch is ſent off, which runs between the Triceps and Integuments, furniſhing Branches to the latter for a conſiderable way along the Fore-arm.

Near the under end of the Os Humeri, a Twig or two commonly go to the inner edge of the Triceps.

Under the bending of the Elbow, a Branch is given out to be diſtributed upon the Belly of the Flexor Ulnaris.

Immediately below the former, another Branch is produced, which is diſperſed upon the Flexor Profundus Digitorum.

About the middle of the Fore-arm, a Filament is tranſmitted which adheres to the Ulnar Artery, furniſhing ſmall Twigs to

the Coats and Sheath of the Artery, and terminating in the corresponding parts of the Wriſt, and Integuments of the Palm.

Near the end of the Ulna, a conſiderable Branch, termed *Dorſalis*, is ſent out, which turning between the Flexor Ulnaris and Ulna, is directed to the back part of the Hand.

The *Dorſal Nerve* ſends Branches to the Integuments of the Wriſt and Metacarpus, which have various anaſtomoſes with others of the Spiral Nerve.

It ſends off a Branch which proceeds along the Ulnar ſide of the Little Finger;—and at the Heads of the Metacarpal Bones, another ſplitting into two Branches which run along the adjacent ſides of the Auricular and Ring-fingers.

The Trunk of the Nerve paſſes with the corresponding Artery over the Annular Ligament into the Palm, where, like the Radial Nerve, it is covered with the Aponeuroſis Palmaris.

In the Palm, it divides into Superficial and Deep Branches; the former deſtined chiefly for the Fingers, the latter for the deep region of the Hand.

The *Superficial Palmar* Nerves ſends—

Branches to the ſhort Muſcles of the Little Finger:

A Branch to the Volar-ulnar ſide of the Little Finger: and—

Another, which is ſoon ſplit into two ſmaller Branches; one to the Radial ſide of the Little Finger, the other to the Ulnar ſide of the Ring-finger.

The *Deep Palmar Nerve* ſinks in between the Abductor and Flexor Parvus Digiti Minimi, or perforates the head of the latter, and forms an Arch which accompanies the Deep Arch of the Arterie, under the tendon of the Flexors, and the Lumbricales Muſcles.

The Deep Nerve gives—

A Branch to the Abductor Minimi Digity, and one to each of the Interoſſei:

A Twig to each of the Lumbricales, which enters from behind:

Branches to the Flexor Brevis and Adductor Pollicis.

The Nerve terminates at length by ſeveral ſhort Branches upon the Abductor Indicis Muſcle.

The Nerves on the Palm and correſponding parts of the Fingers, like the Arteries, are much larger than thoſe of the oppoſite ſide of the Hand.

The Digital Nerves ſends off many lateral Branches to the Integuments and other parts of the Fingers, and terminate, each, by a Bruſh of Fibres, at the Apices of the Fingers.

Between the Branches of the Radial and Ulnar Nerve, different Anaſtomoſes are frequently found; and the ſame may be obſerved between the Nerves of the Palmar and Dorſal ſide of the Fingers.

INTERCOSTO-HUMERALES.—Beſides the Nerves of the Superior Extremity ſent from the Brachial Plexus, there are others belonging to it, which take their origin from the Intercoſtal Nerves, and which may therefore be termed *Intercoſto-Humerales*.

The *Intercoſto-Humeral Nerves*,—conſiſt of a Branch from the Second, and of another from the Third Intercoſtal Nerves, both of which paſs out at the fore and lateral parts of the Thorax, the one under the Second, and the other under the Third Rib.

The firſt Nerve is joined by a ſmall Branch with the Cutaneous Nerve, or with the *Cutaneous Internus* of WRISBERG, and is afterwards diſperſed by numerous Filaments upon the Axillary Glands, and upon the Integuments of the Axilla and of the inner part of the Arm.

The Second Nerve is connected by one or more Branches with the Firſt, and ſends ſome Twigs to the Axillary Glands; but is chiefly diſtributed upon the Integuments of the back-part of the Arm, which it ſupplies with many Branches, ſome of them extending as far as the Elbow.

NERVES

WITHIN

THE THORAX.

THE NERVES, in each ſide of the Thorax, conſiſt of the *Phrenic*, the *Pars Vaga* of the Eighth Pair, the *Great Sympathetic*, and the *Intercoſtals*; all of which are covered and concealed by the Pleura, till they are expoſed by diſſection.

The PHRENIC or DIAPHRAGMATIC NERVE, has a ſmall Filament from the Second Cervical; but is chiefly formed by a Branch from the Third, and by one, and ſometimes by two, from the Fourth Cervical Nerve.

It deſcends in the Neck, along the outer and fore-part of the Scalenus Anticus Muſcle, and enters the Thorax behind the anterior extremity of the Firſt Rib, between the Subclavian Artery and correſponding Vein.

In the Thorax it runs down over the root of the Lungs, and then passes along the Pericardium, to which it adheres closely in its way to the Diaphragm.

The Right Phrenic has nearly a straight direction opposite to the Superior Cava and Right Auricle; while the left makes a considerable Curve near its under end, corresponding with that part of the Pericardium which covers the point of the Heart.

