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A
COMPENDIUM
OF
ANATOMY,
HUMAN AND COMPARATIVE ;

WITH DIRECTIONS FOR DISSECTING THE DIFFERENT PARTS OF THE HUMAN BODY.

INTENDED PRINCIPALLY FOR THE USE OF
STUDENTS.

By ANDREW FYFE,

FELLOW OF THE ROYAL COLLEGE OF SURGEONS OF EDINBURGH,
&c. &c.

NINTH EDITION,

REVISED AND CORRECTED BY

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IN FOUR VOLUMES,—WITH PLATES.

VOL. III.

EDINBURGH :

PRINTED FOR ADAM BLACK, NORTH BRIDGE STREET ;

AND LONGMAN, REES, ORME, BROWN, & GREEN,

LONDON.

1826.

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CONTENTS
OF THE
THIRD VOLUME.

PART V.
OF THE BLOOD-VESSELS.

	<i>Pag.</i>
OF THE BLOOD-VESSELS IN GENERAL, -	3
Arteries, - - - - -	<i>ib.</i>
Veins, - - - - -	10
DISTRIBUTION OF THE BLOOD-VESSELS, -	15
Of the Pulmonary Artery and Veins, -	<i>ib.</i>
General Course of the Aorta and Vena Cava,	16
Blood-vessels of the Head, and Part of those of	
the Neck, - - - - -	18
Carotid Arteries, - - - - -	19
External Carotid, - - - - -	<i>ib.</i>
Arteria Laryngea Superior, -	20
——— Lingualis, - - - - -	21
——— Facialis, - - - - -	<i>ib.</i>
——— Pharyngea Inferior, -	23
——— Occipitalis, - - - - -	24

	<i>Pag.</i>
Arteria Maxillaris Interna, -	25
— Temporalis, -	28
Internal Carotid, - - - -	30
Arteria Ophthalmica, -	31
Arteries of the Brain, - -	34
Arteria Anterior Cerebri, -	35
— Media Cerebri, -	36
Vertebral Artery, - - - -	37
Arteria Posterior Cerebelli, -	38
— Basilaris, - - - -	39
— Anterior Cerebelli, -	<i>ib.</i>
— Posterior Cerebri, -	40
— Communicans, - -	<i>ib.</i>
Veins of the Outer Part of the Head, and of Part of the Neck, - - -	41
External Jugular Vein, - -	42
Veins of the Eye and its Appendages, -	43
Veins of the Dura Mater, corresponding with its Arteries, - - -	46
Veins of the Brain, - - - -	<i>ib.</i>
Internal Jugular Vein, - - - -	49
The remaining Blood-vessels of the Neck, with those of the Superior Extremity in general, -	50
Arteries, - - - - -	<i>ib.</i>
Subclavian Artery, - - - -	<i>ib.</i>
Arteria Innominata, - - - -	51
Thyroidea Inferior, - - - -	52
Cervicalis Anterior, - - - -	<i>ib.</i>
Cervicalis Posterior, - - - -	<i>ib.</i>
Dorsalis Scapulæ Superior, -	53
Axillary Artery, - - - -	<i>ib.</i>

CONTENTS.

vii

	<i>Pag.</i>
Thoracicæ Externæ,	54
Scapularis Interna,	55
Arteriæ Circumflexæ,	56
Humeral Artery,	57
Profunda Humeri,	58
Profunda Inferior,	<i>ib.</i>
Ramus Anastomoticus Magnus,	59
Radialis,	60
Ulnaris,	62
Interossea Posterior,	63
Interossea Anterior,	64
Veins of the Superior Extremity, and of Part	
of the Neck,	66
Superficial Veins,	<i>ib.</i>
Mediana Longa,	67
Vena Basilica,	68
Vena Cephalica,	<i>ib.</i>
Deep Veins,	69
Vena Axillaris,	<i>ib.</i>
Vena Subclavia,	<i>ib.</i>
Blood-vessels within the Thorax,	71
Arteries,	<i>ib.</i>
Mammaria Interna,	<i>ib.</i>
Arteriæ Bronchiales,	72
—— Esophageæ,	73
—— Intercostales,	74
Arteria Intercostalis Superior,	<i>ib.</i>
Arteriæ Intercostales Inferiores,	<i>ib.</i>
Veins corresponding with the Arteries mention-	
ed above,	75
Vena Azygos,	76

	<i>Pag.</i>
Left Vena Azygos, - - - - -	77
Vena Cava Superior, - - - - -	<i>ib.</i>
Blood-vessels of the Diaphragm, - - - - -	<i>ib.</i>
Arteriæ Diaphragmaticæ, - - - - -	<i>ib.</i>
Venæ Diaphragmaticæ, - - - - -	78
Blood-vessels of the Chylopoietic, and Assistant Chylopoietic Viscera, - - - - -	79
Arteries, - - - - -	<i>ib.</i>
Arteria Cœliaca, - - - - -	<i>ib.</i>
Arteria Gastrica Superior, - - - - -	<i>ib.</i>
————— Hepatica, - - - - -	80
————— Gastrica Dextra, - - - - -	<i>ib.</i>
Hepatic Artery continued, - - - - -	81
Arteria Splenica, - - - - -	82
————— Mesenterica Superior, - - - - -	83
————— Inferior, - - - - -	86
Veins, - - - - -	87
Mesenterica Inferior, - - - - -	88
Splenica, - - - - -	<i>ib.</i>
Mesenterica Superior, - - - - -	89
Vena Portæ, - - - - -	90
Blood-vessels of the Organs of Urine and Genera- tion, - - - - -	92
Arteria Renalis, - - - - -	<i>ib.</i>
Vena Renalis, - - - - -	93
Arteriæ et Venæ Capsulares, - - - - -	<i>ib.</i>
————— Adiposæ, - - - - -	94
Arteria et Vena Spermatica, - - - - -	<i>ib.</i>
Arteriæ Iliacæ, - - - - -	96
Arteria Umbilicalis, - - - - -	97
————— Uterina, - - - - -	<i>ib.</i>

	<i>Pag.</i>
Arteria Vaginalis, - - - - -	98
——— Pudica, - - - - -	99
Veins corresponding with the above Arteries,	101
Blood-vessels of the Containing Parts of the Abdo- men, and of the Pelvis and Inferior Extremity,	102
Arteries, - - - - -	<i>ib.</i>
Arteriæ Lumbares, - - - - -	<i>ib.</i>
Arteria Sacra Media, - - - - -	103
Arteriæ Iliacæ Communes, - - - - -	104
Arteria Iliaca Interna, - - - - -	<i>ib.</i>
Arteria Ilio-Lumbaris, - - - - -	105
Arteriæ Sacræ Laterales, - - - - -	<i>ib.</i>
Arteria Glutea, - - - - -	106
——— Obturatoria, - - - - -	107
——— Umbilicalis, - - - - -	108
——— Uterina, - - - - -	<i>ib.</i>
——— Hæmorrhoidalis Media, - - - - -	109
——— Pudica Communis, - - - - -	<i>ib.</i>
——— Sciatica, - - - - -	<i>ib.</i>
Arteria Iliaca Externa, - - - - -	110
Arteria Epigastrica, - - - - -	<i>ib.</i>
——— Circumflexa Ossis Ilii, - - - - -	112
Arteria Femoralis, - - - - -	113
Arteria Profunda Femoris, - - - - -	114
——— Circumflexa Interna, - - - - -	115
——— ————— Externa, - - - - -	116
Rami Perforantes, - - - - -	<i>ib.</i>
Arteria Poplitea, - - - - -	119
Arteriæ Articulares, - - - - -	<i>ib.</i>
Tibialis Antica, - - - - -	121

	<i>Pag.</i>
Fibularis, - - - - -	124
Tibialis Postica, - - - - -	124.125
Arteriæ Plantares, - - - - -	127
Veins, - - - - -	129
Subcutaneous Veins, - - - - -	<i>ib.</i>
Saphæna Major, - - - - -	<i>ib.</i>
----- Minor, - - - - -	130
Deep Veins, - - - - -	131
Vena Femoralis, - - - - -	<i>ib.</i>
Venæ Iliacæ, - - - - -	132
Vena Cava Inferior, - - - - -	133

PART VI.

OF THE ABSORBENT SYSTEM.

OF THE ABSORBENTS IN GENERAL, - - - - -	137
Origin and Situation of the Absorbents, - - - - -	<i>ib.</i>
Lacteal Vessels, - - - - -	138
General Termination of the Absorbents, - - - - -	139
Coats of the Absorbents, - - - - -	140
Blood-vessels and Nerves of the Absorbents, - - - - -	<i>ib.</i>
Valves of the Absorbents, - - - - -	141
Use of the Absorbents, - - - - -	142
Glands of the Absorbents, - - - - -	143
Particular Absorbents, - - - - -	146

	<i>Pag.</i>
Absorbents of the Lower Extremities,	146
——— of the External Parts of Gene- ration,	149
Superficial Absorbents of the Abdomen and Loins, with the different Absorbents of the Nates,	150
Inguinal, Iliac, and Lumbar Absorbents,	<i>ib.</i>
Absorbents of the Bladder of Urine,	151
——— of the Uterus,	152
——— of the Stomach,	<i>ib.</i>
Lacteals, or Absorbents of the Small In- testines,	153
Absorbents of the Great Intestines,	156
——— of the Liver,	<i>ib.</i>
——— of the Spleen,	158
——— of the Kidney and Capsula Re- nalis,	159
Thoracic Duct,	160
Absorbents of the Lungs,	161
——— of the Heart,	162
Thoracic Duct continued,	163
Absorbents of the Superior Extremity,	165
——— of the Head and Neck,	167
General Termination of the Absorbents in the Right Side of the Neck,	169

PART VII.

OF THE NERVES.

	<i>Pag.</i>
OF THE NERVES IN GENERAL, -	173
DISTRIBUTION OF THE NERVES, - - -	179
Nerves which pass through the Base of the	
Cranium, - - - -	180
First Pair, - - - -	<i>ib.</i>
Second Pair, - - - -	182
Third Pair, - - - -	183
Fourth Pair, - - - -	<i>ib.</i>
Fifth Pair, - - - -	184
Sixth Pair, - - - -	190
Seventh Pair, - - - -	191
Eighth Pair, - - - -	197
Ninth Pair, - - - -	200
Great Sympathetic Nerve, -	201
Nervi Accessorii ad Par Octavum,	204
Spinal Marrow, and Origin of the Spinal	
Nerves, - - - -	206
Spinal Marrow, - - - -	<i>ib.</i>
Spinal Nerves, - - - -	209
Blood-vessels of the Spinal Marrow,	212
Nerves of the Neck and Superior Extremity,	214
Nervus Accessorius, - - - -	<i>ib.</i>
Sub-occipital Nerve, - - - -	215
First Cervical Nerve, - - - -	<i>ib.</i>

C O N T E N T S.

xiii

	<i>Pag.</i>
Second Cervical Nerve, -	216
Third Cervical Nerve, -	217
Fourth Cervical Nerve, -	218
Fifth, Sixth, and Seventh Cervicals, with the First Dorsal Nerve, -	<i>ib.</i>
Axillary, or Brachial Plexus, -	219
Nervus Scapularis, -	220
—— Articularis, -	<i>ib.</i>
—— Cutaneus, -	<i>ib.</i>
—— Cutaneus Internus Minor, -	221
—— Musculo-Cutaneus, -	222
—— Spiralis, -	<i>ib.</i>
—— Radialis, -	225
—— Ulnaris, -	226
Nervi Intercosto-humerales, -	229
Nerves within the Thorax, -	230
Nervus Phrenicus, -	<i>ib.</i>
Pars Vaga, -	231
Nervus Recurrens, -	<i>ib.</i>
Pulmonary and Esophageal Branches of the Pars Vaga, -	233
Nervus Sympatheticus, et Nervi Car- diaci, -	234
Sympathetic Nerve continued, -	237
Nervus Splanchnicus, -	<i>ib.</i>
Nervi Intercostales, -	238
Nerves of the Chylopoietic, and Assistant Chy- lopoietic Viscera, -	240
Par Vagus, -	<i>ib.</i>
Rami Splanchnici, -	<i>ib.</i>
Semilunar Ganglion, -	241

	<i>Pag.</i>
Hepatic Plexus,	242
Splenic Plexus,	243
Superior Mesenteric Plexus,	<i>ib.</i>
Inferior Mesenteric Plexus,	244
Aortic and Hypogastric Plexus,	<i>ib.</i>
Nerves of the Organs of Urine and Gene- ration,	245
Renal Plexus,	<i>ib.</i>
Hypogastric Plexus,	246
Nervi Spermatici,	<i>ib.</i>
— Pudici,	247
Nerves of the Loins, Pelvis, and Inferior Ex- tremity,	248
Nervus Sympatheticus,	<i>ib.</i>
Lumbar Nerves,	249
Nervus Obturator,	251
— Cruralis,	<i>ib.</i>
Sacral Nerves,	253
Posterior Sacral Nerves,	<i>ib.</i>
Anterior Sacral Nerves,	254
First, Second, and Third Sacral Nerves,	<i>ib.</i>
Nervi Glutei,	<i>ib.</i>
Fourth and Fifth Sacral Nerves,	255
Nervus Sciaticus,	<i>ib.</i>
— Popliteus,	257
Nervus Fibularis,	<i>ib.</i>
— Tibialis,	259
Plantar Nerves,	260

PART VIII.

OF THE GLANDS.

	<i>Pag.</i>
OF THE GLANDS IN GENERAL, - -	265
Vessels and Nerves of the Glands, -	270
List of the Particular Glands, -	273
Of Secretion, - - -	274

 PART IX.

GENERAL RULES FOR DISSECTION, -	279
GLOSSARY, - - - -	327
INDEX, - - - -	353

PART V.

OF THE

BLOOD-VESSELS.

OF THE

BLOOD-VESSELS IN GENERAL.

THE BLOOD-VESSELS are divided into ARTERIES and VEINS, which are variously dispersed, and are connected to the neighbouring parts by Cellular Substance, but which is sufficiently loose to admit of their necessary motions.

ARTERIES.

The *Arteries* are strong elastic Canals, which convey the Blood from the Heart to the different parts of the Body, and, during life, are distinguished from the Veins by their Pulsation.

The original Trunks of the Arteries, or those which arise from the Heart, are two in number,—the *Pulmonary Artery* and *Aorta*. From these all the other Arteries are derived.

The Principal Trunks run in such parts of the Body as are least exposed to danger, deriving support or defence from the Bones along which they pass; and the larger Arteries are generally seated deeper than the corresponding Veins.

The Arteries are placed in the Cavities of the Body, or in the bending sides of the Joints, or between the Processes of Bones, or in the Grooves, or in Canals formed in the Bones, to prevent the Blood from being impeded in its course.

The largest Arteries are in general deep-seated, while the smaller Branches run more superficially; on the contrary, many of the large Veins, particularly those of the Muscles, run directly under the Skin, while Veins of inferior size are found in the deeper parts of the Body.

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 certain places, they become so extremely minute as altogether to exclude the red Blood, carrying a colourless Fluid only.

The greatest number of Arteries go to active Organs, as the Muscles, Glands, and Organs of the Senses. A more scanty allowance of Branches is given to the Bones, Tendons, and Ligaments.

The Arteries, when empty, are distinguished 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 Me-*

diastinum, 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*. This appears very evident about the Abdominal Aorta, and the great Arteries of the Arm, Thigh, &c.

The first of the proper Coats is the *External Membranous*, or *Cellular*, called also by some Authors the *Nervous Coat*. It is the strongest of the Coats of the Arteries, but the thickness varies considerably in different parts of the Body. It is composed of minute Threads, which internally are condensed into a firm Substance, that accompanies their Arteries to their terminations.

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, and this forms the *Pulse*, called also the *Diastole* of the Arteries.

That the Dilatation of the Arteries is the cause of the Pulse, is readily proved by fixing a flexible Tube, as the Gut of a Cat, or the Trunk of an Artery, to the Artery of a living Animal, in such a manner as to transfuse the Blood from the latter into the former. In this case, the inanimate Substance acquires a Pulsatory motion.

The *Second* is the *Middle*, or *Muscular*, which is the thickest of the Coats. It is composed of Fibres running in a transverse direction,—of a red colour in the

small Arteries, but paler in the large vessels, especially in the Aorta. Each Fibre appears to form only the Segment of a Circle, although the whole constitute a Cylinder round the Artery.

The Fibres of the second Coat are closely compacted together, and formed into Layers, which can be separated from each other, especially in the Great Arteries, and still more particularly in those of large Animals.

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* resembles the inner lining of the Heart. It 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 Substance, which some Authors have considered as forming 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 and middle Coats, none being observed on the internal one.

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, the diminution being in proportion to the number of their Ramifications.

Wherever an Artery divides into two Branches, the Area of these two Branches, taken conjunctly, is found to be nearly one half larger than the Area of the Trunk from which they issue, though this has been differently stated by different Authors.

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, in the distended state, is circular;—when empty, they become flatter, but do not collapse entirely, on account of their elasticity.

The Angles at which the Branches go off from their Trunks vary in different parts of the Body; they are in general more obtuse or acute, in proportion to their vicinity to the Heart, and are such as are most favourable to the parts they have to supply. The acute angle is the most common.

In the Trunk of the Body, or where they belong to tender and delicate Viscera, the Angles 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 divide something after the manner of the Branching of a Tree, or they form many divisions and subdivisions, before they reach their Termination, and at last become invisible to the naked Eye.

The divisions formed by any single Artery have been variously enumerated by different Authors,—one, in particular, reckoning them at forty, and another, of equal respectability, only at twenty; their number, 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 proportionally greater in the small Branches than in the large Trunks, as has been observed by fixing weights to them.

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, as in the Lips, Uterus, &c.

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 is increased, as appears evident in many parts of the Body, when their Vessels are well injected; and this

partly owing to their being fixed down at their Extremities.

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.

In some parts two Arteries unite into a Trunk; in others, they form an Arch, from the convex side of which other Arteries are sent off; and this may be repeated several times, the Arches and Arteries gradually becoming more diminutive in their size.

The *Anastomoses* are more 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, 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 following is the manner in which the Arteries of the Body terminate, viz.

In Red Veins, as is observed by the assistance of a Microscope, and by Injections:

In Glands or Follicles, by Secretory Ducts, which

separate a Fluid from the general Mass of Blood, as in the Salivary Glands :

In Exhalent Vessels, which discharge their Contents into the Internal Cavities, as the Pleura, or Peritoneum, or upon the external Surface of the Body, to lubricate these ;

In colourless or Lymphatic Branches, which are afterwards continued to the Circulating Veins, as in the Cartilages and Cornea :

In Cells, as in the Penis, Clitoris, and Corpus Cavernosum Vaginæ.

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, continued directly from the Extremities of the Arteries, returning the Blood from the different parts of the Body to the Heart,—and having no Pulsation.

The commencement of the Veins is seen, as the termination of the Arteries is, by the assistance of a Microscope, after a minute injection in the dead body, or in certain Membranous Expansions, as the Foot of a Frog, in a Living Animal, where the one set of Vessels

can be distinctly traced as continued from the other, though without our being able to fix upon the point where the one set ends and the other begins.

The *Coats* of the Veins are the same in number with those of the Arteries, but are much thinner and denser, and less elastic when taken in a longitudinal direction; but the reverse when considered transversely; yet from late experiments they are found to be proportionally stronger. Their Coats, like those of the Arteries, are thicker, however, in proportion, in the small Branches than in the Trunks.

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.

About an inch in length of each of the Venæ Cavæ, next the Heart, has scattered Fibres between the outer and inner Coats, somewhat similar to those of the Auricles.

The *Muscular Coat* of the Veins being loose like Cellular Substance, much thinner, 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 bluish, and, when full of Blood, in consequence of the thinness of their Coats, they appear of a purple tinge.

Their size is generally more than double that of the Arteries to which they belong. HALLER thinks the Area of the whole Venous System to that of the Arterious, is about nine to four; but the Pulmonary Veins

are excepted, the size of which scarcely surpasses that of the corresponding Arteries.

In the fleshy parts of the Body, particularly in the Extremities, the Veins 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 generally 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, but in certain parts of the Body they are more apt to swell out into Sinuses; and, upon comparing the Area of their trunks with the collective Area of their Branches, like the Arteries 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 in general so much greater than that of their corresponding Arteries, that when the Vessels of a Membranous Part are distended by Injections of different colours, the Veins are observed to form a Plexus, and in a great measure to conceal the Arteries: In the Intestines, however, the number of the Arteries and Veins is more 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, in this respect, is such, that the Veins differ a little in every different Subject.

The Veins admit of less elongation than the Arteries,

but are capable of suffering greater distension, yet are more frequently ruptured.

The Anastomoses are greater and more frequent in Veins than in Arteries, to lessen the danger of being ruptured; those of the former being often 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* to prevent the Blood from being interrupted in its course. These are Semi-lunar Folds continued from the inner Coat of the Vessels, and placed in pairs at irregular distances. They are sometimes, though seldom, found single.