Upon the Surface of the Diaphragm, the Trunk is divided into several Branches, which are distributed in a radiated form upon the Fleshy sides of that Muscle.

Pars Vaga.—The Pars Vaga, upon approaching the Thorax, sends a Filament, and sometimes two, termed *Cardiac Nerves*, which join the Cardiac Branch of the Great Sympathetic, as already observed.

It enters the Thorax between the Subclavian Vein and Artery, and after giving off the Recurrent Nerve, passes behind the root of the Lungs.

Recurrent Nerve.—The Recurrent,—is reflected upwards, behind the Subclavian Artery in the right, and behind the Arch of the Aorta in the left side of the Thorax; in consequence of which, the left nerve is the longer of the two. It afterwards ascends in the Neck, adhering to the posterior and lateral part of the Trachea, in its way to the Larynx.

It is connected, near its origin, by one or two Branches of considerable size, with the adjacent Ganglia of the Great Sympathetic Nerve, and from the opposite side of its root, sends other considerable Branches to join those of the Eighth Pair, in the formation of the Anterior Pulmonary Plexus of Nerves.

Near the Subclavian Artery, it is connected by different Filaments to the Superficial and deep Cardiac Branches of the Sympathetic Nerve.

In its ascent in the Neck, it transmits Pencils of Filaments, which penetrate the Trachea, and are dispersed upon its Internal Membrane.

Behind the Thyroid Gland, it sends off minute Fibres to the beginning of the Esophagus and bottom of the Pharynx and small Twigs to the Gland itself.

Upon the inner side of the Thyroid Cartilage, it furnishes a Branch which constitutes a remarkable Anastomosis with another from the Internal Laryngeal Nerve.

At the back part of the Larynx, it is divided into many Fibrillæ, which are distributed to the different Muscles fixed to the Arytenoid Cartilage of the corresponding side.

It has also some connections, smaller than the one already mentioned, with Branches of the Internal Laryngeal Nerve, and sends minute Fibrillæ to the Internal Membrane of the Larynx; from which circumstance the Recurrent Nerves are considered as the principal Instruments of the Organ of Voice.

The Pars Vaga, having transmitted the recurrent Nerve, gives off Filaments which form connections with Branches arising from the root of the Recurrent of the same and of the opposite side.

They anastomose also by small Fibrillæ with the Cardiac Branch of the Sympathetic, and then pass to the fore-part of the Bronchi, where they constitute what is termed the *Anterior Pulmonary Plexus of Nerves.*

The *Anterior Pulmonary Plexus,* thus formed by Branches from the Eighth Pair, with the assistance of others from the Recurrent and Sympathetic Nerves,—extends across the Great Branches of the Pulmonary Artery, and after transmitting small Filaments to the Pericardium and to the Great Cardiac Nerve, furnishes many minute Fibrillæ, which accompany the Ramifications of the Bronchi and Pulmonary Blood-vessels in the substance of the Lungs.

From the Pars Vaga, a little below the origin of the Recurrent, and likewise from the root of the Recurrent itself, Nerves are sent off, which form a Plexus, to be dispersed partly upon the Fleshy-glandular Substance of the Trachea, and partly embracing the OEsophagus, and forming upon it the *small OEsophageal Plexus.*

Behind the root of the Lungs, about six or seven Nerves of different sizes are sent off in a transverse direction, which are termed *Posterior Pulmonary Plexus,* although they have few connections with each other.

The Posterior Pulmonary Nerves, like the Anterior, follow the Branches of the Bronchi and Blood-vessels in the substance of the Lungs, and becoming gradually smaller, send off minute Twigs, which penetrate the Air-Vessels, and are ultimately dispersed upon their Internal Membrane.

After giving out the Pulmonary Nerves, the Pars Vaga is split into Cords termed *Great OEsophageal Plexus,* which surrounds the OEsophagus, sends Filaments into its Substance, and is joined by Funiculi of the Pars Vaga of the opposite side.—It goes afterwards through the Diaphragm, to be distributed upon the Viscera of the Abdomen.

From the Ganglia of the Great Sympathetic Nerve, at the bottom of the Neck and top of the Thorax, the principal *Cardiac Nerves* are produced, which are dispersed upon the Heart; while the continuation of the Trunk of the Sympathetic descends in the Thorax at the side of the Vertebræ.

The CARDIAC NERVES of the RIGHT SIDE consist of the *Cardiacus Magnus Profundus,* and *Cardiacus Minor,* the latter of which is termed by SCARPA *Cardiacus Aortæ Superficialis.*

The CARDIACUS MAGNUS PROFUNDUS,—is principally formed by Branches from the Second Cervical Ganglion of the Sympathetic, and afterwards receives one or two Filaments from

the Cardiacus Supremus, together with the Superficial Cardiac and other Branches of the Eighth Pair, as formerly described.

The Trunk, arising in this manner from different sources, passes between the Superior Cava and ascending Aorta to the Posterior Surface of the latter, and joins the Cardiac Branches of the Left Side.

By the addition of the Left Cardiac Nerves, a Plexus is formed, termed *Plexus Cardiacus Magnus of* HALLER, from which is sent out a long Ganglion of a soft consistence, described by WRISBERG under the name of *Ganglion Cardiacum.*

From The Cardiac Ganglion, the following Branches are given off, viz.