The Valves are concave towards the heart, and, when closely applied to each other, by the force of the Blood against them, 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 itself; and Cavities are formed, termed *Sinuses* of the Valves, which appear externally in the form of Varices.

The Valves are generally found in the Fleishy parts of the Body, but are chiefly situated in the Veins of the Extremities.

They are wanting in the Veins of the Deep-seated Viscera, viz. in those of the Brain and Spinal Marrow, in those of the Lungs, in the System of the *Vena Portæ*, and in those of the Kidneys, Bladder, and Uterus. They exist, however, in the Spermatic, and sometimes in the Internal Mammary Veins, and in the Branches of the *Vena Azygos*.

The Valves direct the Blood towards the Heart, and

prevent Regurgitation. They are of such strength, and so nicely adapted to each other, as to prevent Injections after death from passing by the Trunks of the Vessels to their extremities.

The Veins 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* is nearly of the same size with the Aorta; it arises from the upper and left side of the Right Ventricle of the Heart, and ascends behind the Sternum, and within the Pericardium, inclining a little to the left side.

Having run as high as the concave side of the Arch of the Aorta, it divides into two Lateral Branches, which terminate in the Right and Left Lungs.

The Right Branch, which is the largest, passes behind the Curvature of the Aorta and the Superior Vena Cava, and is of course also the longer of the two.

The two Branches are dispersed throughout the Substance of the Lungs, by Ramifications which accompany those of the Bronchi, and, becoming gradually smaller, terminate upon the Pulmonary Cells.

From the extreme Branches of the Pulmonary Artery, the Blood is returned by corresponding Veins.

The *Pulmonary Veins* run contiguous to the Arteries, but, unlike the other Veins in general, are nearly of the same size with their Arteries.

In their course they unite into larger Branches,

which, after leaving the Lungs, 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, at its upper and lateral parts; of these Trunks one is Superior, and the other Inferior, on each side. The Superior passes before the corresponding Artery, the Inferior behind the Branches of the Trachea. The Trunks of the Veins of the right side, like their Artery, are longer than those of the left.

General Course of the AORTA and VENA CAVA.

The *Aorta* arises behind the Pulmonary Artery, from the upper and back part of the Left Ventricle of the Heart, opposite the third Vertebra of the Thorax, and sends off, at its Origin, the *Coronary Arteries*, formerly described.

Where it takes its Beginning, 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 second Dorsal Vertebra, under the name of *Aorta Ascendens*, and is afterwards reflected obliquely backwards over the Right Branch of the Pulmonary Artery, and root of the Left Branch of the Trachea, till it reaches the third Vertebra of the Back, forming what is termed the *Curvature* or *Arch* of the Aorta.

It then becomes *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 immediately upon the fore part of the Vertebrae.

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 Venæ Cavæ, excepting what passes by 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, and is of great size, being about an inch in diameter.

It is situated upon the fore part of the Spine, and at the *right side* of the Aorta, which it accompanies 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 Lower 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, and is about two-thirds of an inch in diameter.

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 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, like the Inferior Cava, 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*, or *Communis*, soon divides into the *Right Carotid*, and *Right Subclavian Arteries*.

The other two are the *Left Carotid*, and *Left Subclavian*, which come off in separate Trunks.

The above is the ordinary way in which the Carotids and Subclavians take their Origin; but there is considerable variety in this respect in different Bodies.

Sometimes there are two common Trunks from which these Arteries take their rise ; at other times there are four original Arteries from the Aorta ; and in some rare cases, the Right Subclavian comes off from the left end of the Arch of the Aorta, and passes behind the Trachea.

In some instances, the two Carotids come off from the Arteria Innominata.

CAROTID ARTERIES.

The CAROTID, termed also CEPHALIC Arteries, after emerging from the Thorax, ascend upon the fore part of the Vertebrae, between the Trachea and Internal Jugular Veins, and behind the Sterno-mastoidei, gradually receding from each other, and getting upon the fore part of the Longus Colli, and Rectus Capitis Internus Major, on each side.

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, though in some rare instances much lower, divides into *External* and *Internal Carotid Arteries*, the former supplying the upper part of the Neck, and the outer parts of the Head, the latter the greater part of the Brain.

In some very rare cases, the Common Carotid has been observed to divide suddenly into numerous small Branches.

EXTERNAL CAROTID.

The EXTERNAL CAROTID, or PERICEPHALIC, sometimes termed Facial 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, under the Digastricus and Stylo-hyoideus, towards the Temple, and in its passage before the Ear, is sunk deep in the substance of the Parotid Gland, which it supplies in its course, and is divided into the following principal Branches, viz. Laryngea Superior, Lingualis, Facialis, Pharyngea Inferior, Occipitalis, Maxillaris Interna, Temporalis.

ARTERIA LARYNGEA SUPERIOR.

THE ARTERIA LARYNGEA SUPERIOR, GUTTURALIS SUPERIOR, vel THYROIDEA SUPERIOR, 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, under the Omo-hyoideus and Sterno-thyroideus, and sends

Branches to the Muscles under the Os Hyoides, and to the Bone itself, and Ligament connecting it to the Larynx:

Branches to the Sterno-mastoideus, Platysma Myoides, Jugular Glands, and Skin near the Larynx:

The *Laryngeal Branch*, which passes between the Os Hyoides and Thyroid Cartilage, to the Cartilages, Muscles, and Membranes peculiar to the Larynx. This Branch is sometimes sent off from the Trunk of the External Carotid.

The *Thyroid Branch*, which is the continuation of the Trunk, dispersed upon the Substance of the Thyroid Gland.

The Branches of the Laryngeal Artery communicate with their fellows on the opposite side; the Anas-tomoses of the Thyroid Branches, however, are small compared with the rest.

ARTERIA LINGUALIS.

The ARTERIA LINGUALIS is sent off immediately above the former.—It runs near the Pharynx, first forwards and upwards over the corresponding Cornu of the Os Hyoides, and under the Hyo-glossus, then 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 Linguae* to the Fauces, Amygdala, Epiglottis, and Pharynx:

The *Ramus Sublingualis*, which comes off under the middle of the Tongue, and is dispersed upon the Sub-lingual 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.

ARTERIA FACIALIS.

The ARTERIA FACIALIS, MAXILLARIS EXTERNA, LABIALIS, vel ANGULARIS, also runs forwards, and

goes under the Stylo-hyoideus, and Tendon of the Digastricus. It perforates the Submaxillary Gland, mounts suddenly over the side of the Lower Jaw, at the under and fore part of the Masseter, from whence it proceeds in a tortuous manner, between the Zygomatic and Buccinator Muscles, to the Angle of the Mouth, and then by the side of the Nose, towards the inner Corner of the Eye.

In this course, it sends the following Branches to the adjacent parts :

The *Palatina Inferior*, vel *Ascendens*, which runs upwards upon the side of the Pharynx, covered by the Stylo-hyoideus, to be dispersed, by a Superficial and a Deep Palatine Branch, upon the Muscles attached to the Styloid Process and Palate, and upon the Velum Palati and parts near it :

A *Branch* spread out by many Twigs upon the Tonsil, and reaching as far as the Tongue :

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 *Arteria Submentalis*, which advances between the Platysma Myoides and Mylo-hyoideus, and also between the anterior Belly of the Digastricus, and the Base of the Lower Jaw, furnishing Branches to the Submaxillary Gland, the Skin, Mylo-hyoideus, Chin, and Under Lip :

A *Branch*, upon the outside of the Jaw, to the Masseter :

The *Labialis Inferior*, which arises a little higher than the former, and goes to the lower part of the Un-

der Lip, inosculating with the corresponding Branch on the opposite side :

Small Branches dispersed upon the Buccinator, and communicating with others distributed upon the Substance of the Cheek :

The *Coronaria Inferior*, which comes off near the Corner of the Mouth, sometimes from the Labialis Inferior :—and

The *Coronaria Superior*, larger than the former, 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 edges of the Lips, where, meeting with their fellows of the opposite side, they form an *Arteria 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 forwards 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 Forehead.

PHARYNGEA INFERIOR.

The PHARYNGEA INFERIOR, vel ASCENDENS, is a small Artery arising near the Lingual, and frequently from the root of the Occipital one.

After ascending some way between the Rectus Capitis Internus Major and Pharynx, 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.—From this Artery, Twigs are also sent to the Sterno-mastoideus, Nerves, and Conglobate Glands.

ARTERIA OCCIPITALIS.

The ARTERIA OCCIPITALIS 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, which is exterior to the Carotis Interna. It afterwards passes between the Atlas and Mastoid Process, and is covered by the posterior Belly of the Digastricus.

It goes likewise behind the upper ends of the Trachelo-mastoideus, Splenius, and Complexus; 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.

Branches to the Digastricus, Stylo-hyoideus, Sterno-mastoideus, and Glands of the Neck, and communicates with Branches of the Cervical Arteries :

A Branch, which passes, with the Jugular Vein, and goes to the under and back part of the Dura Mater :

A small Auricular Branch, which is sometimes from the posterior Auricular, and is distributed on the Lobe and outer edge of the Ear :

The AURICULARIS POSTERIOR, which comes fre-

quently off from the Trunk of the Carotid.—It sends Branches to the Parotid Gland, Digastricus, and Sternomastoideus,—a Branch to the Meatus Externus and Membrana Tympani,—the *Stylo-mastoid Branch*, which passes through the Foramen Stylo-mastoideum, giving Twigs to the Meatus Externus, Membrana Tympani, and to different parts of the Internal Ear.

The Auricular Artery passes afterwards behind the Ear, gives Branches to the Integuments, Muscles, and Bones there, and, creeping upon the back part of the Concha, it sends Twigs to it, and terminates upon the side of the Head.

The Occipital Artery gives next a Branch, of considerable size, which descends between the Trachelo-mastoideus and Complexus, and afterwards gives Branches to most of the Muscles on this part of the Neck.

The Trunk of the Artery afterwards ascends in a serpentine manner upon the Occiput, dividing into several Branches, which are dispersed upon the Integuments and Occipito-frontalis, communicating with the Occipital Artery of the opposite side, one Twig passing occasionally through the Foramen Mastoideum to the Dura Mater.

ARTERIA MAXILLARIS INTERNA.

The ARTERIA MAXILLARIS INTERNA, which has its name in opposition to the Maxillaris Externa, 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 Condylloid and Coronoid Processes of the Lower Jaw.

It passes first between the Jaw and Pterygoideus Externus, and afterwards ascends, in a tortuous manner, towards the back part of the Antrum Maxillare, sending numerous Branches to the parts belonging to the Jaws.

At its Origin, it furnishes Twigs to the fore-side and adjacent part of the Outer Ear, and to the Articulation of the Lower Jaw.

It then sends off the *Arteria Duræ Matris Media Maxima*, vel *Meningea Media*, vel *Spheno-spinalis*, which runs between the External and Internal Carotids, passes through the Foramen Spinale of the Sphenoid Bone, and spreads, like the Branching of a Tree, over the Surface of the Dura Mater and inside of the Parietal and Temporal Bones.

Before entering the Foramen Spinale, it sometimes gives Twigs to the Muscles and other parts near it. A minute Branch runs along the Inferior Maxillary Nerve to the Dura Mater; and within the Cranium, besides the Branches mentioned above, it furnishes Twigs to the Substance of the Bones, and to the inner Ear:

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 Anterior Maxillary Foramen, is dispersed upon the Under Lip, communicating upon the Chin, with Branches of the Facial Artery.

Branches to the Pterygoideus, Masseter, and inner part of the Temporalis, under the names of *Arteriæ Pterygoideæ*, *Massetericæ*, and *Temporales Profundæ*:

The *Arteria Buccalis* to the Buccinator and other parts of the Cheek :

The *Arteria Alveolaris*, which runs behind the Antrum, and sends Branches to the Gums and soft parts surrounding the Upper Jaw.—It sends other Branches which enter by small Holes to the Antrum Maxillare, 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 that Cavity, 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, Upper Lip, and Nose, by several small Branches which communicate with those of the Facial Artery.

The *Palatina Descendens*, or *Palato-maxillary* Branch, which passes through the Foramen Palatinum Posterius, and runs between the Osseous and Fleшы parts of the Palate, supplying these with Branches, and communicating with the Palatina Inferior, 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, and Base of the Cranium near it :

The *Large Lateral Nasal*, or *Spheno-palatine*, which enters the Foramen Spheno-palatinum, and divides, at the upper and back part of the Nose, into many Branches, which supply the greater part of the inside of that Organ, viz. a Branch to the posterior Ethmoid

Cells,—a larger Branch to the Septum Narium,—a conspicuous Branch passing through the Spongy Bones to the bottom of the Nose, furnishing Twigs to the Membrana SCHNEIDERIANA and Antrum Maxillare, and communicating with the Palato-maxillary Branch, which passes through the Foramen Incisivum.

ARTERIA TEMPORALIS.

The Trunk of the External Carotid, having given off the Arteries already mentioned, emerges from the Substance of the Parotid Gland, then passes up between the Meatus Auditorius Externus, and root of the Zygoma, to form the *Temporal Artery*, named also *Temporalis Externa* vel *Superficialis*. From the root of this Artery are sent off *several Branches*, of unequal size, to the Parotid Gland: It next sends off,

The *Transversalis Faciei*, which arises nearly opposite to the Internal Maxillary, and proceeds transversely under the Zygoma, over the Masseter, and near the Parotid Duct. After giving Branches to the Parotid Gland, the Transversalis supplies a large portion of the Cheek, communicating with the Facial and Internal Maxillary Arteries.

The *Articular Artery*, which sends Branches to the Articulation of the Jaw, the External Meatus and Membrana Tympani, and penetrates through the Glenoid Fissure, as far as the Inner Ear, communicating with the Arteria Stylo-mastoidea.

The Deep *Temporal Branch*, which arises behind the Condyle of the Jaw. This penetrates the Aponeurosis of the Temporal Muscle, and ascends obliquely forwards to the outer part of the Orbit:

Anterior Auricular Branches, which come off near the Origin of the former Branch, and are ramified upon the fore part of the Ear, inosculating there with the Posterior Auricular Artery.

Branches to the Masseter, which communicate in the Cheek with the Facial and Internal Maxillary Arteries.

The Temporal Artery having detached the Branches mentioned above, forms one or two sharp turns before the Ear; and a little above the root of the Zygoma, where the Pulsation of the 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*, *External Anterior*, or *Temporo-frontal Branch*, advances in a serpentine direction, spreading out its Ramifications upon the side and upper part of the Forehead, some of which reach as far as the Orbit.

It supplies the Integuments and Muscles near it, communicates, about the Orbit, with the Facial Artery, and, at the upper part of the Head, with the corresponding Branch of the other side.

It occasionally gives a Branch from near its root, termed *Ramus Orbicularis*, which runs towards the outer Corner of the Eye, to be distributed upon the Orbicularis.

The *Posterior*, or *External Posterior*, or *Temporo-occipital Branch*, appears as the continuation of the Trunk. It ascends obliquely backwards, and is distributed extensively on the Integuments and Muscles upon the lateral part and Crown of the Head, communicat-

ing with the Anterior Branch, and with the Occipitalis on the same side of the Head, and also with the posterior Temporal Branch of the opposite side.—From this and from the other Branches of the Head, numerous Twigs go to the Pericranium, and to the Substance of the Bone.

INTERNAL CAROTID ARTERY.

The INTERNAL CAROTID, termed also *Arteria Cerebralis*, vel *Encephalica*, is arched back at its Origin, and then ascends in a waving direction, at the lateral and posterior part of the Pharynx, on the fore side of the Rectus Capitis Anterior Major, 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 the Dura Mater, which form a Cushion between it and the Bone; of course Pulsation is admitted here, as well as in other parts of the Arterious System.

After leaving the Canal, it again bends upwards and then forwards, by the side of the Sella Turcica, and here it is situated within the Cavernous Sinus; 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 serpen-

tine manner, which prevents the Blood in it from rushing too quickly and forcibly upon the tender Substance of the Brain. Contrary to the nature of other Arteries, the Internal Carotid 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, viz.—a Branch which passes through the Pars Petrosa to the Tympanum,—a Branch termed *Posterior*,—and another termed *Anterior Artery* of the *Cavernous Sinus*, which go to the Dura Mater, Glandula Pituitaria, and Nerves at the side of it.

As soon as the Carotid perforates the Dura Mater, at the root of the Clinoid Process, it transmits the *Arteria Ophthalmica*.

ARTERIA OPHTHALMICA.

The *ARTERIA OPHTHALMICA* is the principal Artery belonging to the Eye and its Appendages.

Immediately after it comes off from the Carotid, it enters the Foramen Opticum, and creeps under the Optic Nerve, included in the Dura Mater, towards the outer part of the Cavity of the Orbit.

After proceeding some way through the Orbit, it traverses its Cavity, between the Optic Nerve and Depressor Oculi, taking a spiral direction towards the Nose.

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: one Twig goes to the Periosteum of the Orbit, and another through the Cheek-bone to the Face.

The *Arteria Centralis Retinæ*, which penetrates the Optic Nerve a little behind the Ball of the Eye, runs in the Axis of the Nerve, and spreads out into many small Branches upon the inside of the Retina.

When the Nerve is cut across near the Ball of the Eye, the Orifice of the divided Central Artery is observable, which, before its nature was understood, was known by the name of *Porus Opticus*.

In an Adult, the Central Artery appears to terminate entirely upon the Retina; but in a 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 afterwards 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. These Branches have been distinctly seen by the Author, after throwing in a fine Injection into the Ocular Artery, previously to the seventh Month of Gestation:

The *Arteriæ Ciliares*, three or sometimes more in number, which separate 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*, vel *Posteriores*, which are numerous, and are formed not only of Branches from the original Ciliary Trunks, but also of Twigs from the Muscular Branches. 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. They perforate the Sclerotica a little farther forwards than the former, pass along the Choroid Coat to its anterior part, and then each separates into two Branches, and these into others which inosculate round the outer edge of the Iris.

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 across 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 a Fœtus, they are continued to the Membrana Pupillaris.

The *Muscularis Superior*, et *Muscularis Inferior*,

which are dispersed upon the Muscles, Membranes, and Fat of the Eye; giving Twigs also to the Sclerotic Coat.

The *Ethmoidalis Anterior et Posterior*, two extremely small Twigs, especially the latter, which pass through the Foramina Orbitaria Interna,—Anterior et Posterior,—to the Bones and Membranes of the Nose, particularly to the Frontal, Ethmoid, and Sphenoid Sinuses, where they communicate with the Nasal Branches of the Internal Maxillary Artery.

The *Supra-Orbitalis*, vel *Frontalis*, which, after giving Branches to the Muscles and Periosteum at the upper and fore part of the Orbit, and to the Lacrymal Sac, emerges 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.

ARTERIES OF THE BRAIN.

The Arteries of the Brain consist of the two *Internal Carotids*, and the two *Vertebrals*, all of which spread out their Branches upon the Pia Mater.

Each Internal Carotid, after sending forwards the Ocular Artery, gives a number of separate Twigs to the Optic Nerve, the Glandula Pituitaria, the Infundibulum, and the Choroid Plexus, and sends a particular Branch backwards to the Vertebral, termed *Arte-*

ria Communicans, and then divides into two principal parts, the *Arteria Anterior*, and *Arteria Media Cerebri*.

ARTERIA ANTERIOR CEREBRI.

THE ARTERIA ANTERIOR CEREBRI turns towards its fellow of the opposite side, and commonly sends Filaments to the First and Second Cerebral 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*, and sometimes by two, which form part of that Communication of Vessels termed *Circus Arteriosus WILLISII*.

From the 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, nearly parallel to its fellow of the other side, 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 *Arteria Corporis Callosi*, or simply *Arteria Callosa*, 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,

through the medium of the Pia Mater, 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 then pass by minute Filaments into its Cortical and Medullary Substances.

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.

ARTERIA MEDIA CEREBRI.

The ARTERIA MEDIA CEREBRI,—termed also ARTERIA SYLVIANA, which is larger than the former,—runs outwards in a lateral direction through the *Fossa* of SYLVIVS, to the upper part of the Brain.

It gives first Filaments to the Optic Nerves, Glandula Pituitaria, and parts adjacent to it, and then divides into principal Branches; of which one Set goes 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 spread out upon the Pia Mater, accompanying it into the Sulci. They 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 ARTERY.

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 Vertebrae, though in some rare instances it is seen entering the Seventh Vertebra, or sometimes only perforating two or three of the uppermost of these.

It ascends through the Neck, nearly in a straight direction, sending Twigs outwards between the Vertebrae to the deep Muscles of the Neck, and others which pass inwards by the Holes that transmit the Spinal Nerves, to the Spinal Marrow and its Membranes; communicating with the Spinal Arteries.

Immediately below the Head, it gives out more considerable Branches to the Deep Muscles at the back part of the Neck, particularly to the Recti and Obliqui Capitis, the Trachelo-mastoideus and Complexus; in-osculating with Branches of the Occipital Artery.

In passing from the Third to the Second Vertebra, one turn is formed upwards and outwards; and in going between the Vertebra Dentata and Atlas, another outwards and forwards.

After perforating the Atlas, it bends suddenly backwards, and runs in a horizontal direction in a Notch upon that Bone.

Having reached the lateral part of the Foramen Mag-

num 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 Vertebrales unite into the Trunk called *Basilar Artery*.

Upon entering the Skull, each Vertebral Artery sends a small Branch, termed *Arteria Meningea Posterior*, to the back part of the Dura Mater, which communicates by small Ramifications with the neighbouring Arteries of this Membrane.

It then disperses Twigs to the Medulla Oblongata, and frequently gives off the small Branch which forms one of the *Posterior Arteries* of the Spinal Marrow.

Near the part where it unites with its fellow, it sends down the *Anterior Artery* of the Spinal Marrow, which, with the Posterior Arteries of this Substance, will be afterwards described.

ARTERIA POSTERIOR CEREBELLI.

From the Vertebral, or from the Basilar, or sometimes from each, a principal Branch is sent off, named *Arteria Cerebelli Posterior* vel *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.

BASILAR ARTERY.

The BASILAR ARTERY runs along the middle of the Tuber Annulare, which it slightly impresses, and lies upon the Cuneiform Process of the Os Occipitis; having there the Dura Mater and Tunica Arachnoidea between it and the 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 Nerve to the Internal Organ of Hearing.

At the extremity of the Cuneiform Process of the Occipital Bone, and at the upper and fore part of the Tuber Annulare, the Basilar Artery divides into four principal Branches, two to each side; viz. the Anterior Cerebelli, and Posterior Cerebri, and these go off almost at right angles from the Trunk.

ARTERIA ANTERIOR CEREBELLI.

The ARTERIA ANTERIOR, vel SUPERIOR CEREBELLI, turns round the Crus Cerebri, expands its Branches upon the upper part of the Cerebellum, and sinks into its substance, supplying also the Walls of the fourth Ventricle, the Nates, Testes, and parts near them.

ARTERIA POSTERIOR CEREBRI.

The ARTERIA POSTERIOR, vel PROFUNDA CEREBRI, sends Twigs to the Tuber and to the Crus 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 Crus Cerebri, passes backwards 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 one another in the other parts of the Brain :

ARTERIA COMMUNICANS.

The ARTERIA COMMUNICANS 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 the Transverse Artery which connects the anterior Branches of the Internal Carotids.

It runs by the sides of the Sella Turcica, sends minute Threads to the Crura Cerebri, to the Corpora Albicantia, Optic Nerves, and Infundibulum, and contri-

butes 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.

The Circle of WILLIS incloses the Optic Nerves, the Infundibulum, and the Corpora Albicantia, and is of an irregular, or somewhat quadrangular figure, the size varying not only in different Subjects, but in the different sides of the same Body,

VEINS OF THE OUTER PART OF THE HEAD, AND OF PART OF THE NECK.

The smaller Veins which return the Blood from the Arteries of the outer part of the Head, and of part of the Neck, have a similar course with their corresponding Arteries; they unite into the following Trunks, viz.

The *Frontal Vein*, which is formed by several Branches belonging to the Muscles and Integuments on the upper and fore part of the Cranium, and which is often single, returning the Blood then from both sides of the Fore-head.

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 that vessel, 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, which it here covers, sinks 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 those sent to these parts from the Carotid or Temporal Artery.

At the under part of the Angle of the Lower Jaw, the Facial and Temporal Veins commonly unite and form the *External Jugular*.

EXTERNAL JUGULAR VEIN.

The EXTERNAL JUGULAR VEIN receives the following Branches at the upper part of the Neck, viz.

Branches of the Internal Maxillary Vein, the principal Branches of that Vein terminating in the Internal Jugular.

The *Lingual Vein*, which more frequently terminates in the Internal Jugular.

The *Branches* from the Occipital Vein, the rest passing to the Internal Jugular and Vertebral Veins, and sometimes also communicating by a Foramen Mastoideum with the Lateral Sinus.

The Trunk of the External Jugular Vein descends

in the Neck between the *Platysma Myoides* and *Sterno-Mastoideus*, receives in its course 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 most 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 usual way, and the other in the Internal Jugular.

In some rare cases, the External Jugulars have both been found terminating in one side of the Neck.

Besides the Vein commonly called External Jugular, a small Subcutaneous Vein, termed *Anterior External Jugular*, descends 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 sent to the Contents of the Orbit is returned by the following Branches, 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. The Branches are,

The *Vena Centralis Retinae*, which is formed by many small Branches expanded upon the inner Surface

of the Retina along with those of the corresponding Artery.

The Vena Centralis enters the Optic Nerve, where the Artery leaves it; and a little behind the Ball of the Eye, emerges from the Nerve, and runs between it and the Sheath which covers it; receiving many Twigs from the Nerve and its Membranes.

It passes afterwards under the Fasciculus of Nerves which belongs to the Eye, and terminates sometimes 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*, and by the *Long* or *Posterior 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 *Short Ciliary Veins* pass from the Iris through the Sclerotic Coat, near the same part where the Anterior Ciliary Arteries enter.

The *Long Ciliary Veins*, like the Arteries, are commonly two in number, 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 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 centre 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 Vorticose Veins receive 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. They consist of—

Branches from the Palpebræ and inner Corner of

The *Lacrimal Branch* :
 The *Ethmoidal 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 with the *Facial Vein*, at the inner Corner of the Eye, 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 Levator Oculi; and, after running backwards through the Superior Orbital Fissure, covered by the Third and Sixth Cerebral Nerves, it terminates in the Cavernous Sinus.

VEINS OF THE DURA MATER CORRESPONDING WITH ITS ARTERIES.

The *Veins of the Dura Mater* accompany their Arteries, and run at each side of them. They go partly through the perforations in the Base of the Cranium, and more especially through the Foramina Ovalia of the Sphenoid Bone, to terminate in Branches of the External or Internal Jugular Veins. The rest pass 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 different *Sinuses* of the Dura Mater, and generally in an oblique direction, which prevents the Blood from returning from the Sinuses 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 *Straight Sinus*, or *Fourth* 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 Callosum 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 Sinuses.

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 form 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 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 the 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 also are frequently found, viz.

A *Perpendicular Occipital Sinus*, situated in the Falx Cerebelli, which is sometimes single, at other times double, and terminates in the Lateral Sinuses.—It receives Veins from the Dura Mater, and communicates with the Vertebral Veins.

An *Anterior Superior*, and *Anterior Inferior Occipital Sinus*, placed over the Cuneiform Process of the Occipital Bone, and communicating with the Inferior Petrosal and Lateral Sinuses, and with the Vertebral Veins.

INTERNAL JUGULAR VEIN.

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 the Jugular Fossa at the root of the Pars Petrosa of the Temporal Bone.

The INTERNAL JUGULAR VEIN descends behind the Sterno-mastoideus, 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 persons advanced in life.

In its course in the Neck, it receives, either by se-

parate Branches, or some of these collected into Trunks :

Branches from the Pharynx and Muscles adjacent to it :

The *Internal Maxillary Veins*, with their Branches, termed *Meningeal* :

One or more *Branches* from the Occiput :

The *Lingual Vein*, which sometimes terminates in the External Jugular.—One Branch of this, termed *Ranina* from its complexion, is seen under the Tongue, and is that Vein which is opened in Venesection here :

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 Caro-

tid, by a Trunk called *Arteria Innominata*; and on the left, to come off directly from the Aorta.

ARTERIA INNOMINATA.

The ARTERIA INNOMINATA, seu ANONYMA, named also *Right Subclavian*, scarcely two inches in length, ascends obliquely over the Trachea, at the right side of which it divides into the *Right Proper Subclavian*, and the *Right Common Carotid*.

The *Left Subclavian* arises from the Arch of the Aorta, at the outside of the Carotid, and ascends to the upper part of the Thorax; forming there a sharper curve than the Subclavian of the right side, and advancing till upon a level with the first Rib, before it gives off any Branches.

After the two Subclavians have emerged from the Thorax, each passes transversely outwards at the under part of the Neck, behind the Origin of the Sternomastoideus, and continues its course, first between the anterior and middle Scaleni, and then 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*.—The first of these has been already described; the two others belong to the inner part of the Thorax. It also gives off the *Thyroidea Inferior*, *Cervicalis Anterior*, *Cervicalis Posterior*, and *Dorsalis Scapulae Superior*.

THYROIDEA INFERIOR.

The THYROIDEA, vel GUTTURALIS INFERIOR, arises at the outer side of the Vertebral Artery, previous to the passage of the Subclavian under the Scalenus. It ascends obliquely inwards in a winding manner behind the Carotid Artery, gives Branches to the Trachea, which descend into the Thorax; also Twigs to the Larynx, Pharynx, and Esophagus; while the most considerable part of the Artery is dispersed upon the Thyroid Gland, inosculating with the Laryngea Superior.

CERVICALIS ANTERIOR.

The CERVICALIS ANTERIOR, vel SUPERFICIALIS, frequently comes off from the root of the Inferior Thyroid. It ascends behind the Sterno-mastoideus, 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 Vertebrae.

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.

CERVICALIS POSTERIOR.

The CERVICALIS POSTERIOR, vel TRANSVERSALIS COLLI, 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, Vertebral, and Anterior Cervical Arteries, and sends a principal Branch downwards to the parts about the top of the Shoulder, and the upper, outer, and lateral parts of the Thorax.

DORSALIS SCAPULÆ SUPERIOR.

The DORSALIS SCAPULÆ SUPERIOR, sometimes called *Transversalis Scapulæ*, or *Transversalis Humeri*, comes frequently from the root of the Thyroid, and runs transversely behind the origin of the Sterno-mastoideus, near the Clavicle. It afterwards 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.

Besides the Branches of the Subclavian Artery mentioned above, others are frequently found, which are more variable in their origin, and in their distribution in the Neck; coming off occasionally from the Trunk of the Subclavian Artery, or, at other times, from some of its Branches already described.

AXILLARY ARTERY.

The AXILLARY ARTERY, lying in the Axilla between the Subscapularis and Serratus Major, is merely a con-

tinuation of the Subclavian. It is surrounded by the Lymphatic Glands and Fat, by the Veins, and also by the large Nerves which form the Brachial Plexus. It gives some small Branches to the adjacent Muscles and Nerves, but its principal Branches are, the *Thoracicæ Externæ*, *Scapularis Interna*, and the *Circumflexæ*.

THORACICÆ EXTERNÆ.

The THORACICÆ vel MAMMARIÆ EXTERNÆ, three or four in number,—are by some Authors described under particular names; as,

The *Thoracica Superior*, which arises opposite the first or second Rib, gives Branches to the Serratus and Intercostales, and to the Pectorales and Skin :

The *Thoracica Longa*, vel *Mammaria Externa*, which sends Twigs to the Axillary Glands, but goes chiefly to the Serratus, Pectoralis Major, Mamma, and Integuments, and inosculates with Branches of the *Thoracica Superior*.

The *Thoracica Humeralis*, vel *Acromialis*, which goes off opposite the *Thoracica Superior*, and divides suddenly into Branches, which run to the upper part of the Thorax near it, and to the Integuments, Muscles, and Ligaments surrounding the Articulation of the Humerus; inosculating with Branches of the Scapulary Arteries :

The *Thoracica Axillaris*, vel *Alaris*, which, when present, goes off from, or near to, the *Thoracica Humeralis*, and is bestowed upon the Axillary Glands, Fat, &c. frequently dispersing Branches upon the under

edge of the Subscapularis, and upon the Pectoralis and Serratus.

The External Thoracic Arteries are frequently found to correspond with the description given above; but it may be at the same time noticed, that they vary much in their number, origin, course, and termination, in different individuals. In general, however, they come off from the Axillary Artery, by Branches separate or united, and supply the parts about the top of the Shoulder, and upper and outer lateral parts of the Thorax; anastomosing above with the Arteries of the Neck, and below with those belonging to the containing parts of the Chest, and to the Upper Arm.

SCAPULARIS INTERNA.

The SCAPULARIS INTERNA, vel SUBSCAPULARIS, vel SCAPULARIS COMMUNIS, which is the largest of the Axillary Branches, arises at the under edge of the Subscapularis Muscle, and soon divides into the proper *Scapularis Interna*, and the *Dorsalis Scapulae Inferior*:

The SCAPULARIS INTERNA, strictly so called, runs near the inferior edge of the Scapula, and sends off many large Branches, the principal part of which are dispersed upon the Latissimus Dorsi, Teres Major, and Subscapularis. It sends Branches also to the Muscles arising from the Coracoid Process, to the Capsular Ligament of the Joint of the Humerus, and to the Axillary Glands, which have large Anastomoses with each other, and with the Superior Dorsal Artery of the Scapula.

The DORSALIS SCAPULÆ INFERIOR, vel CIRCUMFLEXA SCAPULARIS, immediately after leaving the Inter-

nal Scapulary Artery, turns round near the Cervix of the Scapula, between the Inferior Costa of the Bone and the Teretes Muscles, to the Fossa Infra-spinata.

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, and extend also to the Capsular Ligament; 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 under or at the root of the Acromion.

ARTERIE CIRCUMFLEXÆ.

The Circumflex Arteries are two in number, one termed *Anterior*, the other *Posterior*.

The CIRCUMFLEXA vel ARTICULARIS ANTERIOR, is sent off between the Subscapularis and Teres Major. It passes in a transverse direction between the Heads of the Coraco-brachialis and Biceps, and body of the Os Humeri, immediately below the Joint of the Humerus. It is dispersed upon the Muscles which cover it, and upon the Periosteum and Capsular Ligament of the Joint; anastomosing with Branches of the Dorsalis Scapulæ Inferior.

The CIRCUMFLEXA vel ARTICULARIS POSTERIOR, arises directly opposite to the former, and is by much the larger of the two.

It passes first between the Subscapularis and Teres Major, and then turns round between the back part of the Os Humeri, and Long Head of the Triceps, and the Deltoides. It sends branches to the Periosteum

and Joint, to the Short Head of the Biceps and Coraco-brachialis, to the two Teretes, to the Triceps and Subscapularis, and runs in a circular manner to the Deltoides, upon which it is chiefly dispersed. Its extreme Branches anastomose with those of the Anterior Circumflex Artery, so as completely to encompass the Body of the Bone. It inosculates also with the Branches of the Dorsalis Scapulæ Inferior.

Though the above is the common origin of the Circumflex Artery, it frequently happens that they come off from the Humeral Artery; or one rises from the Axillary, and the other from the Internal Scapulary, or they often come off by a common Trunk.

After giving off these different Branches, the Axillary Artery emerges from behind the edge of the Pectoralis Major, and runs along the Os Humeri, where it is termed *Humeral* or *Brachial Artery*.

HUMERAL ARTERY.

The HUMERAL ARTERY, which is a continuation of the Axillary one, descends at the inner part of the Arm, between the Tendons of the Latissimus Dorsi and Pectoralis Major, and behind the internal edge of the Coraco-brachialis and Biceps. It is covered by the general Aponeurosis, and has the Triceps Extensor Cubiti and Brachialis Internus at the back part of it. In this course, it bestows Branches to the Muscles and Integuments, and to the Periosteum and Bone, viz.

A *Branch* under the Coraco-brachialis to the Capsule of the Joint and parts adjacent to it.

Branches to the Triceps and Coraco-brachialis :

Various Branches to the Biceps, Brachialis Inter-nus, and Bone.

Three Branches, more conspicuous than the rest, viz. the *Profunda Humeri*, *Profunda Inferior*, and *Ramus Anastomoticus Magnus*.

PROFUNDA HUMERI.

The PROFUNDA HUMERI, vel PROFUNDA SUPERIOR, vel SPIRALIS, arises near the upper part of the Arm, at the insertion of the Latissimus Dorsi and Teres Major, but sometimes has its origin from the Scapularis Interna, or from the Articularis Posterior, and in some very rare cases, is of great proportional size. It takes a Spiral direction downwards and outwards, between the Triceps and Bone, and terminates at the outer Condyle of the Os Humeri, by a *large communicating Radial*, or *Profundo-radial* Branch.

The Arteria Profunda sends Branches upwards, which inosculate with others from the Humeral, Scapulary, and Circumflex Arteries. The principal Branches run to the Coraco-brachialis and Triceps, and to the Muscles at the outer part of the Elbow;—and one of them, termed *large communicating Ulnar*, or *Profundo-ulnar*, descending at the inner side of the Arm, is sometimes so considerable as to form the—

PROFUNDA INFERIOR.

The PROFUNDA INFERIOR vel MINOR, is frequently a Branch of the Profunda Superior, but 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 side of the Os Humeri.

RAMUS ANASTOMOTICUS MAGNUS.

The RAMUS ANASTOMOTICUS MAGNUS comes off a little above the Elbow, and bestows Branches to the Brachialis Internus, to the under end of the Triceps, and to the Muscles, Ligaments, and parts in general about the Elbow-Joint. The Ramus Anastomoticus is variable both in its origin and distribution; frequently instead of one there are two, or even three Anastomosing Arteries at this part of the Arm.

The smaller Branches sent from the Trunk of the Humeral Artery, pass in succession to the Muscles and other parts adjacent. They are shorter than the rest, and run more in a transverse direction, especially those to the Biceps. One small Branch, termed *Nutritia* or *Medullaris*, goes into the Substance of the Bone by the passage near its middle, and supplies the Marrow, and parts which contain it; though this Branch is sometimes sent off from some of those in the neighbourhood.

The Humeral Artery, having sent off 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; here it is situated over the Brachialis Internus, having the Tendon of the Biceps and Extensors of the Fore-arm

on its outer, and the Pronator Teres and Flexors of the Fore-arm on its inner side.

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 directly over the Joint of the Elbow; at other times about the middle of the Arm; and not unfrequently as high as the Axilla. In some very rare instances, the Humeral Artery divides upon the Arm into two portions, which again unite into a Trunk, that afterwards divides in the common way. Sometimes the Artery divides into the Radial, Ulnar, and Interosseous Branches.

In *Lusus Naturæ* of this kind, the Branch sent off in the Humerus, whether it be the Radial, Ulnar, or Interosseous, is commonly situated in the vicinity of the Trunk; or if there be an equal division, the two Arteries, or Trunks, have nearly the same situation which the Trunk has in common cases, and, like it also, are continued under the general Aponeurosis.

RADIALIS.

The *RADIALIS* passes over the Pronator Teres, and runs on the fore part of the Radius through the whole length of that Bone. It descends between the Supinator Longus and Flexor Carpi Radialis, resting on the Flexor Longus Pollicis.

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, lies close upon the Radius, and immediately under the Skin

in consequence of which the *Pulse* is commonly felt in this place. Its principal Branches are,

The *Recurrrens Radialis*, which is reflected, between the Supinator Radii Longus and Tendon of the Biceps, to the Muscles and parts of the Joint near it, and anastomoses freely with the Profunda and Anastomotica Magna of the Humeral Artery, at the outer part of the Elbow. In one preparation in the Collection of DR MONRO, the Humeral Artery, about the middle of the Arm, sends a considerable Branch, which joins the top of the Radial Artery, and, in another Preparation, an Artery goes off from the Axillary one, and runs partly into the end of the Radial Trunk, the remaining portion descending superficially to join the Ulnar Arch of the Palm.

Numerous *Lateral Branches*, in the descent of the Artery to the Muscles and Integuments, and parts in general situated about the Radius :

The *Superficialis Volæ*, which goes off at the Wrist, and passes over, or through the Abductor Pollicis to the Palm. It is sometimes so small as scarcely to reach this part of the Hand. More frequently it is a considerable Artery, sending Branches to the Ball of the Thumb and superficial parts of the Palm near it,—a Branch along the outer side of the Thumb, and an Anastomosing Branch which unites with the Arch of the Ulnar Artery.—Sometimes the Superficial Volar Branch is equal in size to the continuation of the Trunk of the Radial Artery ; in such cases it forms a considerable part of the Superficial Palmar Arch of the Ulnar Artery :

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, Thumb, and Fingers.

At the under part of the Fore-arm, the Radial Artery turns back between the Tendons of the Extensors of the Thumb, and the Bones of the Wrist;—then, getting between the roots of the Metacarpal Bones of the Thumb and Fore-finger, and perforating the Abductor Indicis, it divides into three principal Branches, viz.

The *Arteria Magna Pollicis*, which runs along the side of the Thumb next the Fingers, and sometimes divides at the root of the former 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 Flexors of the Fingers, and forms an *Arcus Profundus*, from which Branches go off to the Interossei and other deep parts of the Palm.

ULNARIS.

The ULNARIS, somewhat larger than the Radialis, is found at the anterior and inner part of the Fore-arm. It appears at first as the continuation of the Trunk of the Humeral Artery.

At its upper part it sinks deep behind the Pronator Teres, Flexor Carpi Radialis, Palmaris Longus, and Flexor Digitorum Sublimis, and passes afterwards, for some way, between the Flexores Sublimis et Profundus Digitorum. When its origin is in the Upper Arm, it

commonly runs superficially upon the Aponeurosis of the Fore-arm, in which case the Radial appears as the continuation of the Trunk of the Humeral Artery.