A Branch which, after transmitting Filaments to the Anterior Pulmonary Plexus of the Eighth Pair, passes behind the Right Division of the Pulmonary Artery to the Left Coronary Plexus of the Heart:

One or two Filaments, which unite with others sent from the Anterior Pulmonary Plexus of the Eighth Pair, and go before the Right Branch of the Pulmonary Artery to the Base of the Heart:

Branches of considerable size, passing partly over the right side of the Aorta, and partly between it and the Pulmonary Artery to the Anterior Coronary Plexus:

Small Branches which unite with others coming from the Trunk of the Great Cardiac Nerve, and pass over the Aorta to the Anterior Coronary Plexus.

The NERVUS CARDIACUS MINOR arises from the undermost Cervical Ganglion, creeps over the Arteria Innominata and Aorta, and terminates in a Plexus formed by the Cardiac Nerves on the left side of the Aorta Ascendens.

The LEFT CARDIAC NERVES are, the *Cardiacus Superficialis*, and the *Cardiacus Magnus Profundus.*

The CARDIACUS SUPERFICIALIS arises from the upper part of the Sympathetic Nerve, as formerly noticed, and passes behind the Arch of the Aorta to the Plexus Cardiacus Magnus.

The CARDIACUS MAGNUS PROFUNDUS SINISTER, the upper portion of which is smaller than that of the right side, arises by numerous roots from the middle, and from the lowest Ganglion of the Sympathetic Nerve.

It passes across the Arch of the Aorta, and, after receiving the Cardiac Branch of the Eighth Pair, joins the Great Cardiac of the right side, to assist in forming the Cardiac Plexus.

From the Cardiac Plexus, a Reticulum of Nerves extends upon the left side of the ascending Aorta, which receives the Cardiacus Minor, and a Filament or two from the Cardiacus Magnus of the right side, passing over the Aorta.

From this Reticulum, the Anterior or Right Coronary Plexus is produced, which passes between the Pulmonary Artery and

Aorta, and afterwards follows the courſe of the Trunk and Branches of the Right Coronary Artery, along with which it is diſperſed upon the correſponding ſide of the Heart.

The Great Cardiac Plexus, after ſending a Filament or two to the Lungs, gives off Nerves which unite, and form the *Trunk* of the Great Deep Cardiac Nerve of the left ſide, which has a ſoft Gangliform appearance, and paſſes along the correſponding ſide of the Pulmonary Artery.

Upon the Surface of this Artery, the Trunk ſoon divides into Branches, which, after ſending Filaments acroſs it to the right Coronary Plexus, give origin to the Coronary Plexus of the left ſide, which attends the Trunk and Branches of the Left Coronary Artery.

In the Left or Poſterior Coronary Plexus, the Nerves are larger than in the Right, correſponding with the Parts they have to ſupply; and, in both, they have repeated connections with each other on the ſurface of the Heart.

In general, the Nerves run cloſe to the Arteries; ſome of them being continued as far as the Apex, while others penetrate the ſubſtance of the Heart.

The Great Sympathetic, having ſent Nerves to the Heart, conſiſts of an anterior and poſterior part,—the former going over, and the latter under the Subclavian Artery.

Behind this Artery, the two parts unite into a Trunk, which deſcends in the Thorax over the Heads of the Ribs.

At the Head of each Rib, it forms a ſmall Ganglion of an irregular ſhape, which unites behind with each of the Intercoſtal Nerves, generally by two, and ſometimes by three ſhort Branches.

From ſeveral of the Dorſal Ganglia of this Nerve, Filaments are detached obliquely over the Vertebræ to the Coats of the Aorta.

From the Sixth, Seventh, and Eighth Dorſal Ganglia,—and frequently from a Ganglion above or below theſe,—Branches ariſe, which deſcend obliquely upon the ſides of the Vertebræ, and unite into a Trunk, termed *Nervus Splanchnicus*,—which perforates the Appendix of the Diaphragm, and goes to the Viſcera of the Abdomen, from which circumſtance the Nerve obtains its name.

Beſides the Nervus Splanchnicus, another, termed *Splanchnicus Secundarius*, or *Acceſſorius*, is generally obſerved, which ariſes from one or two of the Dorſal Ganglia, below the origins of the Splanchnicus,—near its termination,—or runs ſeparate from it into the Abdomen.

The Intercostal, or Costal, or Dorsal Nerves,—after eſcaping from the Vertebræ,—run in the Furrows at the lower edges of the Ribs, in company with the Intercoſtal Blood-

veſſels, and proceed to the anterior part of the Thorax, between the two Layers of Intercoſtal Muſcles.

Immediately after getting out from between the Vertebræ, each is connected, as already noticed, by ſhort Branches to the Sympathetic Nerve.

Oppoſite to this connection, they give principal Branches, backwards, to the Muſcles lying near the Spine, and ſerving for the erection of the Trunk of the Body.

Through the reſt of their courſe, they give Branches to the Intercoſtal Muſcles, to the Muſcles and Integuments of the Thorax, and alſo to thoſe of the Abdomen, and becoming gradually ſmaller, they at laſt vaniſh in the fore-part of the Body.

The Six upper Intercoſtals ſends Branches to the numerous Muſcles, and to the Integuments covering the back-part of the Thorax, to the Serratus Magnus, and to the upper part of the Abdominal Muſcles; while the remains of them, paſſing out between the Ribs at the edge of the Sternum, are reflected along with Branches of the Internal Mammary Blood-veſſels, to be diſperſed by ſmall Filaments upon the Mamma, and likewiſe upon the Muſcles and Integuments next the edge of the Sternum.

The Trunk of the Firſt Intercoſtal enters the compoſition of the Axillary Plexus;—a Branch of it, however, runs along the edge of the firſt Rib, in the manner the other Intercoſtals run along their reſpective Ribs.

Two principal Branches,—one from the Second, and the other from the Third Intercoſtal,—are occupied in forming the Intercoſto-humeral Nerves, already deſcribed; while a conſiderable Branch from the Fourth is reflected over the edge of the Latiſſimus Dorſi to the Integuments of the back-part of the Thorax.

The Six lower Intercoſtals, after ſupplying the adjacent Muſcles and Integuments of the Thorax, continue their courſe obliquely forwards, and are diſperſed upon the different Muſcles and Integuments of the Abdomen;—the Twelfth, running from the laſt Rib along the under end of the Abdomen, ſends Filaments which extend as far as the Skin of the Pelvis and Thigh.

NERVES

OF THE

CHYLOPOIETIC AND ASSISTANT CHYLOPOIETIC VISCERA.

THE NERVES of the Chylopoietic and Aſſiſtant Chylopoietic Viſcera, are formed by *Branches*, of the *Par Vagum*, and the *Rami Splanchnici* of the *Great Sympathetic Pair*.

The PARS VAGA of the *Left Side*,—deſcending from the Great OEſophageal Plexus of the Eighth Pair, creeps along the fore-part of the Cardia, detaches Filaments to the Left Hepatic Plexus, and divides into many Branches which are diſtributed to the upper and left portion of the Stomach.

The RIGHT PARS VAGA paſſes upon the poſterior part of the Cardia, and ſplits into two Faſciculi, one of which goes to the root of the Hepatic Plexus and to the Cœliac Ganglion, while the other, which is the principal one, is diſperſed by numerous Branches upon the under and left portion of the Stomach.

The Nerves of the two Faſciculi have ſeveral connections with each other, about the Cardia and along the ſmall Curvature of the Stomach, and form a Plexus, by ſome Authors termed *Coronary*, from which Branches extend along the ſmall Curvature as far as the Pylorus.

The RAMUS SPLANCHNICUS and SPLANCHNICUS SECUNDARIUS have their origins from the Sympathetics, and perforate the upper and lateral part of the inferior Muſcle of the Diaphragm, —as already mentioned in the Deſcription of the Nerves of the Thorax.

After entering the Abdomen, they expand their Fibres, and unite with the lateral part of the Great Semilunar Ganglion.

The SEMILUNAR GANGLION,—is formed by the Rami Splanchnici of the Right and Left Sympathetics, with the addition of the Branches from the Eighth Pair.

It is of a long curved ſhape, with the convex edge undermoſt, and is compoſed of many ſmaller Ganglia, termed *Cœliac*, which are of different ſize and of irregular forms.

The COELIAC GANGLIA are placed over the Aorta, about the roots of the Cœliac and Superior Meſenteric Arteries, and extend ſome way upon the Fleſhy Pillars of the Diaphragm.

From the Cœliac Ganglia innumerable Nerves iſſue on all ſides forming a Plexus, termed by ſome Authors *Solar*, which extends along the Trunks and Branches of the Cœliac and Superior Meſenteric Arteries.

The Nerves upon theſe Arteries are ſo intermixed with each other and with Cellular Subſtance, as to form confuſed Webs; the name of Plexus, however, is ſtill retained, and the particular name of each Plexus is derived from the Artery which it ſurrounds, or the Viſcus to which it belongs.

The HEPATIC PLEXUS,—after giving Twigs to the Renal Glands, ſends Filaments to the Diaphragm, which accompany the Diaphragmatic Arteries, and anaſtomoſe with Branches of the Phrenic Nerves.

It afterwards divides into Right and Left Plexuſes, correſponding with the Right and Left Branches of the Hepatic Artery, or with the Right and Left Trunks, when ſuch are preſent.

The Left Hepatic Plexus furniſhes ſeveral Branches to the Stomach, which intermix with thoſe of the Eighth Pair, upon the ſmall Curvature.

The Right Hepatic Plexus imparts Branches to the correſponding part of the Pancreas, to the ſmall end of the Stomach and beginning of the Duodenum, and gives origin to the Right Gaſtro-epploic Plexus, which attends the Artery of the ſame name, diſtributing its Filaments to the great Curvature of the Stomach, and to the Omentum Majus.

The Hepatic Plexuſes ſurround the Hepatic Artery and Vena Portæ, and, after ſending ſeveral Filaments to the Biliary Ducts and Gall-Bladder, follow the Branches of the Blood-veſſels through the ſubſtance of the Liver.

The SPLENIC PLEXUS, compoſed of ſeveral ſmall Filaments, ſurrounds the Splenic Artery, gives Twigs to the Pancreas, and then accompanies the Veſſels into the Spleen.