Near the Wrist, it becomes more superficial, and runs between the Tendons of the Flexor Carpi Ulnaris and Flexor Digitorum Sublimis, to the Hand.

In this course it sends off many Branches to the Fore-arm, among which the following are the most considerable, viz. the *Recurrrens Ulnaris*, *Interossea Posterior*, and *Interossea Anterior*.

The *Recurrrens Ulnaris* runs deep among the Flexor Muscles, and soon divides into Branches, which ascend and supply the parts about the posterior and inner side of the Elbow and Capsule of the Joint.—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.

INTEROSSEA POSTERIOR.

The INTEROSSEA POSTERIOR comes off at the upper end of the Interosseous Ligament, perforating that Substance immediately after coming off from the Ulnaris, 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 posterior part of the Joint.

The Interossea is afterwards continued downwards,

and is chiefly dispersed upon the Bellies of the Extensor Muscles of the Hand and Fingers, being commonly exhausted before it reaches the Wrist.

INTEROSSEA ANTERIOR.

The INTEROSSEA ANTERIOR generally comes off immediately below the former, but at other times in common with it. Now and then, both are from the Radial Artery; and this is for ordinary the case where that Artery takes its origin in the Upper Arm. Sometimes the Interosseæ arise by a common Trunk from the Humeral Artery.

The Anterior Interosseous Artery is considerably larger than the Posterior, but is only about half the size of the Ulnar Artery, from which it springs.

It runs close upon the fore part of the Interosseous Ligament, and furnishes Branches to the Muscles and deep parts upon the anterior side of the Fore-arm, and the *Nutritious Arteries* of the Radius and Ulna.

Near the Wrist, the principal part of the Artery perforates the Ligament, and goes to the posterior side of the Carpus and back of the Hand, dividing there into Branches which inosculate with others of the Posterior Interosseous and Radial Arteries. The other part of the Artery is spent about the Ligaments on the fore-side of the Wrist. Sometimes the Interossea is continued under the Anterior Annular Ligament of the Wrist, and terminates in one of the Palmar Arches.

The Ulnar 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 Radial side of the Os Pisiforme, and then over the Annular Ligament, very seldom under it, 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 behind the Tendon of the Flexor Carpi Ulnaris to the back of the Hand, where, joining with Branches of the Anterior Interosseous and Radial Arteries, it assists in forming a Plexus which supplies the back parts of the Wrist, Hand, and Fingers, with a number of Branches, which are small when compared with those in the Palm.

The *Arcus Volaris Superficialis*, vel *Sublimis*, is placed with its convex side towards the Fingers, 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 *Aponeurosis Palmaris*. Sometimes there are two Superficial Arches, one from the Ulnar, the other from the Radial Artery.

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, termed *Ulnaris Profunda* of the Palm, 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

subdivided 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 Ulnar Margin of the Little Finger, and the Radial 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 Joints, but more particularly near the points of the Fingers, the Arteries communicate by cross Arches, and send Branches to the parts adjacent, an intricate Plexus being at length formed at the extremities of the Fingers.

The Superficial Arch of the Palm commonly sends off one of the Arteries of the Thumb, and ultimately communicates by a large Anastomosis with the root of the Arteria Magna Pollicis.

VEINS OF THE SUPERIOR EXTREMITY, AND OF PART OF THE NECK.

The Veins of the Superior Extremity have numerous *Valves*, and are divided into a *Superficial* and a *Deep Set*; the former lying immediately under the Integuments, and chiefly above the Fascia, 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. They

form also considerable Anastomoses with the deep-seated Veins.

The Superficial Veins from the back of the Hand, (one of which, belonging to the Little Finger, was termed by the Ancients *Salvatella*), go chiefly to the *Superficial Radial* and *Ulnar Veins*, and to the Vein termed *Mediana Longa*.

The Superficial Radial Veins run principally to a Vein termed *Cephalica*, and the Superficial Ulnar Veins to one named *Basilica*, at the Joint of the Elbow.

The Superficial Veins on the anterior part of the Fore-arm form a Plexus which communicates laterally with the Radial and Ulnar Veins, and particularly with the Trunk of the *Mediana Longa*.

From this Plexus an *Internal Median Trunk*, or a *Mediana Longa Minor*, is commonly formed, which terminates in the Basilica.

MEDIANA LONGA.

THE MEDIANA LONGA, vel MEDIANA LONGA MAJOR, arises by numerous Branches from the back of the Hand and root of the Thumb, and communicates with the Vena *Salvatella*. That from the root of the Thumb has been termed *Cephalica Pollicis*, though it goes into the Median Vein.

The Long Median Vein crosses over the Radius in a slanting direction, and, a little below the bending of the Elbow, is divided into two short Veins, the *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.

Frequently the Cephalic is almost entirely formed by the Mediana Cephalica, or the Basilic by the Mediana Basilica. Sometimes the Mediana Longa Minor goes into the Median Basilic. There are often more than two short Median Veins:—and sometimes, instead of a Mediana Major and Minor, there is an irregular Plexus; but constantly a communication is found of the Veins on the Radial and Ulnar sides of the anterior part of the Fore-arm, and also a communication between the superficial and deep Trunks at the bending of the Elbow.

VENA BASILICA.

The BASILICA, in its ascent, forms the principal Humeral Vein, which passes along the side of the Os Humeri, a little to the inner part of the Humeral Artery; and receiving Branches from the corresponding side of the Arm, and communicating with the deep Veins, it runs into the Arm-pit, and forms the Vena Axillaris.

VENA CEPHALICA.

The CEPHALICA ascends at the outer side of the Biceps, receives Branches from the adjacent parts of the Arm, communicates in several places with the Basilica, and, passing in the Groove between the Pectoralis Major and the Deltoides, terminates in the Axillary Vein.

DEEP VEINS.

The *Deep Veins*, termed also *Venæ Satellites*, vel *Concomites*, run close to their respective Arteries, one lying commonly on each side of the Artery, and receiving the Blood from the adjacent parts. They terminate directly, or indirectly, in the Axillary Vein.

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 Set; and, in general, the communication is with one of the Median Veins.

VENA AXILLARIS.

The VENA AXILLARIS, formed by the Trunks of the Superficial and deep Humeral Veins, but more especially by the Basilic, 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*.

VENA SUBCLAVIA.

The VENA SUBCLAVIA passes between the Subclavian Muscle and first Rib, at the inner side of the Trunk of the Artery, and afterwards goes over the fore

part of the Scalenus Anticus; of course is more superficial than the Artery 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, the *Veins* 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 by the addition of these forms a Trunk, which may be called *great Subclavian*, or *Jugular Subclavian Vein*.

Near the termination of the Internal Jugular, the Subclavian receives a *Vein* of considerable size, which corresponds with the Trunk of the Vertebral Artery, but commonly passes through the Vertebra beneath that by which the Artery enters these Bones.

The *Vertebral Vein* communicates within the Cranium, by small Branches, with the Inferior Petrosal Sinuses, or with the 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 Great Subclavian Vein frequently receives the *Inferior Laryngeal*, *Anterior External Jugular*, and the *Internal Mammary Vein*, which at other times go into the Superior Cava.

Besides these, the *Left* Great Subclavian receives also the *Left Vena Azygos*; after which it goes across the root of the Great Arteries sent up from the Arch of the Aorta, in consequence of which it is considerably longer than the Right Subclavian. It de-

scends a little in its course, and, opposite to the Cartilage of the Right First Rib, it joins its fellow of the other side, to form the Cava Superior.

BLOOD-VESSELS WITHIN THE THORAX.

OF the Blood-vessels within the Thorax, the *Pulmonary Arteries* and *Veins*, the *Aorta*, the *Coronary Vessels*, and the other Vessels directly connected with the Heart, have already been taken notice of.

The following are those which remain to be described, viz. the *Mammaria Interna*, *Bronchiales*, *Esophageæ*, *Intercostales*, and *Pericardiacæ*.

ARTERIES.

MAMMARIÀ INTERNA.

The MAMMARIÀ INTERNA, vel ARTERIA STERNALIS, arises from the Subclavian, opposite to the Inferior Laryngeal, and descends between the Pleura and Cartilages of the true Ribs, and between the Intercostales Interni and Sterno-costalis, at the edge of the Sternum. It sends 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 a young Subject :

A minute Branch, termed *Comes Nervi Phrenici*, and *Pericardio-Diaphragmatica*, which accompanies the Phrenic Nerve, and, after giving Twigs to the neighbouring Membranes, is distributed upon the Diaphragm :

Some small Branches, called *Mediastinæ*, and *Pericardiacæ*, to the Mediastinum and Pericardium, and others to the Sternum and Cartilages of the Ribs.

Several Branches, outwards to the Intercostales, and others between the Cartilages of the True Ribs, at the edge of the Sternum, to the Pectorales, Mamma, and Integuments, which communicate with those of the *Thoracicæ Externæ*.

A *Large Branch* at the under end of the Thorax, or near the Cartilage of the Sixth Rib, termed *Musculophrenica*, which is dispersed upon the Diaphragm, and partly also upon the *Transversalis Abdominis*, and communicates with the Intercostals.

The Mammary Artery afterwards emerges from the Thorax, commonly under the Cartilage of the Seventh True Rib, and forms an *Epigastric Branch*, which runs anterior to the Peritoneum, upon the back part of the *Rectus Abdominis*, upon the upper end of which it is dispersed, after sending a Branch to the *Obliqui Abdominis*.

ARTERIE BRONCHIALES.

The ARTERIE BRONCHIALES come chiefly from the fore and near the upper part of the descending Aorta,

and are distributed to the Lungs. They vary much in different Subjects, both in origin and number. They commonly consist of,

The BRONCHIALIS DEXTRA, which arises sometimes from the Aorta, but more frequently from the uppermost Aortic Intercostal, and runs to the corresponding Lung :

The BRONCHIALIS COMMUNIS, which, however, is frequently absent. It arises from the upper and fore part of the descending Aorta, divides into two Branches, one to the Left Lung, the other to the Right one, and also to the Esophagus :

The BRONCHIALES SINISTRÆ, Superior et Inferior, which are of unequal size, arising from the fore part of the Aorta, at a little distance from each other ; the Inferior occasionally coming off from those of the Esophageals.

The Bronchial Arteries send small Branches to the Esophagus; to the Posterior Mediastinum, to the Pericardium, and to the Bronchial Glands, and afterwards accompany the Branches of the Trachea through the Substance of the Lungs, being dispersed upon the Bronchi, upon the Coats of the Pulmonary Artery and Veins, and upon the Cellular Substance and Membranes of the Lungs ; where they communicate also by minute Branches with the Pulmonary Artery.

ARTERIE ESOPHAGEÆ.

The ARTERIE ESOPHAGEÆ are a few minute Branches arising from the different parts of the Aorta, or from the Bronchials, and dispersed upon the Esophagus, also

sending Twigs to the Posterior Mediastinum and Pericardium.

INTERCOSTALES.

These consist of the following Branches, viz. the *Intercostalis Superior*, and *Intercostales Inferiores*.

INTERCOSTALIS SUPERIOR.

The INTERCOSTALIS SUPERIOR, vel INTERCOSTALIS SUBCLAVIA, comes off from the Subclavian Artery, a little farther out than the Mammary one, or sometimes from one of the Branches of the Subclavian. After sending a branch upwards to the Deep Muscles and Nerves at the under and fore part of the Neck, it descends between the Pleura and first Rib, near the Spine, and sends off two or three Branches, which pass between the External and Internal Intercostal Muscles, supplying an equal number of the uppermost Intercostal Spaces; and one or two Branches, which go backwards to the Spine and Spinal Marrow, and to the Muscles of the Back and Neck.

The Branches of this Artery communicate, in the Neck, with others of the Subclavian, and in the Thorax with each other, and with the Mammaries.

INTERCOSTALES INFERIORES.

The INTERCOSTALES INFERIORES, vel AORTICÆ, are nine or ten Pairs, the number varying with that of the Superior Intercostal Branches. They arise from the lateral and back part of the Aorta, and run in the

Grooves at the under edges of the Ribs, between the Intercostales Externi et Interni, and, of course, are covered by the Pleura.

Towards the fore part of the Thorax, each sends off a Branch to the upper edge of the Rib below it.

They furnish Branches to the Spine, to the Spinal Marrow and its Membranes, to the Intercostales, Pleura, and other parts adjacent; also numerous Branches to the Muscles on the outside of the Thorax, and communicate with each other, with those of the Internal and External Mammary, and with the Diaphragmatic Arteries.

The first of the Aortic Intercostals inosculates with the Superior, or Subclavian Intercostals;—the last, passing behind the Crus of the Diaphragm, goes over the Quadratus Lumborum, and follows the Margin of the Twelfth Rib, to be distributed upon the Tendon of the Transversalis Abdominis.

When there are thirteen, or only eleven Ribs, the number of Intercostal Arteries corresponds with that of the Ribs.

VEINS.

The Blood sent to the Thorax by the Arteriæ Mammariæ Internæ, Bronchiales, Esophageæ, and Intercostales, is returned to the Heart by the following Veins, viz.

The MAMMARIÆ INTERNÆ, which accompany their corresponding Arteries, and terminate, the Left in the Left Subclavian, and the Right in the Right Subclavian, or in the top of the Vena Cava.

Some small Veins, as the *Pericardio-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 VENA INTERCOSTALES, which are the same in number with their Arteries, and accompany them along the edges of the Ribs. They terminate, partly in the Vena Semi-Azygos, but chiefly in the Vena Azygos.

VENA AZYGOS.

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 in some rare instances, before the Trunk of the Aorta, —to the right side.

The VENA AZYGOS, vel *Vena sine Pari*, thus originally formed by the Lower Left Intercostals, ascends on the fore part of the Spine over the Intercostal Arteries, on the right side of the Aorta.

At its lower extremity, it generally communicates with one of the Lumbar or Renal Veins, 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, directly before this Vein perforates the Pericardium.

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, or SEMI-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 corresponding Subclavian Vein.

The VENA CAVA SUPERIOR, formed by the union of the Subclavian Veins, with the addition of the Vena Azygos, passes down the right side of the ascending Aorta, perforates the Pericardium, and terminates in the upper part of the Right Auricle; receiving, therefore, the Blood from the Head and Neck, from the Superior Extremities, from the Parietes of the Thorax, and from the Bronchial Arteries.

BLOOD-VESSELS of the DIAPHRAGM.

The Diaphragm is supplied with *Arteries* 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*.

ARTERIE DIAPHRAGMATICÆ, vel PHRENICÆ.

The ARTERIE DIAPHRAGMATICÆ, vel DIAPHRAGMATICÆ INFERIORES, are two in number, one on each side, though in very rare instances three, or even four, have been seen. They commonly arise from the fore part of the Aorta, as soon as it enters the Abdomen.

In general, their origins are distinct from each other, but sometimes they arise from a common Trunk; and now and then, one or both originate from the root of the Cœliaca, or even from the Renal or Lumbar Arteries.

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 of the Mammariæ Internæ and Intercostales, 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.

VENÆ DIAPHRAGMATICÆ.

The VENÆ DIAPHRAGMATICÆ, like the 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 CHYLOPOIETIC AND
ASSISTANT CHYLOPOIETIC VISCERA.

ARTERIES.

THE Arteries of these Viscera consist of the *Cæliac*, and the *Superior* and *Inferior Mesenterics*; all of which are *Azygous*, or single Arteries arising from the fore part of the Aorta.

ARTERIA CÆLIACA.

THE ARTERIA CÆLIACA arises from the Aorta, immediately after it emerges from between the Crura of the Diaphragm into the Abdomen, or nearly opposite the Eleventh Dorsal Vertebra. It is situated at the upper edge of the Pancreas, behind the small Curvature of the Stomach, and directly under the Liver.

THE Trunk of the Cæliac 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*.

GASTRICA SUPERIOR.

THE GASTRICA SUPERIOR, vel 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 some way 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 this Viscus, and sending Twigs to the Omentum Minus,—while the Trunk is frequently extended as far as the Pylorus.

ARTERIA HEPATICA.

The ARTERIA HEPATICA, the largest of the three great Branches, is concealed at its root by the Pancreas, and passes obliquely forwards, upwards, and to the right side, behind the Pylorus,—before and a little to the right side of the *Lobulus SPIGELII*,—till it arrives at the *Porta* of the Liver.

Where it approaches the *Porta*, it divides into the *Gastrica Inferior Dextra*, and the *Proper Hepatic Artery*.

GASTRICA DEXTRA.

The GASTRICA DEXTRA, vel GASTRICA INFERIOR DEXTRA, vel 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 right end of the Stomach, and afterwards runs some way along the small Curvature of that Organ, inosculating with the Superior Gastric Artery.

Besides this principal Branch, there are a few smaller ones sent from the Gastrica Dextra 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, to near its large extremity, being included in the Layers of the Anterior Portion of the Great Omentum.

In this course it sends off—

The *Rami Epiploici*, which are long and slender Branches dispersed upon the Epiploon and Omentum :

The *Rami Gastrici*, which, plunging suddenly into the substance of both sides of the Stomach, communicate with the Pyloric and Superior Gastric Arteries.

HEPATIC ARTERY *continued.*

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 to supply the small Lobe of the Liver.

From the Right Branch, before it plunges into the

Liver, is sent off the *Arteria Cystica*, which afterwards divides into two smaller Branches, termed *Gemellæ*, that are distributed upon the Gall-bladder, and Trunks of the Biliary Ducts.

The Branches of the Hepatic Artery are ramified extensively through the Substance of the Liver; they supply also the Coat which covers it, and, through the medium of the Ligaments connecting it to the Abdomen, they anastomose with the Phrenic and Internal Mammary Arteries.

Frequently, besides the Hepatic Artery sent off directly from the Cœliac, there is another, coming sometimes from the Superior Gastric, at other times from the Superior Mesenteric Artery, or from the Aorta, to be sent into the Liver. In such cases, the Artery which gives origin to this additional one is greater than usual, and the Hepatic Artery, which this one accompanies, is proportionally smaller.

ARTERIA SPLENICA.

The **ARTERIA SPLENICA**, nearly equal in size to the Trunk of the Hepatica, and sometimes exceeding it, takes a long and serpentine course across the left side of the Body, the Flexures guarding it and the Spleen from being ruptured by over distension. It runs first behind, then at the upper end of the Pancreas, in its way to the Spleen.—Its Branches are—

The *Rami Pancreatici*, which are few in number, and small. They run at different distances from the Splenic Artery nearly at right angles, and supply the greater part of the Pancreas :

The *Gastrica Sinistra*, vel *Gastrica Inferior Sinistra*, vel *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 large Curvature of the Stomach.

The *Gastrica Sinistra* sends some *Rami Pancreatici*, *Gastro-Epiploici*, and *Meso-colici Sinistri*, to the Pancreas, to the left Portion of the Omentum, and to the Meso-colon; while its Trunk frequently forms a common Arch with the *Gastrica Dextra*:

The *Vasa Brevia*, vel *Arteriæ Breves*, which are three or four considerable branches, that run to the left part of the great Curvature of the Stomach, to be distributed upon the upper and under parts of its large extremity; their Ramifications anastomosing with those of the Superior, and of the Left Inferior Gastric Arteries:

The *Rami Splenici*, which, like the Trunk of the Artery, are also contorted. They are several in number, and of considerable size. They go, at the concave side of the Spleen, to be distributed throughout the whole of its substance, but in such a manner, that the Branches of one part of the Spleen do not communicate freely with those of another.

MESENTERICA SUPERIOR.

The MESENTERICA SUPERIOR, vel MAJOR, arises from the Aorta, immediately below, but almost never in common with, the Celiac Artery, which it equals in

size ; and running under or behind the Pancreas, and over the Duodenum, it passes between the layers of the Mesentery, towards the under side of the Abdomen:

In its descent, it forms an Arch, being bent forwards and a little to the left side, its lower extremity turning toward the beginning of the Colon.

From the convex side of the Artery, about sixteen or eighteen Branches are sent off to the Small Intestines ; while others proceed from the right side to the right portion 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, and of the Lumbar or other Arteries situated near them.

The principal Branches from the left or convex side of the Trunk are dispersed upon the Jejunum and Ilium, supplying, in their course, the Layers of the Mesentery, and the parts it contains.

The first of these Branches are short and small ; those which succeed gradually increase in length and size as far as 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 Meshes, of different figures, which increase in number, but diminish in size, like the Vessels themselves, as they approach the Intestines, the convex side of the Arches always being turned towards the part on which the Arteries are to be dispersed.

From the last of these Areolæ, many Branches are detached, which take a straight course to the concave part of the Intestines, where each divides into two that are afterwards ramified on the opposite sides of the Substance of the Gut, forming numberless Anastomoses with each other, first on the same side, then on the opposite one. They terminate at length upon the inner surface of the Tube, by Branches so minute as to require the assistance of Glasses to view them distinctly. In this part of the Canal they are observed to form innumerable Plexus.