The SUPERIOR MESENTERIC PLEXUS, forms a Vagina, which ſurrounds, and in a great part conceals the Trunk of the correſponding Artery.

From this Plexus, numberleſs Filaments are produced,—many of them extremely minute,—which run through the Meſentery, partly with the Blood-veſſels, and partly at a diſtance from them; and which, after ſupplying the Coats of the Veſſels and Meſenteric Glands, are diſtributed to the ſmall Inteſtines in general, and to the right portion of the Colon.

The Nerves of the Colon are, in proportion to the part they have to ſupply, larger than thoſe of the Small Inteſtines, and in ſeveral places form Arches, which are ſituated at the ſides of the Arteries.

The Cœliac Ganglia ſend down, along the Aorta, a Vagina ſimilar to that ſurrounding the Superior Meſenteric Artery, which is joined by other Nerves from the Trunk of the Sympathetic continued along the Lumbar Vertebræ.

From the Aortic Vagina or Plexus, a Proceſs is ſent off, termed INFERIOR MESENTERY PLEXUS, which ſurrounds the Trunk of the Inferior Meſenteric Artery, and follows it to the left portion of the Colon, and to the Rectum;—the Nervous Filaments forming Arches in ſeveral places, as in the Superior Meſenteric Plexus.

The Aortic Plexus receiving freſh ſupplies from the Trunks of the Sympathetics, ſends down a Plexus, commonly termed *Hypogaſtric*, which paſſes over the end of the Aorta, and, upon the laſt Lumbar Vertebra, ſplits into right and left portions, which deſcend to the Viſcera contained in the Pelvis.

NERVES

OF THE

ORGANS OF URINE AND GENERATION.

THE NERVES of the Organs of Urine and Generation consist of the *Renal* and *Hypogastric Plexus*, and of the *Spermatic* and *Pudic Branches*.

The RENAL PLEXUS is composed of Nerves sent from the Cœliac Ganglia, joined by some others derived from one or two of the Ganglia, of the Sympathetic Nerve in the bottom of the Thorax.

It is interspersed, at its beginning, with small Ganglia, termed Renal, and is afterwards divided into Anterior and Posterior Plexuses, which extend along the corresponding Surfaces of the Renal Artery to the Substance of the Kidney.

From the Renal Plexus, small nervous Twigs ascend to the Renal Gland, which is furnished with others from the Cœliac Ganglia and root of the Hepatic Plexus.

The Renal Plexus also sends down Filaments to supply the upper portion of the Ureter;—the under receiving Nerves from the Hypogastric Plexus.

The HYPOGASTRIC PLEXUS, the origin and course of which have been already mentioned, is connected by different Nerves to the adjacent Trunks of the Great Sympathetic and Sacral Nerves, and sends many Filaments to the Rectum, Bladder, and Spermatic Vessels in the Male; and to the Rectum Bladder, Uterus, and Vagina in the Female.—The Nerves of the Uterus are proportionally small. They pass into its substance at the Cervix, and follow the course of the Blood-vessels.

SPERMATIC NERVES.—The Spermatic Nerves are very minute—They consist of a Superior or Internal, and of an Inferior or External set of Capillary Branches.

The former are derived from the Renal and Aortic Plexus, and accompany the Spermatic Blood-vessels in their course through the Abdomen, and afterwards to the Testicle.

The latter are sent off from a Branch of the Second Lumbar Nerve, which running behind the Tendon of the External Oblique Muscle, near POUPART'S *Ligament*, detaches a Filament, which, in the Male, goes to the Spermatic Cord, and more particularly to the Cremaster Muscle; and in the Female, is reflected along the Ligamentum Rotundum to the Uterus.

NERVI PUDICI.—The Nervi Pudici arise in two Fasciculi,—a *Superior* and *Inferior*—which are formed by Fibrillæ from all the Cords entering the composition of the Sciatic Nerve.

The Superior Fascículus is formed, more particularly, by Threads from the two under Lumbar and two upper Sacral Nerves;—the Inferior is composed of a small Cord from the Second, and a large one from the Third Sacral.

The Fasciculi pass through the under part of the Notch of the Os Ilium, and afterwards between the Sacro sciatic Ligaments, and follow the Pudic Blood-vessels, anastomosing in some places with each other by Oblique Branches.

They send many Branches to the Muscles and other parts about the Anus and Perineum, and then pass forwards to supply the different parts of the Penis.

On the Penis, the Nerves follow the course of the Arteries, the Superior Fasciculus constituting the Nervus Dorsalis, and the Inferior giving Branches to the under part of the Penis.

The *Nervus Dorsalis* which is the most considerable of the Penis, runs forwards between the corresponding Artery and Vena Magna, expanding into many Branches which after supplying the Corpus Cavernosum and Teguments of the corresponding side, terminate in the Substance of the Glands.

NERVES

OF THE

LOINS, PELVIS, AND INFERIOR EXTREMITY.

THE NERVES of the Loins, Pelvis, and Inferior Extremity, consist of the continuation or inferior portion of the Sympathetic, and of the Trunks and Branches of the *Lumba* and *Sacral* Nerves.