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 Colon, they communicate by large, and then by smaller Arches,—but the Arteries here are of greater magnitude than those which belong to the small Intestines; their Arches are also larger, but they are less frequent, and nearer the Gut; of course the last Ramifications sent off from these Arches are shorter than those belonging to the Small Intestines.

The principal Branches, from the concave side of the Trunk, are the following :

The *Ilio-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*, vel *Ramus Colicus Dexter*, for supplying the right side of the Colon,—its Branches communicating with those of the Ilio-colica, and with

Arteries of the adjacent parts of the Parietes of the Abdomen :—and

The *Colica Media*, vel *Ramus Colicus Medius*, vel *Arteria 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 *Colica 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 *Meso-colic Arch*, and the other a similar Arch with the ascending Branch of the *Inferior Mesenteric Artery*.

Sometimes the *Superior Mesenteric Artery* has been found to communicate at the head of the *Pancreas*, by a large Branch with the *Arteria Gastrica Dextra*.

MESENTERICA INFERIOR.

The *MESENTERICA INFERIOR*, vel *MINOR*, arises from the anterior and left side of the *Aorta*, somewhat lower than half-way between its *Bifurcation* and the origin of the *Superior Mesenteric Artery*.

It descends obliquely behind the *Peritoneum*, upon the left *Psoas Muscle*, and soon divides into principal Branches.

These near the Intestines, join with each other, and form arches, from which others go off, composing Areolæ, and, in the Substance of the Intestines, Anastomoses and Plexus, much after the same manner with 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 Meso-colic Arch, the other is reflected upon the left portion of the Colon:

The *Colica Sinistra*, vel *Ramus Colicus Sinister*, which is frequently double from its origin, or at other times splitting into two Branches, one joining the Ramus Ascendens, the other passing down by the Sigmoid Flexure of the Colon:

The *Hæmorrhoidalis Interna*, which is of great size, being the Trunk continued. It anastomoses with the Colica Sinistra, and afterwards descends by many Branches, upon the back part of the Rectum, as far as the under extremity of that Intestine; communicating with the Arteries in the adjacent parts of the Pelvis.

VEINS.

The VEINS which return the blood from the Chylopoietic and Assistant Chylopoietic Viscera, accompany their respective Arteries; the Hepatic Veins excepted. They have, like their Arteries, large and frequent communications with each other, but 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, viz. the *Mesenterica Inferior*, *Splenica*, and *Mesenterica Superior*.

MESENTERICA INFERIOR.

The **MESENTERICA**, vel **MESARAICA MINOR**, vel **HÆMORRHOIDALIS INTERNA**, runs upon the left side of the Spine, and receives—

The *Proper Vena HÆMORRHOIDALIS INTERNA*, which returns the Blood from the Intestinum Rectum :

The *Venæ Colicæ Sinistræ*, which come from the left portion or side of the Colon :—and

The *Vena Duodenalis*, which returns the Blood from the left portion of the Duodenum.

The Mesenterica Minor commonly terminates in the Vena Splenica, though frequently 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 side of the Pancreas :

The *Venæ Breves*, vel *Vasa Brevia*, which come from the left or great end of the Stomach :

The *Vena Gastrica Sinistra*, vel *Epiploica Sinistra*, which comes from part of the great Arch of the Stomach, and corresponding portion of the Omentum :—and

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.

MESENTERICA SUPERIOR.

The VENA MESENTERICA SUPERIOR, vel MAJOR, is situated at the under side of the Artery, and receives—

The *Rami Mesenterici*, which are very large and numerous, returning the Blood from the Jejunum and Ilium,—the Branches going to the left side of the general Trunk :

The *Ilio-Colica*, which comes from the end of the Ilium and beginning of the Colon :

The *Colica Dextra*, which belongs to the right portion 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, after forming, with the descending Branch of the Mesenterica Minor, a large Arch similar to that of the corresponding Artery. It terminates 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 Co-

lon, forming a short common Trunk, which has the term of *Gastro-Colica* applied to it:—and

The *Pylorica* and *Duodenalis*, which sometimes terminate in the *Mesenterica Superior*, 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*, vel *Vena Portarum*.

VENA PORTÆ.

The *VENA PORTÆ*, formed by the two *Mesenterics*, 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*, vel *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 assists in forming it.

It passes upwards, inclining a little to the right in its course to the *Liver*, having the Trunks of the *Biliary Ducts* before it, and the *Hepatic Artery* on its left side,—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 Arteria Hepatica.

From the extremities of the Vena Portæ, and likewise from the extremities of the Hepatic Artery, a set of Veins arise, termed *Venæ Hepaticæ*, which accompany the Branches of the Hepatic Artery and Vena Portæ.

The Branches of the Venæ Hepaticæ afterwards unite into large Trunks, called *Venæ Cavæ Hepaticæ*, 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 *Arteria Emulgens*, arises opposite to its fellow, from the side of the *Aorta*, a little below the root of the *Superior Mesenteric Artery*.

It runs across the *Spine* and *Psoas Muscle*, nearly in a transverse direction, descending, however, a little in its course towards the *Kidney*. 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 *Right Kidney*.

At the concave edge of the *Kidney*, the *Artery* divides into three or four *Branches*, varying in length in different *Subjects*, 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*.

Frequently, instead of one *Renal Artery*, there are two from the *Aorta* to each *Kidney*, or sometimes the *Artery* is single in one side of the *Body*, and double in

the other; and in rarer instances, three or more have been found. There is occasionally, also, some variety in point of origin, sometimes the right coming off higher than the left, and sometimes the reverse.

In a specimen in the Anatomical Museum of the University of Edinburgh, one of the Kidneys, which is situated in the back part of the Pelvis, has its Artery from the Bifurcation of the Aorta, while the other, placed a little higher than the former, and towards the left side of it, derives its Artery from the lateral part of the Aorta, lower than the Mesenterica Inferior.

VENA RENALIS.

The VENA RENALIS, vel EMULGENS, terminates in the Inferior Cava, and is more superficial, and less variable, 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 longer than the Right, in consequence of the Aorta lying between the left Kidney and the Cava. It is situated on the fore part of the Aorta, and goes first behind, but afterwards anterior to the corresponding Artery. Sometimes, though rarely, it passes between the Aorta and Spine.

The Right Vein is short, it covers the Artery, and passes directly into the Cava.

ARTERIE ET VENÆ CAPSULARES.

The ARTERIE CAPSULARES, or *Arteries of the Renal Capsules or Glands*, are small but numerous.

They are derived from the Renal and Diaphragmatic Arteries, and sometimes there are Twigs from the Cœliac, or from the Lumbar; and, in general, the Renal Gland, especially the Left, receives additional Branches from the Trunk of the Aorta. The Capsular Arteries inosculate with those of the adjacent Viscera.

The *VENÆ CAPSULARES* commonly unite into a large Trunk, which, in the left side, terminates in the Renal Vein, while in the right it frequently goes into the Cava.

ARTERIE ET VENE ADIPOSE.

The Arteries which supply the Tunica Adiposa of the Kidneys 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 ET VENA SPERMATICA.

The *ARTERIA SPERMATICA*, 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 Arteria Renalis, or Capsularis, at other times a little higher from the Aorta; in rarer instances, from the Diaphragmatic Artery, or from one of the Lumbar, and frequently the one comes off a little higher than the other, and occasionally they come off from the Aorta in a common Trunk.

It descends, in a waving direction, on the Surface of the Psoas, behind the Peritoneum; the right passing obliquely over the Cava, the left behind the Colic Arteries of the corresponding side, and both crossing before the Ureters, to reach the under part of the Abdomen.

After this it goes over the Arteria Epigastrica, perforates the Abdominal Rings, and runs in the Spermatic Cord, where it divides into Branches, which are dispersed, some upon the Epididymis, while others, larger and much convoluted, run forwards across the Surface of the Testicle, plunge into its Substance, and are distributed upon the Seminal Ducts.

In the descent of the Artery, it imparts *Twigs*—

To the Tunica Adiposa of the Kidney;

To the Peritoneum and Cellular Substance near it;

To the Ureters,—which are also supplied with other Arteries from the adjacent Vessels, viz. from the Renal and Capsular Arteries, from the Aorta, Iliacæ, and Vesicales;—and,

To the Cremaster and Scrotum, anastomosing there with the Pudic, and with its fellow on the other side.

In its descent, it communicates with Branches of the Lumbar, Mesenteric, and other adjacent Arteries.

In its course through the Abdomen, it has been observed to be somewhat increased in size, and of a serpentine direction; which circumstance is very remarkable in some of the large Quadrupeds, as a Bull.

The VENA SPERMATICA is much larger than its corresponding Artery, and is furnished with Valves within, but more particularly without the Abdomen.

It composes a Plexus which accompanies the Artery; and about the place where it recedes from it, which is

nearly opposite to the under end of the Kidney, it forms a single trunk, which in the right side goes into the Cava a little below the termination of the Emulgent Vein, and in the left into the corresponding Vena Renalis.

Besides the Artery commonly called *Spermatic*, the Testicle generally receives a smaller *Branch* from the Hypogastric, and frequently also a minute *Branch* from the Epigastric, which accompany the Vas Deferens to the Body of the Testicle, upon which they are dispersed, communicating there with the Branches of the Spermatic Artery.

The *Veins* proper to these Arteries terminate in the Hypogastric and Epigastric Veins.

The *Spermatic Artery*, in a Female, has the same kind of origin, and the same course through the Abdomen, as in a Male, but is frequently more tortuous; especially during Pregnancy, when it also increases in size in proportion to the size of the Uterus. In place of perforating the Abdominal Rings, as it does in a Male, 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 Fundus of the Uterus itself,—passing in at its corner, and communicating with the Artery of the opposite side.

The Spermatic Veins have the same termination in a Female as in a Male, but are considerably larger.

ARTERIE ILIACÆ.

The Iliac Arteries consist of the *two common Iliacs*, which are formed by the division 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 *Arteria 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 a Fœtus, as the continued Trunk of the *Internal Iliac*; but in an Adult, is shrivelled into a Ligament, excepting at its beginning or under part.

The beginning of the *Umbilical Artery* gives off—

One or more, but most frequently two, *Arteriæ Vesicales*, which run to the under part of the Bladder, and extend along its sides as far as the *Fundus Vesicæ*. At their origin, they furnish Twigs to the *Vesiculæ Seminales*, *Prostate Gland*, and *Intestinum Rectum*.

In a Female, the *Umbilical Artery* sends minute Branches to the Bladder, Uterus, Vagina, and Rectum.

ARTERIA UTERINA.

The *ARTERIA UTERINA*, termed also *Uterina Hypogastrica*, is much larger than the *Spermatic Artery*,

and, like that Artery, increases in size in the state of Pregnancy.

It arises from the Hypogastric, near the origin of the Pudic, Hæmorrhoidal, or Umbilical Arteries, and, getting between the Layers of the Ligamentum Latum, it runs to 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 the Spermatic Artery, with which it forms frequent Anastomoses. It runs under the outer Coat of the Uterus, and sends off many serpentine Branches, which plunge into its Substance; forming numerous communications with the Artery of the opposite side.

The Uterine Artery sends Branches downwards, to be distributed extensively upon the Substance of the Vagina, a principal Branch of which is termed *Vaginalis*, and others forwards, to be dispersed upon the Bladder.

ARTERIA VAGINALIS.

The ARTERIA VAGINALIS is commonly from the Uterine, at other times it is from the Trunk of the Hypogastric, or from some of the adjacent Branches, particularly the middle Hæmorrhoidal. It is extensively distributed upon the Vagina, communicating with the Uterine Branches at the Cervix of the Uterus.

Besides this, there are other small Vaginal Branches from the neighbouring Arteries, as the *Vesicales*, *Uterina*, and *Pudica*, which communicate with each other, and with the proper *Vaginalis*, upon the Substance of the Vagina.

ARTERIA PUDICA.

The ARTERIA PUDICA, vel PUDENDA COMMUNIS, 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 Arteria Ischiatica.

It passes out of the Pelvis, through the under part of the Notch of the Os Ilium, at the lower edge of the Pyriformis.

It then turns between the Sacro-sciatic Ligaments, to get to the inner side of the Tuber Ischii, where it is lodged so deep in the Cellular Substance, as to be in some measure again in the Cavity of the Pelvis.

From the Tuber, it proceeds along the inner side of the Crura of the Os Ischium and Os Pubis, and behind the Transversus Perinei and Crus Penis, till it approaches the Symphysis 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 Ischium.

The *Arteria Hæmorrhoidalis Externa*, which soon divides into Branches, to supply the Muscles and Integuments about the verge of the Anus.

The *Arteria Perinei*, which passes under the Trans-

versalis Perinei, in the space between the Crus Penis and Bulb of the Urethra, and gives Branches to the Skin, Muscles, and Fat, at the fore part of the Anus, and root of the Penis, and to the Scrotum; while the Artery itself terminates on the under part of the Penis.

One of these Branches, termed *Transversa Perinei*, is necessarily divided, along with the Muscle of that name, in the lateral operation of Lithotomy.

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 is the smallest of the three. It 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*, vel *Arteria Cavernosa*, which goes into the Crus Penis of the corresponding side, and directs its course in the Axis of the Corpus Caverosum, through which it passes, in nearly a straight line, to the other extremity of that Body; its Branches communicating, through the medium of the Septum, with the Artery of the opposite side, and by innumerable Branches with the Cells of the Penis :

The Third Branch, called *Dorsalis Penis*, which turns between the Symphysis 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 Caverosa, and sending Branches to it and to the Integuments.

In some very rare cases, the Pudic Artery, instead of passing between the Sacro-ischiatic Ligaments, has

been seen running first by the under part and side of the Bladder, and then over the lateral portion of the Prostate Gland, to its place of destination.

In a Female, the Pudic Artery has the same general course as in a 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 Branch, which, in a Male, goes to the Bulb of the Urethra, in a Female, passes to the outer end of the Vagina.

VEINS.

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 ISPIUS 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 Pubis, forming a complicated Plexus which surrounds the Neck of the Bladder and Prostate Gland, and sending out Branches which terminate in others at the sides of the Bladder. Like other Veins subject to pressure, the Vena Penis is provided with Valves :

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.

ARTERIES.

ARTERIE LUMBARES.

The *ARTERIE LUMBARES*, which come off from the Aorta, are commonly four in number on each side, though sometimes five. They arise in pairs, in the same manner as the Intercostals do from that Vessel in the Thorax, though occasionally two on either side take their origin by a common Trunk, from the back part of the Aorta. The Left are a little shorter than the Right,

which pass under the Vena Cava to the place of destination.

They run first over the fore part of the Bodies of the four uppermost Lumbar Vertebrae, and afterwards go between them and the Psoæ Muscles, in their way towards the Parietes 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.

They communicate with the lower Intercostal, Diaphragmatic, Internal Mammary, and Epigastric Arteries, and also with their fellows of the same side.

The first Lumbar passes behind the corresponding Crus of the Diaphragm, to which it gives Branches in its course outwards. The fourth winds round the Crest of the Ilium, to be dispersed upon the Iliacus Internus and Abdominal Muscles.

When there is a fifth Lumbar Artery, it comes off from the Aorta, or from the fourth Lumbar, or from the Ilio-lumbar, or from the Sacra Media.

SACRA MEDIA.

The SACRA MEDIA is an Azygous Artery, of an inferior size to the Lumbar. It arises from the under and back part of the Aorta, immediately at its Bifurcation; or, in some rare instances, by a Trunk common to it and the fourth Lumbar Artery.

It generally sends off a Branch over each side of the

last Vertebra of the Loins, which supplies the place of a fifth Lumbar Artery. This Branch gives off others behind, in common with the Lumbar, while its outer Ramifications are exhausted upon the Iliacus Internus.

The Sacral Artery afterwards descends along the middle of the last Lumbar Vertebra and Os 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.

ILIAE COMMUNES.

After giving off the Arteries of the Contents and of the Containing Parts of the Abdomen, the Aorta, upon the under end of the fourth Lumbar Vertebra, divides into the two *common Iliac Arteries*, which are of equal size, and take a similar course upon the right and left sides.

They pass obliquely downwards and outwards; and sometimes, though rarely, send a Twig or two to the Lumbar Glands, or other parts near them. At the under and outer side of the last Vertebra of the Loins, *i. e.* opposite to the posterior or Sacro-iliac Symphysis of the Pelvis, each divides into two others, a Posterior, termed *Iliaca Interna*, and an Anterior, called *Iliaca Externa*, as formerly mentioned.

ILIIACA INTERNA.

The ILIIACA INTERNA, vel POSTERIOR, vel ARTERIA HYPOGASTRICA, passes downwards and backwards, for about a couple of inches, after which it generally di-

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vides upon the Sacro-iliac Symphysis, into a Posterior and an Anterior set of Branches, which come off either separately, or from each other; the former supplying the parts nearest the Sacrum and Ilium, the latter belonging more immediately to those about the anterior region of the Pelvis.

Posterior Branches.

ILIO-LUMBARIS.

The ILIO-LUMBARIS, vel ILIACA INTERNA MINOR, 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, and divides suddenly into Branches; one of which frequently forms a kind of *Lumbalis Ima*, or fifth Lumbar Artery.

The other Branches go to the Psoas and Iliacus Internus, communicating there with the Lumbar Arteries, and with the Branches of the Circumflex Artery of the Ilium;—a particular Twig, constituting an *Arteria Nutritia*, vel *Medullaris*, of the Os Ilium.

SACRÆ LATERALES.

The SACRÆ LATERALES are generally two, but sometimes three, arising from the common Trunk, or the Ilio-lumbar, or frequently from the Gluteal Artery. 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, though seldom, of the *Sacræ Media*.

They furnish Branches to the Muscles, Membranes, and Nerves, on the Surface of the *Os Sacrum*, and inosculate by cross Branches with the *Sacræ Media*.

Their principal Trunks enter the Anterior Sacral Holes, to be distributed upon the *Cauda Equina*, and 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 between the two Trunks or Heads of the Sciatic Nerve, goes afterwards through the upper part of the great Notch of the *Os Ilium*, and is reflected over the edge of that Bone, after the manner of the Inferior Dorsal Artery of the Scapula.

Upon emerging from the Cavity of the Pelvis, between the *Gluteus Medius* and *Pyriformis*, and after giving Twigs to the *Iliacus Internus* and *Pyriformis*, it is divided into a Superficial and a Deep Set of Branches.

The *Superficial Set* creep in between the *Gluteus Maximus* and *Medius*, upon the former of which they are chiefly dispersed.

The *Deep Set* run in a radiated direction close upon the Bone, and are chiefly distributed to 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.

The Branches of this Artery, which are very exten-

sive, anastomose with each other, with the last of the Lumbar, and with the Sacræ Laterales, through the Posterior Foramina of the Os Sacrum.

Anterior Branches.

ARTERIA OBTURATORIA, vel OBTURATRIX.

The OBTURATOR ARTERY has its Origin from the Trunk of the Hypogastric, or from the Ilio-lumbar, or from the Gluteal, or Ischiatic, or Pudic, and frequently from the end of the Iliaca Externa, or from the root of the Epigastrica. Sometimes one Branch of the Obturator is from the Internal Iliac, another from the Epigastric, or Trunk of the External Iliac near the Epigastric. In some rare instances it has been observed to arise from the Femoral Artery, and pass behind the Crural Arch into the Pelvis.

When the Obturator arises from the Hypogastric, or from one of its Branches, it descends in the Pelvis by the inner side of the Psoas Muscle, or over the upper edge of the Obturator Internus, 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, and, in its passage through the Foramen Thyroideum, sends a Branch to the Obturator Internus.

After perforating the Ligament, it divides into two Sets of Branches, one Set of which are dispersed upon the parts about the Hip-joint, while another belong to the Obturator Externus, 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.

When the Obturator comes off from the External Iliac, it commonly goes directly into the Pelvis, but sometimes it make a Curve by the inner side of GIMBERNAT's Ligament, and is then found on the fore part of the protruding Bowel in Crural Hernia; but this circumstance happens more frequently where the Obturator arises from the root of the Epigastric. The Trunk common to these two Vessels varies from a quarter to upwards of an inch in length. Where it is long, the Obturator is then apt to take such a turn as to go by the inner side of the Crural Arch, and to be found on the Anterior Surface of a Femoral Hernia.

ARTERIA UMBILICALIS.

The UMBILICAL ARTERY sends off Rami Vesicales from its under part or beginning; the rest of it, in an 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 Pudic, at other times from the Hypogastric near the Umbilical, 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, a small Artery, is sometimes sent off from the original Trunk, and at other times from some of its Branches, as the Pudic in a Male, or Umbilical in a Female. Sometimes it is wanting.

It runs upon the Anterior Surface of the Rectum, and is chiefly distributed upon its Under Extremity, where it anastomoses with the Hæmorrhoidalis Interna. It frequently sends Branches to the under part of the Bladder;—to the Vesiculæ Seminales and Prostate Gland of a Male,—and to the Vagina and Bladder in a Female, by a Vaginal Trunk which supplies the place of the Vaginal Artery sent off from the Uterine.