The SYMPATHETIC NERVE, after reaching the Abdomen, makes a sweep forwards upon the anterior and lateral part of the Lumbar Vertebræ, between the Tendinous Crura of the Diaphragm and the Psoas Muscle.

It afterwards descends into the Pelvis, nearly of the same size as in the superior parts of the Body, and passes over the anterior Surface of the Os Sacrum, at the inner side of the Great Sacral Foramina.

Towards the lower part of the Pelvis, it becomes considerably smaller, and at last finishes its course upon the surface of the Os Coccygis, where it unites into an Arch with its fellow of the opposite side.

In the Loins, it forms Ganglia similar to those in the Thorax, each of which is connected behind, by two or three long slender Branches, to the roots of the Lumbar Nerves, and before, by other slender Nerves to the Aortic Plexus.

In the Pelvis also, it forms Ganglia which are connected to the Sacral Nerves on one side, and to the Great Sympathetic on the other, by cross Branches.

Filaments are sent off in the Pelvis, from the Sympathetic to the Muscles and Membranes about the Os Coccygis, and to the Intestinum Rectum.

Lumbar Nerves.

The Five Lumbar Nerves, immediately after emerging from the Bones, communicate with each other and with the Sympathetic Nerve, and send large Branches backwards to the Muscles and Integuments on the posterior part of the Loins.

By their connections with each other, they compose a Plexus termed *Lumbar*, which is situated behind the Psoas Muscle, and sends Branches outwards to the Quadratus Lumborum, and to the Flexors of the Thigh.

The First Lumbar Nerve is connected by a small Branch to the Twelfth Dorsal, and by its Trunk to the Second Lumbar.

It gives Twigs to the Quadratus, and a principal Branch which passes over that Muscle towards the Spine of the Os Ilium, where it sends Nerves to the Integuments of the Pelvis to the upper and outer part of the Thigh, to the under end of the Abdominal Muscles, and to the Integuments of the Pubes.

The Second Lumbar perforates the Psoas, to which it gives Branches; and afterwards runs into the Third.

From the Second Lumbar, the *Spermaticus Externus* is sent off, which perforates the under part of the Transverse and Internal Oblique Muscles, near the anterior end of the Spine, or Crest of the Ilium.

It goes next under the Tendon of the External Oblique, at the inner side of Poupart's Ligament, and passing through the Abdominal Ring, is distributed to the Scrotum and to the Spermatic Cord in the Male.

In the Female, it sends a Branch to the Labia, and another, reflected along the Ligamentum Rotundum, to the Uterus; and in both Sexes, it gives Branches also to the Integuments and Glands of the Groin.

Another Branch, smaller than the former, arises also from the Second Lumbar, and passing between the Psoas Muscle and Vertebræ, constitutes the Cutaneous Medius of the Thigh.

The *Cutaneous Medius* descends in the fore part of the Thigh, opposite to the inner edge of the Rectus Muscle, and supplies the Integuments near it as far as the Knee,—one Branch of it anastomosing with another of the Cutaneus Anterior.

Branches of the Second, Third, and Fourth Lumbars, form a Nerve of conſiderable ſize, called *Obturator*, which paſſes between the External and Internal Iliac Blood-veſſels, and along the ſide of the Pelvis.

The OBTURATOR NERVE accompanies the Blood-veſſels, of the ſame name, through the upper part of the Obturator Muſcles and Ligament, and having furniſhed Branches to the Obtutator and Pectineus Muſcles, it divides into an Anterior and Poſterior Faſciculus; the former diſperſed upon the two ſmall Adductors and Gracilis, the latter upon the Great Adductor of the Thigh.

The principal parts of the Trunks of the four upper Lumbar Nerves, eſpecially of the THIRD and FOURTH, unite and form a Nerve of great ſize, termed *Crural*, or *Anterior Crural*.

The CRURAL NERVE, after beſtowing Branches upon the Iliacus Internus, paſſes behind, then at the outſide of the Pſoas Muſcle, to get to the Thigh.

In its courſe from the Abdomen, and at the upper part of the Thigh, it is ſituated at the outſide of the Femoral Artery, which lies between it and the correſponding Vein.

Behind POUPART's Ligament, it is divided into many Branches, which are diſtributed to the Muſcles and Integuments on the fore and lateral parts of the Thigh,—one Branch in particular deſcending upon the Leg.

The Branches are as follow:

The *Cutaneus Anterior*,—more internal than the Cutaneous Medius, which croſſes over the middle of the Sartorius Muſcle, and after ſupplying the adjacent Integuments, terminates in the Skin and Cellular Subſtance, at the fore and inner part of the Knee.

The *Cutaneus Internus*,—ſtill more internal than the former,—which paſſes between the Sartorius and Triceps, and, after giving Filaments to the Integuments at the inſide of the Thigh, terminates in thoſe at the under and fore part of the Knee.

The Deep Branches of the Crural Nerve, which are conſiderably larger than the Superficial, go to the Pectineus and Triceps, to the Sartorius and Gracilis, and to the four Extenſors of the Leg, and furniſh Twigs to the Femoral Blood-veſſels alſo.

The Branch to the Leg, termed *Saphenus*, deſcends between the Sartorius and Triceps, and afterwards behind the Tendon of the former, to the inner ſide of the Tibia.