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, between the Pyriform and Gemelli Muscles, accompanied by the Sciatic Nerve, and having the Pyriformis between it and the Gluteal Artery.

It afterwards descends some way down upon the

Thigh in company with the Nerve, in the hollow between the great Trochanter of the Thigh-bone and Tuber of the Ischium,—covered by the *Gluteus Maximus*.

Within the Pelvis, it sends Twigs to the Rectum, Obturator Internus, and Pyriformis. Without the Pelvis, it sends an Artery backwards, termed *Coccygea*, which creeps along the Posterior Sacro-sciatic Ligament; some of its Branches perforating the Fibres of that Ligament. It is distributed upon the Coccygeus, the Levator Ani, the Fat and Bones of the Coccyx, and sends Branches upwards, which anastomose with some of the Lateral Sacral Arteries, through the Holes in the back part of the Os Sacrum.

The Sciatica gives off also a *Concomitant Branch*, which passes along the Surface of the Sciatic Nerve.

It sends Branches to the *Glutei Medius et Minimus*, to the Pyriformis and other Rotator Muscles of the Thigh, and to the Capsule of the Joint.

The Principal Branches of the Sciatic Artery, however, are dispersed upon the under part of the *Gluteus Maximus*, some Twigs being sent to the Muscles arising from the Tuberosity of the Os Ischium, which communicate with the Obturator and Pudic Arteries.

ILIACA EXTERNA.

The ILIACA EXTERNA, vel ANTERIOR, which appears in an Adult as the continuation of the common Trunk, descends in tough Cellular Substance behind the Peritoneum, along the Brim of the Pelvis, taking a curved direction by the inner and fore part of the

Psoas Muscle, and afterwards passing over it, and under the *Ligament of POUPART*, to form the Femoral Artery.

In this course, it does not send off any Branches, excepting sometimes a Twig to the Peritoneum, Psoas Muscle, coats of the corresponding Vein, and the Lymphatic Glands, till it is about to leave the Abdomen, where it gives rise to two principal Arteries,—the *Epigastrica*, and *Circumflexa Ossis Ilii*.

ARTERIA EPIGASTRICA.

The ARTERIA EPIGASTRICA goes off from the inner side of the External Iliac Artery, immediately before that Vessel gets under the *Ligament of POUPART*, but is found on the outer side of the Peritoneum.

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, at the inner side of the upper Abdominal Ring, behind the Spermatic Cord in a Male, and Round Ligament in a Female.

It commonly passes in such a manner as to lie first behind, then at the inner side of a common Inguinal Hernia; though in some cases the reverse of these has occurred.

It continues its oblique course, under the inferior part of the Transversus, till it reaches about as high as half way between the Symphysis Pubis and Umbilicus, after which it takes a perpendicular direction along the back part, and at the outer side of the middle of the Rectus Muscle.

Near its Origin, it sends Branches to the adjacent parts of the Pubes, one of which, in a Male, frequently runs to the Spermatic Cord, and in a Female to the Round Ligament of the Uterus; the Branch to the Cord running to the Cremaster and Scrotum, and anastomosing with the Spermatic and Pudic Arteries, and that to the Round Ligament, going sometimes as far as the Uterus.

Under the Umbilicus, it generally divides into two Branches, variable in their size; one directed towards the Umbilicus, the other continued in the line of the Rectus.

It furnishes Branches to the Muscles, Integuments, and Membranes of the fore part of the Abdomen, communicates in several places with the Lumbar and Ilio-Lumbar Arteries, and with its fellow of the opposite side, 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 CIRCUMFLEXA OSSIS ILII, sometimes termed *Iliaca Anterior*, 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. In some rare cases, it comes off in common with the Epigastric, or from the beginning of the Femoral Artery, or from the Profunda Femoris.

It runs at the inner edge of the Crest or Spine of the Os Ilium, between the Transversalis and Obliquus Internus, till it arrives near the Vertebrae of the Loins.

It gives Branches to the Psoas, Iliacus, and Sartorius, to the under end of the Obliqui and Transversus Abdominis, between which it sometimes extends a considerable way. At length it communicates with the Epigastric, and with the Inferior Intercostal and the Lumbar 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 exit, it is situated superficially over the Ball of the Os Femoris, having the inner edge of the common end of the Psoas and Iliacus Internus between it and the Capsular Ligament of the Joint.

At the top of the Thigh it forms the Inguinal or Common Femoral Artery, so named from its situation, and subsequent division into other Arteries.

Here it is covered by the Lymphatic Vessels and Glands of the Groin, and by the general Aponeurosis and Fat; farther down, it is lodged deep in an angular Cavity in the upper and inner part of the Thigh, with the Rectus and Sartorius upon the outer, and the Triiceps Adductor Femoris upon the inner side of it. From this part it descends at the inside of the Thigh, turning gradually backwards till it reaches the Ham, or rather, strictly speaking, having the Thigh-Bone first upon its outer, then upon its fore part.

From the Inguinal or Common Femoral Artery, a few small Branches are sent off to the Skin of the Abdomen, 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*, and by some Authors *Pudicæ Externæ Superior et Inferior*, to the Pubes, to the Integuments of the External Parts of Generation, and to the upper and inner side of the Thigh in both Sexes. Some of these Branches sent from this part of the Femoral Artery, anastomose with those of the Epigastric, and others with the Arteries of the Penis.

About two inches below the Ligament of POUPART, or opposite the insertion of the Psoas Magnus and Iliacus Internus into the Trochanter Minor, the common 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*. It sometimes, however, though rarely, happens, that the division of this Artery is about three inches below POUPART'S Ligament, and, in some still more rare cases, directly under it.

PROFUNDA FEMORIS.

The ARTERIA PROFUNDA, also called VASTA POSTERIOR, vel MUSCULARIS FEMORIS, concealed at first by the proper Femoral Trunk, gives off at its origin from that Artery, small Branches arising separately or in a common Trunk, and dispersed upon the Integuments, Muscles, and Capsular Ligament, at the upper and fore part of the Thigh.

It gives next, from its origin also, two large Branches,—the *Circumflexa Interna*, and *Circumflexa Externa*,—which run in opposite directions at the top of the Thigh.

CIRCUMFLEXA INTERNA.

The CIRCUMFLEXA INTERNA, though most frequently coming off from the beginning of the Profunda, often arises higher than it, from the common Femoral; sometimes it comes off in common with the Circumflexa Externa, and there are now and then two of them, one a little lower than the other.

It passes between the under ends of the Psoas and Pectinalis, and afterwards turns round the inner part of the Neck of the Thigh-bone.

It sends off—

Bránches to the Pectinalis, Triceps, and Capsule of the Joint :

A *Superior* and *Anterior Ascending Branch*, to the Triceps and Obturator, which has a considerable Anastomosis with the Obturator Artery at the external Margin of the Foramen Thyroideum, though the communication is not so visible as many have supposed. From this Branch a Twig is detached, 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*.

An *Inferior*, or *Inferior Posterior Circumflex Branch*, which is the continuation of the Trunk. It bends round the Neck of the Thigh-bone, sending small Branches to the Capsule of the Joint, to the Obturator Externus, Quadratus, and Adductores Femoris; communicating with the Obturator, Sciatic, Hæmorrhoidal, Gluteal, and Pudic Arteries.

CIRCUMFLEXA EXTERNA.

The CIRCUMFLEXA EXTERNA arises for the most part nearly opposite the former, but frequently a little lower. Now and then it 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, and over the root of the Trochanter Major of the Os Femoris.

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 Glutea.

Others which have more of a lateral direction, and are distributed upon the Skin and Muscles at the upper and back part of the Thigh, upon the Muscles more immediately about the Joint, and also upon the Periosteum,—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.

Sometimes an External Pudic Branch is derived from this Artery, which more frequently comes off from the Trunk of the common Femoral.

RAMI PERFORANTES.

The Profunda Femoris, having detached the Circum-

flex Arteries, sinks deep behind the Trunk of the Femoralis, and, passing between the Adductor Muscles and Vastus Internus, descends near to the middle of the Thigh.

In its descent, it sends off, or is divided into, principal Branches, termed *Rami Perforantes*, which, after giving out small Branches to the Triceps, perforate it, to be dispersed upon the Flexors and other Muscles on the back part of the Thigh.

The Perforantes come off in the following succession, viz.

The *Perforans Prima*, which arises near the Trochanter Minor, perforates the Triceps a little farther down, and divides into ascending and descending Branches, which supply the Muscles and Integuments in the upper and back part of the Thigh.

The ascending Branches form numerous communications with the Circumflex Arteries, about the root of the Trochanter Major, and anastomose with the Glutea, and, in particular, with the under end of the Sciatica.

The *Perforans Secunda*, vel *Magna*, which comes off some way below the former, and is the largest of the perforating Arteries. This also perforates the Triceps.

It gives Branches to the Muscles in general about the middle of the back part of the Thigh, particularly to the Adductors, Vasti, and to the Flexors of the Leg; and communicates above with Branches of the Perforans Prima, and with the two Circumflexæ.

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, and upon the Periosteum; one Twig sent off from these sometimes forming a *Nutritia* vel *Medullaris* of the Os Femoris.

The Femoral Artery, after giving off the Profunda Femoris, passes down, still covered by the Fascia of the Thigh, between the Vastus Internus and insertion of the second or long Head of the Triceps, giving only small Branches to the Muscles and Integuments at the fore and inner side of the Thigh.

One Branch, termed *Ramus Anastomoticus Magnus*, more conspicuous than the rest, is sent off previously to the passage of the Artery through the Tendon of the Triceps. It descends with many Ramifications upon the Vastus Internus, upon which it is chiefly dispersed; inosculating with the descending Branch of the Circumflexa Externa, and below, with Branches about the Knee.

About the middle of the inside of the Thigh, the Trunk of the Artery is situated behind the Sartorius; 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 perforated the Triceps, it is found in the back part of the Thigh, where it sends *Rami Perforantes* to the adjacent Muscles and Integuments.

Of the Rami Perforantes two are more constant and considerable than the rest, and called by some Authors *Perforans Superior*, and *Perforans Inferior*; the former distributed to the Muscles at the back and inner, and the latter, after sending off Branches to the Periosteum, and the *Principal Medullaris*, going to those of the back and outer part of the Thigh; and both com-

municating above with the descending Branches already described.

In this part of the Thigh, the Artery lies close upon the Bone, and adheres firmly to it, till it reaches the Ham, where it is termed *Poplitea*.

ARTERIA POPLITEA.

The ARTERIA POPLITEA, strictly so called, is that part of the Femoral Artery which lies over the Joint of the Knee; the name, however, is generally applied to all that portion of it which extends from the part where it perforates the Tendon of the Triceps to the under edge of the Popliteus, or where the Artery divides into its two great Branches.

It is lodged deep in the Hollow between, and protected by, the Ham-strings, Condyles of the Os Femoris, and Heads of the Gastrocnemius Externus.

While it passes over the Joint, it adheres to the Capsular Ligament. It goes afterwards over the Popliteus, and is covered by its associate Vein and Nerve, and generally by a large quantity of Fat.

It gives off several Branches, termed *Articulares*, to the Joint of the Knee, which vary in their number.

ARTERIE ARTICULARES.

Four of these, situated two above and two below the Joint, and therefore called *Articulares Superiores et Inferiores*, are more regular and constant than the rest, viz.

The *Articularis Superior Interna*, which runs round the Os Femoris, above the inner Condyle, passes under

the Semi-membranosus and Semi-tendinosus, and, after perforating the Tendon of the Triceps, is dispersed upon the upper and inner part of the Knee, anastomosing 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 Vastus Externus, and 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 passing by the Semilunar Cartilage into the internal 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 Ligaments, to be dispersed upon the under and outer side 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*.

Besides the Superior and Inferior Articulating Arteries, another Branch is frequently found, termed *Arti-*

cularis Media, vel *Azygos*, which is irregular in its origin, arising sometimes from the Trunk of the Poplitea, at other times from one of the Superior Articular Branches. It is situated between the Condyles, and is exhausted upon the Ligaments, Fat, and Bones, at the back part of the Joint; inosculating with all the adjoining Branches.

The other less constant Articular Branches are dispersed upon the Muscles a little above the Joint.

The Articular Arteries form numerous communications with each other: some are expanded in the form of a net-work over the Patella; several are distributed upon the Capsular and other Ligaments of the Joint, while numerous Branches penetrate the Substance of the corresponding Bones.

The Arteria Poplitea, having furnished Branches to the Joint of the Knee, gives others to the Muscles of the upper and back part of the Leg; two of which, termed *Surales*, more considerable than the rest, pass by different Branches into the Heads of the Gastrocnemius Externus.

The Trunk of the Artery descends afterwards between the heads of the Gastrocnemius, and commonly from two or three inches below the bending of the Knee, and at the under and outer edge of the Popliteus, or upper end of the Soleus, divides into two large Arteries, the *Tibialis Antica*, and *Tibialis Postica*.

TIBIALIS ANTICA.

The TIBIALIS ANTICA, analogous to the Radialis, arises from the fore part of the Poplitea. It passes

directly through the upper end of the Interosseous Ligament, at the under edge of the Popliteus Muscle, to the fore part of the Leg.

In its descent in the Leg, it adheres closely to the anterior surface of the Interosseous Ligament; lying at first between the Tibialis Anticus and Extensor Digitorum, and then between the Tibialis and Extensor Pollicis.

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, advances in a waving direction upon the convex Surface of the Foot.

It supplies, in general, the Muscles and Integuments which belong to the outer and fore part of the Leg and upper part of the Foot, and is ultimately spent upon 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 Bones, Ligaments, and Muscles near the Joint of the Knee, particularly upon the Soleus and Tibialis Posticus; the superior Twigs running in a retrograde direction, and inosculating with the Inferior Articular Branches:

The *Recurrens Anterior*, which arises from the Artery after it has perforated the Ligament, and passes up between the Tibialis Anticus and Extensor Digitorum Longus, to which it gives Branches, and is afterwards distributed upon the Ligaments at the upper part of the Leg, and upon those at the under part of the Knee, anastomosing there with the Inferior Articular Arteries:

Numerous Branches sent off, at short distances, in a

lateral direction, to the Muscles and Integuments on the outer and fore part of the Leg; many minute Ramifications spreading out also upon the Periosteum.

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 before 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 *Interossee*, to the Muscles between the Metatarsal Bones of the small Toes,—which, however, are frequently derived from the Metatarsal Artery :

Branches from the Artery upon the Dorsum Pedis, distributed upon the Integuments, Muscles, Membranes, and Bones, at the upper and inner side of the Foot :

The *Arteria Metatarsa*, which goes off about the middle of the Dorsum Pedis, and passes obliquely towards the root of the Little Toe, assisting the Arteria Tarsea in furnishing Branches to the upper side of the Foot and Toes, and sometimes, in part or entirely, supplying the place of that Artery.

The above is the common origin, course, and distri-

bution of the Arteries upon the upper side of the Foot, but there is great variety in each of these circumstances in different Subjects.

The remaining portion 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*, termed *Anastomotica Profunda*, which may be considered as the continuation of the Trunk, sinks between the Metatarsal Bones of the two first Toes, and anastomoses in the Sole with the Posterior Tibial Artery.

The *Anterior Branch* runs forwards, under the name of *Dorso-metatarsea*, vel *Dorsalis Pollicis*, to be dispersed upon the Great and Second Toes.

TIBIALIS POSTICA.—The Tibialis Postica, somewhat larger than the Antica, divides about a *finger's breadth* under the origin of the Tibialis Antica, though sometimes considerably lower, into the *Fibularis*, and *Tibialis Postica* strictly so called.

FIBULARIS.

The FIBULARIS, termed also *Peronea*, somewhat corresponds with the Interossea Anterior of the Fore-arm. It is commonly smaller than, though sometimes nearly equal in size to, either of the Tibial Arteries, and runs down at the inner side of the Fibula for a considerable way along the Leg. It is situated, first between the

Tibialis Posticus and Flexor Longus Pollicis, and is afterwards covered by the last-named Muscle.

Its Branches are distributed to the Muscles, Integuments, and other parts at the outer side of the Leg in the neighbourhood of the Fibula,—a small *Medullary Branch* also penetrating the Substance of that Bone. The Branches of the Fibular Artery inosculate forwards with those of the Anterior Tibial, and backwards with the Branches of the Posterior Tibial Artery.

A little above the Inferior Articulation of the Tibia and Fibula, it sends a Branch forwards, termed *Fibularis vel Peronea Anterior*, which perforates the Interosseous Ligament, and is dispersed upon the fore part of the Ankle, where it anastomoses with the external Branches of the Tibialis Antica.

The continuation of the Trunk, sometimes termed *Fibularis vel 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, and also with Ramifications of the Tibialis Postica.

TIBIALIS POSTICA.

The TIBIALIS POSTICA, properly so called, analogous to the Ulnaris, 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 in the Leg.

At the under part of the Leg it becomes more superficial, being covered only by Cellular Substance and the Tendinous Fascia. Here it runs between the Tendo

ACHILLIS and Malleolus Internus ; having 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 passes in the hollow of the Os Calcis, between that Bone and the Abductor Pollicis, to the Sole of the Foot.

Its branches supply the Muscles, Integuments, and Membranes, at the back and inner part of the Leg, and through the whole length of the Sole ; forming many Inosculations with the Branches of the Anterior Tibial, and Fibular Arteries, on the different sides of the Leg and Foot. In the deep-seated parts there are also many communications, by means of perforations in the Interosseous Ligament.

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 *Arteria 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 *Internal* and *External Plantars*.

PLANTAR ARTERIES.

The Plantar Arteries run forwards under the Aponeurosis Plantaris, having the Flexors of the Toes between them.

The PLANTARIS INTERNA, vel RAMUS INTERNUS, passes near the inner side of the Sole, between the Aponeurosis Plantaris and Abductor Pollicis; having the Muscle upon the inner side of it.

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 to the Bones, Ligaments, and other parts at the concave edge of the Sole.

It sends a *principal Branch* to the inner side of the Great Toe; 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, vel RAMUS EXTERNUS, 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 forward, between the Flexors and Metatarsal Bones of the small Toes, 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 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 inner 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 :—and

Perforating Branches, which, passing between the Metatarsal Bones, communicate with the Arteries on the upper part of the Foot :

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 large 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 anterior extremities of the Trunks of the Digital Arteries also form distinct Anastomoses with the Interosseous Arteries of the upper part of the Foot.

VEINS.

The VEINS of the INFERIOR EXTREMITY, like those of the Superior, consist of a *Subcutaneous* and a *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 *Saphena Major* and *Saphena Minor*.

SAPHENA MAJOR.

The SAPHENA 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, some way below the Knee, is frequently split into a Plexus.

It receives Branches from the Superficial parts of the Thigh, and small Twigs from the Inguinal Glands.

It perforates the Fascia Lata at the edge of the Fal-ciform Ligament, and terminates in the top of the Femoral Vein, nearly opposite to, or a little higher than, the origin of the Arteria Profunda.

SAPHENA MINOR.

The SAPHENA 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 originally by the Veins of the upper and outer part of the Foot, and is joined to the Saphena Major, over the Metatarsal 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 Saphena Major.

It terminates in the Vena Poplitea, and, a little above the Knee, communicates constantly by a small Branch with the Saphena Major.

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 Deep Radial or 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 or posterior Surface of the Artery, being more superficial than the latter, which it in a great measure conceals, and is commonly single, excepting a small Vein which sometimes accompanies it, and communicates with it.

The Popliteal Vein receives the Venæ Surales and Articulares, and the Saphena Minor; after which it forms the Femoral Vein.

VENA FEMORALIS.

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, is joined by the Vena Profunda.

The VENA PROFUNDA 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, and is often very conspicuous in cases of Ascites.

ILIAC VEINS.

The Trunk of the Femoralis, having received the different Veins of the Inferior Extremity, passes into the Abdomen, behind POUPART'S Ligament, still situated at the inner side of the Artery, the two Vessels being here upon the same plane,—after which it forms the Iliaca Externa.

The ILIACA EXTERNA receives into its beginning the Epigastric, and the Circumflex Vein of the Os Ilium, and sometimes the Vena Obturatrix.

It is situated at first at the inner side 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*, vel *ILICA INTERNA*, is situated at the outer side of the Concomitant Artery, and receives the different Veins which correspond with the Branches of that Artery, and which are furnished with Valves where they are situated among the Fleishy parts of the Pelvis.

The External and Internal Iliacs unite, and form the *Common Iliac*, a little below the division of the corresponding Arteries.

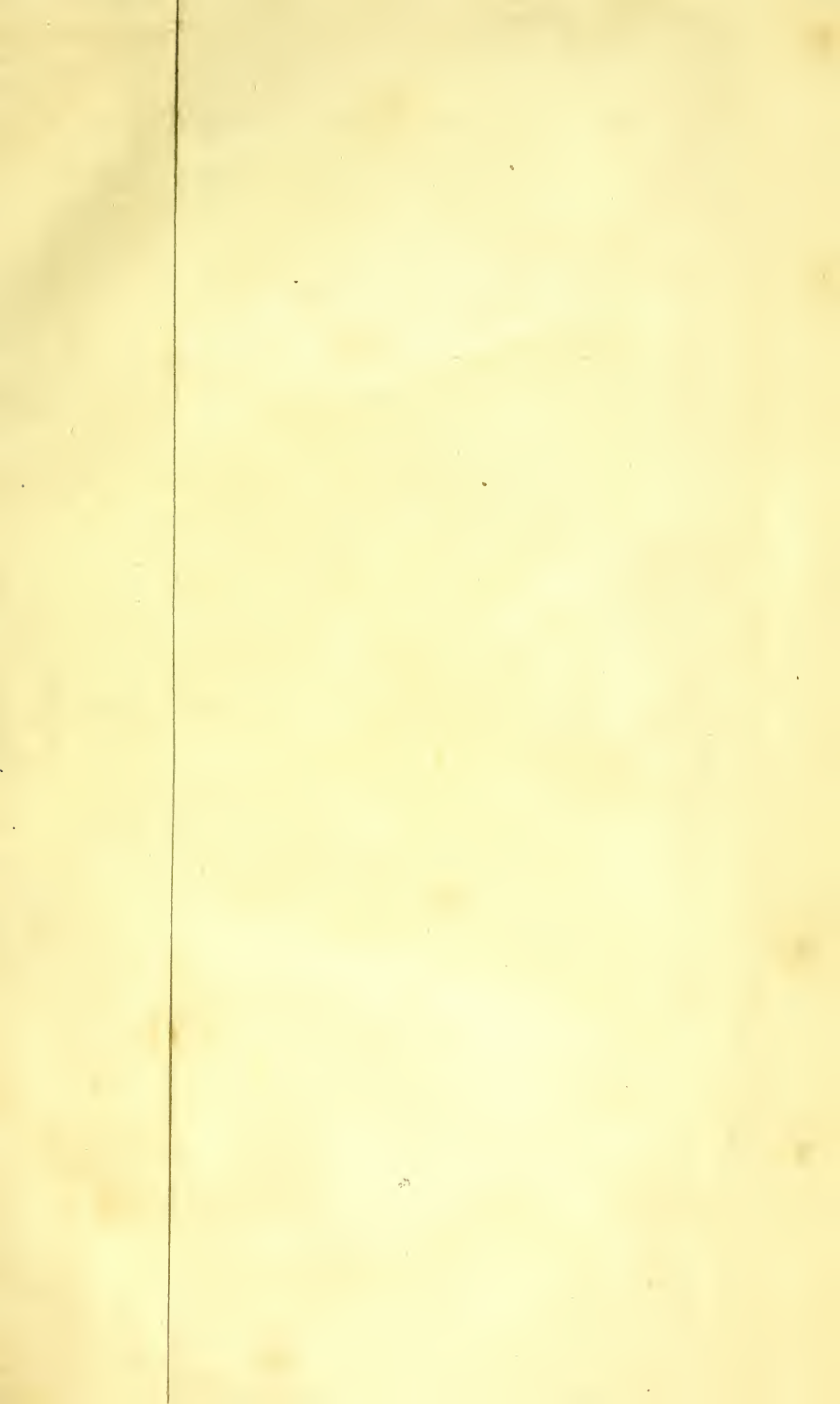
The *ILICAÆ COMMUNES* ascend by the right side of their respective Arteries, and, a little below the Bifurcation of the Aorta, or upon the fore part of the Fifth Lumbar Vertebra, and behind the right common Iliac Artery, unite to form the Inferior Cava, situated, as formerly mentioned, at the right side of the Aorta.

VENA CAVA INFERIOR.

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 last, 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 Tendinous part of the Diaphragm, at the root of the Liver, it terminates in the under part of the Right Auricle of the Heart; thus receiving the Blood from the Inferior Extremities, from the Viscera and Parietes of the Abdomen, or from all the parts situated under the Diaphragm.



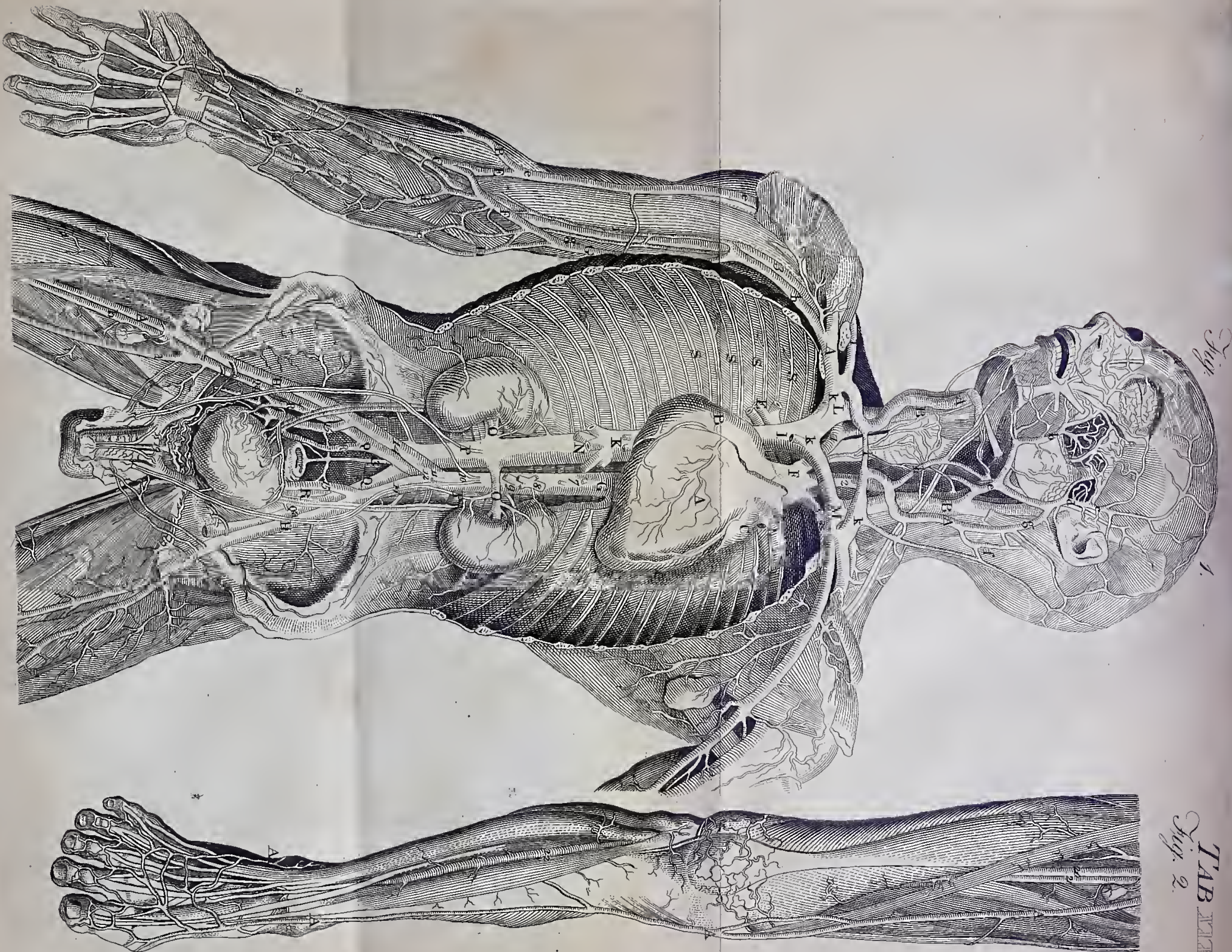


Fig. 1.

TAB. XXXIII.
Fig. 2.

T A B L E X X X V .

GIVES a GENERAL VIEW of the ARTERIAL and VENOUS
SYSTEMS.

FIG. 1.

HEAD and NECK.

- a*, The frontal vein.
- b*, The facial vein.
- c*, The temporal vein.
- d*, The trunk of the temporal vein, where it lies behind the parotid gland, and receives the transversalis faciei.
- e*, The common trunk formed by the facial and temporal veins, opening into,
- B, B, The internal jugulars.
- f*, The occipital veins.
- g*, The external jugular, arising from the temporal vein.
- h*, The interior external jugular vein.
- A, A, The external jugular veins, descending, and communicating by,
- i*, A cross branch at the bottom of the neck.
- k*, *k*, The termination of the external jugulars in the subclavian veins.
- 2, The left carotid artery ascending at the inner side of the internal jugular vein, and at the place of its division sending off the superior laryngeal artery.

SUPERIOR EXTREMITY.

- 1, The trunk common to the right carotid and subclavian arteries.

T A B L E XXXV. CONTINUED.

a, The vena saphena major.

b, The femoral vein.

FIG. 2.

20, The continuation of the femoral artery.

21, The corresponding vein.

22, The anterior tibial artery.

A, A, A, The vena saphena major.

Aa, The beginning of the saphena minor.—Upon the foot and toes a plexus of veins appears, which terminates in both the saphenæ.

PART VI.

OF THE

ABSORBENTS.

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*, and the common Trunk, or *Thoracic Duct*, in which they terminate.

The *Absorbents* are small *Pellucid Tubes*, which have been discovered in most parts of the Body, and are supposed to exist in all.

ORIGIN AND SITUATION OF THE ABSORBENTS.

The Absorbents begin by numberless open *Mouths*, too minute to be visible to the naked Eye; by the assistance of Glasses, however, the Orifices of the Lacteals have been seen in the Human Body;—and those of the Lymphatics in certain kinds of Fishes.—See CRUICKSHANK'S and MONRO'S *Treatises on this Subject*.

The Lymphatics arise from the External Surface of the Body, from the Cellular Substance, from the Sur-

face of the large Cavities, and from the Surface and Substance of the different Viscera ; but have not yet been distinctly observed in the Cavity of the Cranium and Spine, nor in the Placenta and its Membranes. MASCAGNI, however, represents a few Lymphatics both upon the Brain and its Membranes.

In the different parts of the Body, they generally run in two Sets ; one Superficial and very numerous, the number being much greater than that of the red Veins, the other accompanying the Arteries, and at least double their number.

In general, they have a waving direction, and form an irregular *Net-work*, having frequent communications with each other, more so than either the Arteries or Veins have ; and these are most numerous in the vicinity of their Glands.

The Communications of the Absorbents differ from those of the Blood-vessels in this, that when two of them unite to form a Trunk, it is commonly not larger than either of the Branches which enter into its composition.

The Lymphatics contain a pellucid, insipid, and slightly Viscid Fluid, which is considered by some of the latest Writers on the Subject, as being chiefly formed of a Solution of the Blood. MR BRANDE found in it a small quantity of common Salt.

LACTEAL VESSELS.

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, the

Lacteals carry a white Fluid, called *Chyle*, which, on account of the thinness of the Coats of the Vessels, readily appears through them. At other times, they carry a *Colourless Fluid* or *Lymph*, to be mixed with the contents of the Lymphatics.

In a Human Body, and in Quadrupeds, the Chyle has the appearance of Milk. It has a sweet and somewhat saline taste. By allowing it to remain at rest for some time, and exposed to the Air, it is said to afford Cream, and also to coagulate. It is found to contain Albumen, Serum, and different kinds of Salts, and, according to some, Saccharine Matter.

When a Person has died a few hours after taking too great a quantity of Food, the Lacteals have been observed gorged with Chyle; and, upon opening the Abdomen of a Dog, &c. three or four hours after the Animal has taken Food, the Lacteals are found full of this Fluid. At longer periods than that just mentioned, the whiteness of the Fluid diminishes; and where the Animal has fasted twenty-four hours, the contents of the Lacteals are colourless.

GENERAL TERMINATION OF THE ABSORBENTS.

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, and mixed with the Blood; after which these Fluids pass through the Lungs, where they undergo various changes.

The large Veins in the bottom of the Neck are the common place of termination; no facts nor observa-

tions having been yet established, of their terminating in any other part of the Venous System.

COATS OF THE ABSORBENTS.

The *Coats* of the Absorbents are thinner and more transparent than those of the Veins, in consequence of which the colour of their Contents is readily perceived through them; but they are stronger, being able to support a column of Mercury of considerable weight;—yet from their thinness, they cannot be enumerated.

The Absorbents, however, like the Blood-vessels, are generally supposed to be formed of different *Membranous Layers*.—Fibres can be seen in them, especially in a Human Thoracic Duct, as well as in that of the larger Animals, as in a Horse and Ox, and the Muscularity of the Absorbents is rendered probable by the contractile power which they are observed to possess in a living, or moribund, or even in a recently dead Animal.

By this contractility, together with a degree of elasticity they possess, they convey their contents from their origins towards their terminations, in which they are assisted by the motions of the surrounding Muscles, and pulsations of the neighbouring Arteries, independent of such a *Vis a Tergo* as contributes to propel the Blood through the Veins.

BLOOD-VESSELS AND NERVES OF THE ABSORBENTS.

The Absorbents are furnished with *Blood-vessels* for their nourishment, as is sometimes distinctly observed

by the assistance of penetrating Injections ; and this is rendered still more evident, by their being susceptible of inflammation.

The presence of *Nerves* also appears probable, from their vicinity in many parts to considerable Nerves, and from the acuteness of their feeling when in an inflamed state.

VALVES OF THE ABSORBENTS.

Through their whole extent, the Absorbents are intercepted by *Valves*, which, like the sides of the Vessels to which they belong, are of great proportional strength. They 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, being quite similar to the Valves of the Red Veins.

In some parts, the Valves are found 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 pairs, 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. Sometimes there is not above a single pair in the space of an inch, and occasionally a Lymphatic runs one or more inches without a Valve.

When the Absorbents are distended, they appear largest on the side of the Valves towards their general terminations, and the enlargements are such as to give

the Lymphatics a jointed, and the Lacteals frequently a Vesicular appearance.

In the termination of Absorbents, whether in the Thoracic Duct or in the Red Veins, there is always one, commonly two, but never more than two Valves, to prevent the contents of the Duct or of the Veins from passing into them.

The Valves promote the general course of the Lymph and Chyle, and prevent the retrograde motion of these Fluids within their Vessels. Even after death they perform the office of Valves, as the Lymphatics can only be injected according to the course of the absorbed Fluids; and they can support a column of Mercury, and prevent its retrograde motion.

USE OF THE ABSORBENTS.

The Lymphatics take in the Fluids applied to their Orifices by Capillary Attraction, and afterwards by a power inherent in themselves, and, by their contractile nature, conduct them into the Mass of Blood, whereby they prevent Morbid Accumulations.—They absorb the thinner parts of the secreted Fluids, so as to give them a proper consistence, and take up solid parts originally formed for temporary purposes, to make way for others that are to be more permanent, &c.

The Lacteals receive the Chyle from the Intestines, in the same manner as the Lymphatics do the Lymph from the other parts, and afterwards, by means of the Thoracic Duct, send it to be mixed with the Blood, for the nourishment of the Body.

GLANDS OF THE ABSORBENTS.

The Glands of the Absorbents, or *Conglobate Glands*, are found solitary or in groups in various parts of the Body, and are situated in the Cellular Substance under the Skin, generally near the great Blood-vessels, or over the Trunks of the vessels belonging to the different Viscera; but scarcely can be said to be placed in the Substance, or upon the Surface of any of the Viscera. They are chiefly found at the bendings of the Knee and Thigh; about the Vessels in the Pelvis; between the plies of the Mesentery, where they are in greater abundance than in any other part of the Body; about the Vessels going into the other Viscera of the Abdomen; about the Vessels in both Mediastina, especially the Bronchi; at the inner part of the Arm; in the Axilla; about the large Vessels of the Neck; under the Lower Jaw; before and behind the Ear. They have not yet been found upon the Hands or Feet, nor in the Cavity of the Cranium; and scarcely have any ever been observed upon the Fore-arms or Legs; and only a small straggling Gland is occasionally met with upon the superficial parts of the Trunk of the Body. This is seen about the size of the Crystalline Lens, sometimes on the back, at other times on the fore side of the Thorax.

They are of a round or oval form, and frequently a little flattened; and of different sizes, from that of a Millet-seed to near an inch in diameter; sometimes several are collected in 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 more turbid, and of a reddish and brown colour, and become smaller and paler with increasing age, though they never entirely disappear. Immediately under the Skin, they are redder and firmer, and have more of a pink colour than within the large Cavities.

In the Mesentery, they are of a pale greyish colour; about the Bronchi, they are of a bluish tint, and sometimes almost jet black.

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 at an early period of life, by a *Succus Proprius* full of Globules, which, MR HEWSON supposed, afterwards form the red Globules of the Blood. MASCAGNI maintains, that this matter is not contained in the Cellular Substance, but in the Vessels themselves. Like other Glands, they are supplied with Arteries, Veins, and Nerves, which are derived from those of the adjacent parts.

They are described by some Anatomists as being composed of *Cells internally*, while others consider them as 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 out upon it, penetrate into its Substance, where they divide almost to infinity, in some parts coiling up upon themselves; then they re-join, and, communicating freely with each other, pass out at the opposite side of the Gland.

The greater part of the Absorbents, approaching a Gland, terminate in it in this manner, while others turn aside to go over it, and end in other Absorbents, or in other Glands, but at such a distance, that virulent matter may enter the mass of blood without being at first perceived.

From the opposite side of the Glands, the Vessels go out nearly in the manner they entered them, and are there termed *Vasa Efferentia*. These 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 the general terminations. Few appear to enter the Red Veins without previously having penetrated one or more Glands; but occasionally an Absorbent, as in the Arm, passes through its whole course without perforating any Gland.

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, though the Glands are found to be as essential to the Absorbent Vessels as the Ganglia are to the Nervous System.

PARTICULAR ABSORBENTS.

ABSORBENTS OF THE LOWER EXTREMITY.

THE *Superficial Absorbents of the Lower Extremity*, consist of numerous Vessels, which are imbedded in the Cellular Substance, 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 side 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 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 passes afterwards on the fore and inner part of the Thigh to the Groin.

Most of the Trunks of the last Plexus accompany the *Vena 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 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. The Superficial Lymphatics of the upper and back part of the Thigh, and of the Nates, Abdomen, and Loins, also enter the Inguinal Glands.

The *Deep-seated Lymphatics of the Lower Extremity* are situated among the Muscles.—They accompany the Blood-vessels, and are few when compared with the Subcutaneous Set.

In several places, one only has been yet observed on each side of the Trunk 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.

ABSORBENTS OF THE EXTERNAL PARTS OF
GENERATION.

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 unconnected; and in all, they appear to divide at the root of the Penis into right and left Branches, which pass into the corresponding Inguinal Glands, that lie next the Symphysis 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 Substance of the Testicle, and from the Epididymis, and run with the Spermatic Cord through the Abdominal Rings, 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 Abdominal Rings, in company

with the round Ligaments of the Uterus, and terminate in the Iliac, and in the Lumbar Glands.

SUPERFICIAL ABSORBENTS OF THE ABDOMEN AND
LOINS, WITH THE DIFFERENT ABSORBENTS
OF THE NATES.

The *Superficial Lymphatics of the under part of the Abdomen*, and those of the *Loins*, pass into the Inguinal Glands; each set terminating in such of the Glands as lie nearest the parts to which the Vessels belong. Of the Absorbents of the Nates, some go to the Glands of the Groin, but the greater number pass into the Pelvis with the Gluteal and Sciatic Blood-vessels, and terminate in the Iliac Glands.

INGUINAL, ILIAC, AND LUMBAR ABSORBENTS.

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 enter the Glands.

The Vasa Efferentia of the Inguinal Glands enter the Abdomen under POUPART'S Ligament, in company with the Inguinal Artery and Vein.

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 a Male, and by a portion of those of the Uterus and of the Vagina in a Female.

Besides the Lymphatics which lie on the outside of the External Iliac Artery, there are others situated on the outside of it, upon the Psoas. 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.

ABSORBENTS OF THE BLADDER OF URINE.

The *Lymphatics of the Bladder*, in both Sexes, accompany the principal Blood-vessels of that Organ, 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.

ABSORBENTS OF THE UTERUS.

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 run from above downwards, into Glands situated on the sides of the Vagina. From these Glands the Lymphatics pass to others which surround the Internal Iliac Vessels, and then, intermixing with the Trunks from the Extremity, they terminate in the Thoracic Duct.

The Spermatic Lymphatics terminate in the Lumbar Plexus.

The Lymphatics of the Uterus, like its Blood-vessels, are much enlarged, and of course easily discovered, in the gravid state, where they also are observed to be extremely numerous.

ABSORBENTS OF THE STOMACH.

Of the Absorbents of the Stomach, which consist of superficial and deep Branches, one set runs upon its Small, and another upon its Great Curvature; but neither the one nor the other is found to carry Chyle, though a few Absorbents have been observed filled with it in other Animals,—as a Dog.

The first Set, composed of Branches from the upper and under Surfaces of the Stomach, accompanies the Superior Coronary Artery.