Under the Knee, it gives off a Branch, named by FISCHER, *Saphenus Minor*, which goes down a little behind the Saphenus, and, furniſhing Filaments to the Integuments of the inner and back-part of the Leg, terminates behind the Malleolus Internus, on the Integuments of the Foot.

The Trunk of the Saphenus attends the Vena Saphena Major, ſending many Nervous Threads obliquely forwards to the Integuments on the inner and fore-part of the Leg, and is at length conſumed upon the Skin and Cellular Subſtance of the upper and inner part of the Foot.

The remaining part of the Fourth Lumbar Nerve unites with the FIFTH into a Trunk which deſcends into the Pelvis.

SACRAL NERVES.

The SACRAL NERVES conſiſt of ſmall *Poſterior*, and large *Anterior* Trunks.

The POSTERIOR SACRAL NERVES paſs out by the Holes in the back-part of the Os Sacrum, and anaſtomoſe with each other, and with ſome of the Branches of the Gluteal Nerves.

They ſend out a few tender Fibrillæ, which are diſperſed upon the Muſcles covering the back-part of the Os Sacrum, and upon the Glutei Muſcles and their Integuments.

ANTERIOR SACRAL NERVES.—Of the Anterior Sacrals,—the two uppermoſt are the largeſt: The reſt ſuddenly diminiſh in ſize, the laſt being the ſmalleſt of the Spinal Nerves.

They go through the Holes in the fore-part of the Os Sacrum, and, ſoon after their exit, are united with each other, and with Branches of the Sympathetic Nerve.

The FIRST, SECOND, and THIRD SACRALS, join into a Trunk, which receives the common one ſent down from the Fourth and Fifth Lumbars, and forms a Plexus which ſends out the SCIATIC, the largeſt Nerve of the Body.

The roots of the Sciatic Nerve give origin to the Faſciculi which compoſe the Pudic Nerve, formerly deſcribed, and alſo to the Gluteal Nerves which are diſperſed upon the Muſcles of the Hips.

The GLUTEAL NERVES run in two Faſciculi,—a Superior, ariſing immediately from the Trunk formed by the two laſt Lumbars, and—an Inferior, coming off from the two laſt Lumbars and firſt Sacrals.

The *Superior Faſciculus* goes through the upper part of the Notch of the Os Ilium, to be diſperſed upon the two ſmaller Glutei Muſcles.

The *Inferior* Faſciculus paſſes through the under part of the ſame Notch, and below the Pyriform Muſcle, to be diſtributed upon the Gluteus Maximus and Integuments.

The FOURTH SACRAL ſends Filaments to the Hypogaſtric Plexus, others to the Muſcles and Ligaments of the Os Coccygis; the reſt paſs outwards to the Muſcles and Integuments about the Anus.

The FIFTH, which is ſcarcely above the ſize of a Filament, after giving Twigs to the Coccygeus Muſcle, perforates the Sa-

cro-ſciatic Ligaments, and terminates in the Muſcles and Integuments of the Anus.

SCIATIC NERVE.—The Sciatic or Iſchiatic Nerve,—paſſes obliquely through the Notch of the Ilium, under the Pyriform Muſcle. It goes afterwards over the other ſhort Rotator Muſcles, and is placed between the Tuber Iſchii and Trochanter Major, where it is covered by the Gluteus Maximus.

After leaving the Pelvis, it deſcends in the back-part of the Thigh, firſt between the Long Flexors and Adductor Magnus, and then between the latter and Os Femoris to the Ham, where it obtains the name of *Popliteus*.

In this courſe, it gives out the following Branches, which ſupply the Muſcles and Integuments on the back-part of the Thigh, viz.

Twigs to the Rotators of the Thigh, which come off from it after its paſſage through the Sciatic Notch.

The *Cutaneous Poſterior Superior*, which ariſes within the Pelvis, and paſſing out with the Sciatic, is divided into Branches, ſome of which are reflected to the Scrotum in the Male, and to the poſterior parts of the Labia in the Female, and, in both, to the Skin about the Anus and Perineum.—The principal Branches of this Nerve paſs downwards, ſupplying the Integuments of the back-part of the Thigh, as far as the bending of the Knee.

A *Branch* to the long Head of the Biceps.

Two ſmall Nerves, the one termed *Cutaneus Internus Superior*, which comes off near the upper part of the Thigh, and vaniſhes in the Skin, a little farther down; the other termed *Cutaneus Internus Inferior*, which ariſes near the former, goes down the poſterior part of the Thigh, and then deſcending upon the inner Head of the Gaſtrocnemius Externus, terminates in the Integuments of the Calf of the Leg.

A *Large Common Trunk*, and ſometimes, inſtead of it, *ſeparate Branches*, which ariſe near the middle of the Thigh, and are diſtributed to the Adductor Magnus, Semimembranoſus, Biceps, and Semitendinoſus.

NERVUS POPLITEUS.—The Popliteal Nerve is ſituated between the Ham-ſtrings, and between the Skin and Popliteal Blood-veſſels.

A little above the bending of the Knee, it is divided into a Small External, and a Large Internal Branch; the former named *Fibular*, and the latter *Tibial Nerve*.

The Tibial and Fibular Nerves adhere, for ſome way, by Cellular Subſtance, and even the Trunk of the Sciatic may be ſplit into theſe two Nerves for a conſiderable way up the Thigh.

The FIBULAR,—teſmed alſo PERONEAL NERVE,—ſends off, at its beginning, the *Cutaneus Externus*, which is a ſmall Branch giving Twigs to the under end of the Biceps, and which,

after running down on the Outer Head of the Gaſtrocnemius, diſappears in the Integuments of the ſame ſide of the Leg.

Over the outer Condyle of the Os Femoris, it gives off another *Cutaneous Branch*, which goes over the Gaſtrocnemius Muſcle, and, after anaſtomoſing with a Branch of the Tibialis, goes along the outer part of the Leg, and terminates in the Integuments of ſide of the foot.

The Fibular Nerve afterwards paſſes over the Head of the Fibula, and divides into *Superficial* and *Deep Branches*, which ſupply the Muſcles and Integuments of the outer and fore-part of the Leg.

The *Superficial Fibular* croſſes over the Fibula, immediately under its articulation, and perforating the Peroneus Longus, and going over the Brevis, it gives Branches to both, and afterwards becomes Subcutaneous, about the middle of the outer parts of the Leg.

It ſends Branches to the Metatarſus, to the Extenſor Digitorum Brevis, and others, which, after anaſtomoſing upon the upper part of the Foot, furniſh Dorſal Branches to the larger Toes.

The *Deep Fibular Nerve* croſſes over the Fibula immediately above the former, and divides into ſeveral Branches, viz.

A *Reflected Branch* to the ſoft parts of the Joint:

A *Branch* to the Peroneus Longus:

A *Branch* to the Tibialis Anticus:

Branches to the Extenſor Pollicis, and Extenſor Digitorum Longus:

Filaments which creep along the Perioſteum of the Tibia, and others which adhere to the Coats of the Tibial Artery.

The longeſt Branch of the Nerve accompanies the Anterior Tibial Artery, and divides upon the Foot into Branches, which have ſome connections with each other, and ſupply the Extenſor Digitorum Brevis.—Some Filaments continued from theſe Branches run to the Muſculi Interoſſei, while others of more conſiderable ſize go to ſome of the innermoſt Toes, one Twig ſinking with a Branch of the Anterior Tibial Artery to the Deep Muſcles of the Sole.

The TIBIAL NERVE paſſes between the Heads of the Gaſtrocnemius Muſcle, and, after perforating the origin of the Soleus, deſcends between it and the Flexor Digitorum Longus, upon the Poſterior Tibial Artery, to the under part of the Leg; in which courſe it ſends off the following Nerves, viz.

The *Communicans Tibiæ*,—which accompanies the Vena Saphena Minor in the back part of the Leg, and to the outer part of the Foot.

Behind the Belly of the Gaſtrocnemius, the Communicans ſends a Branch to be conſumed in the Fat; and a little lower, it anaſtomoſes with the communicating Branch of the Fibular Nerve.

The under part of this Nerve is diſperſed upon the Integuments of the outer Ankle and adjacent ſide of the Foot, ſome Branches paſſing as far as the Dorſal ſide of two or three of the ſmaller Toes.

Branches to both Heads of the Gaſtrocnemius, to the Plantaris, and to the Soleus.

Near the middle of the Leg, it ſends *Branches* to the Tibialis Poſticus, to the Flexor Digitorum and Flexor Pollicis.

One or two *Cutaneous Branches*, diſperſed upon the Skin at the under and inner part of the Leg.

Near the Ankle a *Branch* which paſſes behind the Tendo Achillis, principally to the Integuments of the outer and back-part of the Foot.

The Tibial Nerve paſſes afterwards between the Arteries and Os Calcis into the Sole.

In the hollow of the Os Calcis, after detaching Branches to the parts adjacent, it divides into *Internal* and *External Plantar Nerves*, which are nearly of equal ſize.

The INTERNAL PLANTAR NERVE runs near the inner ſide of the Sole, ſends Filaments to the Abductor Pollicis, Flexor Digitorum Brevis, and Flexor Digitorum Acceſſorius, and Twigs to the Lumbricales.

It afterwards gives out four large Branches ſplitting into others, which run with the Arteries along the Plantar ſides of the three firſt Toes, and inner ſide of the fourth Toe,—in the manner the Radial Nerve runs along the correſponding Fingers.

The EXTERNAL PLANTAR NERVE, ſends branches to the Heel, and paſſes with the Artery of the ſame name to near the outer edge of the Sole, where it ſplits into three principal Branches.

The two firſt run to the adjacent ſides of the fourth and fifth Toes, and outer ſide of the Little Toe, the inner one often anaſtomoſing with a correſponding Branch of the Internal Plantar.

The third forms an Arch correſponding with that of the External Plantar Artery, furniſhes Branches to the ſhort Muſcles of the Little Toe, to the Interoſſei, Lumbricales, and Tranſverſalis, and terminates in the ſhort Muſcles of the Great Toe.

The Plantar Digital Nerves ſend Filaments to the Integuments, and upon the Toes anaſtomoſe with each other, and with the Dorſal-digital Nerves,—as the Palmar Digital Nerves do in the Hand.

FINIS.

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