In their passage, the Lymphatics go through a few small Glands situated at the junction of the Omentum Minus with 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, is 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 some small Glands which lie close to the Right Gastric Artery.

In their descent by the Pylorus, they meet the Plexus which accompanies the Superior Coronary Artery, and run with it, and with the Deep Lymphatics of the Liver, to the Thoracic Duct.

LACTEALS OR ABSORBENTS OF THE SMALL INTESTINES.

The *Lacteal Vessels*, so called from conveying a Fluid of the colour of Milk, 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.

The Radiated Branches are collected into Fasciculi, which are inclosed in Processes of the Inner Coat of the Intestines. These Fasciculi are of a roundish form

and have been called *Ampullæ* of LEIBERKUHN, from that Author considering them as little Bottles receiving the Chyle.

From the Villi, the Lacteals run a considerable way under the Muscular Coat of the Intestines, and then pass obliquely through it, 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 an Artery.

Upon the Surface of the Intestines an external Set also appears. It runs between the Peritoneal and Muscular Coats, and commonly proceeds some way in the direction of the Intestine, and with few Ramifications.

The Superficial and deep-seated Lacteals communicate freely in the Substance of the Intestines, and, after leaving them, commonly form a Plexus, which runs between the plies of the Mesentery and Meso-colon, without following particularly 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 the former.

In their course they pass through a great number of Lacteal or Mesenteric Glands, from 130 to 150 and upwards having been counted by different Authors. The Glands, 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 Branches 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 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 pale colour. When filled with the Chyle, they are almost as white as the Fluid contained in them.

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 Glands 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.

ABSORBENTS OF THE GREAT INTESTINES.

The Absorbents of the *Great* are proportionally of an inferior size 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 Meso-colic Glands, which are situated between the Layers of the Meso-colon, and are generally much less numerous, and also considerably smaller than those of the Mesentery, or than most of the other Conglobate Glands 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.

The *Absorbents 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.

ABSORBENTS OF THE LIVER.

The *Lymphatics of the Liver*, like those of the other Viscera, run in two Sets; the Vessels of the Superficial Set 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 of the External Surface, the Deep-seated Absorbents are readily filled from them.

The greater number of the Lymphatics upon the convex Surface of the Liver, go by a Right and Left Plexus towards the Suspensory Ligament, and the Vessels of these Plexus, contrary to what happens in other parts of the Body, may be injected against the natural course of the Fluids.

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 y 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 they run in the Anterior Mediastinum, they most frequently terminate in the upper end of the Thoracic Duct:—sometimes, however, they communicate with the general termination on 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 derive numerous small Branches.

The Deep-seated Lymphatics accompany the Blood and Biliary Vessels, and, communicating with the Superficial Absorbents already mentioned, 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.

ABSORBENTS OF THE SPLEEN.

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 accompanies the

Splenic Artery, and goes through 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.

ABSORBENTS OF THE KIDNEY AND CAPSULA RENALIS.

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.

THORACIC DUCT.

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, belong 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, where the Duct formed by them is twice or thrice as large in diameter as it is higher up.

It commonly enlarges again upon the first Lumbar Vertebra, where it has generally been called the *Receptaculum Chyli*, and considered as the beginning of the Duct, being often found forming an oval, or Pyriform Bag, about a fourth or 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,

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 in impelling its Fluids by the strokes of the Aorta.

In the middle of the Thorax, it is smaller than elsewhere, its diameter here being only about that of a wheat straw. After this it gradually enlarges, till it arrives at its general termination.

In the Thorax, it receives the Lymphatics of the Spatia Intercostalia, one or two of which accompany each of the Intercostal Arteries, and the whole go through small Glands placed near these Arteries, but most numerous about the side of the Dorsal Vertebrae, where they form a sort of Chain.

Here, likewise, it receives Branches from the Esophagus and Lungs; the former of which is surrounded by a number of Glands, and by a remarkable and intricate Plexus of Lymphatic Vessels.

ABSORBENTS OF THE LUNGS.

The *Superficial Lymphatics of the Lungs* form large Areolæ, which have smaller Areolæ within them; the larger Branches running chiefly between the Lobules, and the smaller passing over them in such a manner as to cover their whole Surface.

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 Viscera of the Thorax.

At this place they are joined by the deep-seated Lym-

phatics, 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 forms 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 the Lymphatics 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.

ABSORBENTS OF THE HEART.

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 right side of the Neck:

The Lymphatic Trunk accompanying the Left Coronary Artery, is formed of two principal Branches.— One of these 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 this Organ, and having reached the space between the Auricle and Ventricle, it turns round to join the former Branch near its corresponding Artery.

The Trunk runs next to a Gland placed behind the Pulmonary Artery, and behind 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.

THORACIC DUCT CONTINUED.

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 and Internal Jugular Vein, to about the Sixth Vertebra of the Neck.

It now makes a turn downwards, and, after descending nearly an inch, terminates in the upper and back part of the angle formed by the left Internal Jugular and Subclavian Veins.

The Thoracic Duct, like the Absorbents which form it, is endowed with Valves, but the number of these varies in different Bodies, there being sometimes only three or four pairs, at other times a considerable number are found in it.

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 re-unite previously 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 Veins, 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, and the other to the corresponding part in the right side of the Neck.

It has also, in a few very rare instances, been observed to terminate 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.

ABSORBENTS OF THE SUPERIOR EXTREMITY.

The *Superior*, in a similar manner with the *Inferior Extremity*, has 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 deep-seated parts.

The Superficial Lymphatics of the Superior Extremity are numerous, and are readily seen in emaciated Dropsical 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, the rest somewhat higher; other Lymphatics

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 Pectoralis and Deltoides, 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 Vessels, 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 edges of the Mamma and Pectoralis Major.

The Superficial Lymphatics of the containing parts of the Thorax, in general, with the Absorbents from the Integuments and Muscles of the Scapula, run in a radiated manner; those from the upper parts passing downwards, those from below going upwards, and those from the middle running in a transverse direction, to terminate in the Axillary Glands, each Set entering the Glands of its respective side.

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 Pectoralis Major and Latissimus Dorsi; adhering closely to the Trunks of the Axillary Blood-vessels and Nerves.

From the Axillary Glands large Branches go under the Subclavian Muscle, and form a Trunk, which, in the left side, commonly joins the Thoracic Duct near its termination. In the right side, it joins 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.

Sometimes two Trunks arise from the Axillary Glands in each side, in which case one goes to the end of the Thoracic Duct, or the corresponding Trunk in the right side, while the other terminates in the Subclavian Vein.

ABSORBENTS OF THE HEAD AND NECK.

The *Lymphatics on the outside of the Head* accompany the Blood-vessels, and pass through Glands in their way to the Neck.

Those accompanying 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, and 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, 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, and about the Inferior Maxillary Salivary 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 upon 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 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,—from an appearance of Lymphatics having been by some, as MASCAGNI, observed upon the Surface of the Dura Mater, and between the Tunica Arachnoidea and Pia Mater, and—from their having been found on the Brains 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; re-

ceiving at the same time Branches from the Larynx, Pharynx, Muscles, and other parts of the Neck; some of the Superficial Lymphatics of the Neck passing down to the Axillary Glands.

Most of these Lymphatics go along with the Internal Jugular Vein and common 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 *Glandulæ 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*, and having received some Branches from the anterior part of the Thorax and Axillary Glands, unite at the bottom of the Neck into a Trunk, and sometimes two, which, in the left side, enter the Thoracic Duct near its termination, and, in the right, go into the Trunk, which forms the general termination of that side.

GENERAL TERMINATION OF THE ABSORBENTS IN THE RIGHT SIDE OF THE NECK.

The Trunk which forms the termination mentioned above, is only from a quarter of an inch to half an inch in length, but its diameter 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, at a little distance from the Angle formed by these two Veins.



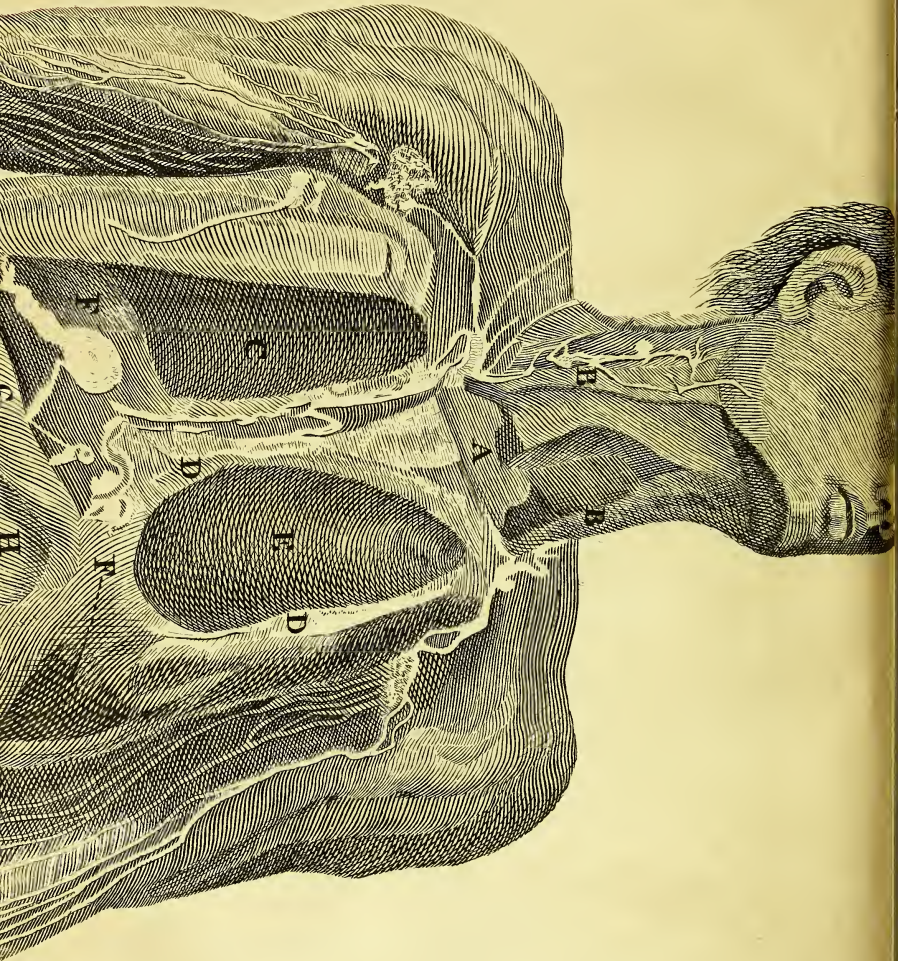


TABLE XXXVI.

GIVES a GENERAL VIEW of the ABSORBENT SYSTEM, after the LYMPHATICS and LACTEALS had been Injected with QUICKSILVER, the BLOOD-VESSELS with WAX, and the PREPARATION dried.

- A, A section of the upper end of the sternum, and of the inner end of the clavicles, which are turned up.
- B, B, The internal jugular veins, between which are represented the muscles, fat, &c. which cover the trachea.
- C, The cavity of the right side of the thorax.
- D, The pericardium cut.
- E, The heart.
- F, F, The convex surface of the diaphragm.
- G, G, A flap formed by the integuments and abdominal muscles turned up.
- H, Part of the liver.
- I, The stomach and part of the colon shrivelled.
- K, K, The descending aorta.
- L, The right common iliac artery.
- M, M, The inferior vena cava.
- N, N, The mesentery and small intestines collected into folds, and turned to the left side.
- O, The cavity of the pelvis.
- P, The pubes.
- Q, R, The spermatic cord and testicle.
- S, S, S, The inguinal glands distended with quicksilver, and in part assuming a cellular appearance.
- T, T, T, Branches of the vena saphena major.

ABSORBENTS.

The course of many of the absorbents represented in

TABLE XXXVI. CONTINUED.

this figure is so obvious, as to supersede the necessity of letters ; viz.

Those upon the upper part of the feet, which take their origin from the toes.

Trunks behind the inner ankles, which ascend from the soles.

Lymphatics from the outside of the feet and ankles, running across the under part of the tibiæ, to the inside of the legs.

The principal lymphatics of the legs, running near the great venæ saphenæ.

Lymphatic trunks, going obliquely across the upper part of the tibiæ, to the inside of the legs.

The course of the principal lymphatics of the legs, running at the inner side of the knees.

A trunk from the inside of the right knee.

The principal lymphatics from the legs, passing along the inside of the thighs.

An irregular plexus formed by the lymphatics, in their course along the inside of the limbs in general.

The inguinal glands, receiving the lymphatics from the inside of the thighs, &c.

In the Right Side:—The inguinal glands, receiving lymphatics which run in a radiated manner from the fore part of the thigh upwards and inwards,—from the outer part of the pelvis inwards, and—from the under end of the superficial parts of the abdomen downwards. Upon the Right Side of the Dorsum Penis:—Two lymphatic trunks, one of which, at the pubes, splits into branches, which terminate partly in the uppermost, and partly in the undermost inguinal glands.

T A B L E XXXVI. CONTINUED.

A few of many lymphatics injected from the testicle, passing along the spermatic cord.

At the Right Side of the Pelvis:—The iliac plexus of lymphatics, formed by trunks which ascend, some of them from the inguinal glands, behind *POUPART'S Ligament*, others from the spermatic cord, through the abdominal rings, and some from the contents of the pelvis, along with the iliac blood-vessels.

At the Bifurcation of the Aorta:—Lymphatics which come up from the surface of the os sacrum.

At the Sides of the Inferior Cava, and over the Aorta :
—The vessels and glands which form the lumbar plexus.

Upon the Mesentery:—A few of many injected lacteals, directing their course towards the beginning of the thoracic duct.

U, Trunks descending from the under part of the liver, and from other viscera situated at the upper part of the abdomen, meeting with the lacteals and lumbar plexus, and terminating at this place in the thoracic duct.

V, A very large lymphatic gland upon the convex surface of the diaphragm, appearing as if formed of convoluted branches.

Large lymphatic vessels entering this gland, which perforate the diaphragm from the right side of the liver.

W, W, Lymphatics and glands placed at the under end of the anterior mediastinum, the vessels passing from the ligamentum hepatis latum, through the fore and middle part of the diaphragm.

X, X, &c. The anterior thoracic plexus of lymphatic vessels and glands, which accompany the internal mammary blood-vessels, receiving the lymphatics from the convex part of the liver and diaphragm; the lym-

T A B L E X X X V I . C O N T I N U E D .

phatics of the right plexus running to the right general termination of the absorbent system, and those of the left plexus to the upper end of the thoracic duct.

Y, A lymphatic trunk from the mamma and adjacent parts of the thorax, entering glands near the axilla.

Upon the Superior Extremities:—An extensive plexus formed by the superficial lymphatics, which pass from the anterior side of the extremity upwards, and receive many branches which ascend in an oblique direction, from the opposite sides of the arm.

At the Axillæ:—The lymphatics of the superior extremities entering the axillary glands.

a, a, Principal trunks proceeding from the glands of the axillæ.

b, The principal trunk of the left arm, terminating along with the thoracic duct.

c, The thoracic duct receiving a lymphatic belonging to the neck, and terminating in the angle formed by the left internal jugular, and left subclavian veins.

In the Right Side of the Neck:—Some of the lymphatic vessels and glands which form the jugular plexus.

d, The general termination of the lymphatic vessels of the right side of the head and neck, right arm, &c. in the angle formed by the right internal jugular, and right subclavian veins.

N. B.—*A much greater number of Absorbents were injected in the Preparation from which this Figure was taken, than are here represented,—none having been drawn excepting what could be distinctly seen, after the Preparation had been kept a considerable time in the dried state, and, of course, many Lymphatics so shrivelled as not to admit of accurate delineation.*

PART VII.

OF

THE NERVES.

1877

THE NEW YORK

OF THE

NERVES IN GENERAL.

THE Nerves are firm, white Cords, which are generally considered as being directly or indirectly 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 a Fœtus, and yet the Nerves retained their usual appearance.

The Nerves which arise directly from the Brain or Spinal Marrow, are sometimes called Primary, and those arising indirectly from these parts, viz. from Plexuses, or from the Substances termed Ganglia, or from the Trunks of larger Nerves, are considered as Secondary.

The greater number of Nerves are composed of se-

veral *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 a Microscope; some Nerves consist of only one Funiculus. No Cavity has been yet observed in the Nerves.

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.

They possess a great degree of strength in consequence of the covering they derive from the *Dura Mater*, but have very little elasticity.

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 the size, as well as strength of the Nerve, 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.

When the Cellular Texture connecting the Fibrillæ of the Nerves is exposed to an Alkaline Solution, it appears like a bundle of hollow Tubes, the Medullary Matter being destroyed. This Substance is now known by the name of *Neurilema*.

If, instead of using an Alkaline Solution, the Nerves be macerated a short time in Muriatic Acid, the *Neurilema* is then dissolved; the Nervous Filaments are at the same time hardened, and may be separated from each other and examined.

The Fibrillæ inclosed in the *Neurilema*, vary in size in different Nerves. They are commonly so much smaller than fine hair, as to require the assistance of a Microscope before they can be distinctly observed.

The *Neurilema* of the Nerves within the Cranium and Spine, is observed to consist of *Pia 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.

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 Ves-

sels and Fibres of Cellular Substance straitening the Nerves.

DR MONRO considered them as Folds or Joints, allowing the Nerves to accommodate themselves to the various states of flexion or extension.

The Nerves are supplied with *Arteries* from the neighbouring Blood-vessels, to which they return corresponding Veins.

The Arteries, however, are small, and are injected with difficulty, excepting in the large Nerves, where they are more considerable, and where, after a minute Injection, the Nerve receives the colour of the Matter injected.

When the Arteries are now examined, they are observed to run into the Nerves at different places, then to go parallel to the Funiculi, and at last to penetrate the Filaments themselves. The Nerves have also their Absorbents; these are, however, but occasionally seen, and then only on the largest Trunks.

Upon dividing the Nerves, they are not found to possess much contractility; while the Arteries, upon being cut, are observed to retract very considerably.

The Trunks of the Nerves are generally lodged in the common Cellular Substance and Fat, and in the Interstices of the Viscera and Muscles, where they are protected from compression; 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 Body, they generally run as straight as is consistent with the nature of the particular part over which they go, and with their own safety.

In their progress, they divide into *Branches*, which separate into others still smaller; and which, when taken collectively, are little different from the size of the Trunks from which they issue.

The Branches generally go off at acute angles; but in several places they have a retrograde direction.

They have commonly the same kind of distribution in the opposite sides of the Body, and vary little in this respect in different Subjects.

In some parts of the Body, several Nerves unite together, and form a *Plexus*; in others, they join into a *Common Trunk*; and in many, a number of Nerves unite together, and form a hard Knot, termed *Ganglion*.

In some parts, a Ganglion is found upon the Trunk of a single Nerve.

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.

The *Ganglia* differ from each other in size and figure: Some of them are little larger than the head of a common-sized pin, while others are upwards of half an inch in one direction or other. They have thicker Coats, are more Vascular, and generally firmer 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 Ner-

vous influence, and which is derived from the Vessels dispersed upon them.

They are composed of Nervous Fibrillæ, inclosed seemingly in Neurilema, and covered by something like a Cineritious Matter, or, according to SCARPA, by a soft Cellular Substance, filled with a greyish and Mucilaginous Matter in emaciated Subjects, and with a yellowish oily matter in those that are fat.

The Nerves are so divided, multiplied, and intermixed in a Ganglion, that each of the Nerves passing out from it, is found to be composed of Fibrillæ derived from the greater parts of the Nerves which enter it.

The Longitudinal Section of a perfectly recent Ganglion, shews the Fibrillæ to pass through it, none seeming to terminate entirely in it, or to take their origin directly from it.

The section of a Ganglion also shews the Fibrillæ to have the same serpentine or zigzag appearance as Nerves have in other parts of the Body.

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, as in some parts of the Sympathetic Nerves, 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 other-

wise accurately examined, they are observed to divide, subdivide, and re-unite, or to intermix somewhat after the same manner of the Fibrillæ in the Plexus, or in the Ganglia, in consequence of which, the danger arising from Accident or Disease is lessened.

The termination of the Nerves in the different Organs, is soft, pulpy, and semi-transparent, at least this is distinctly the case in the Retina of the Eye, and in the Ear; the external covering being then entirely laid aside, while the Pia Mater, in particular, accompanies them throughout.

The Nerves preserve the motion of the Muscular Fibres, and the irritability of the Arteries; promote the circulation in the extremities of these, and their power of secretion. 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 Elastic Matter common to them and many other Substances,—is not yet understood.

DISTRIBUTION OF THE NERVES.

THE NERVES are distinguished into two Classes; one arising from, or connected with, the Brain, termed *Cerebral*, the other from, or connected with, the Spinal

Marrow, termed *Spinal Nerves*, and all similar to their fellows in the opposite side of the Body.

According to the idea of some modern Physiologists, the Nerves, instead of taking their origin from the Brain and Spinal Marrow, as is commonly understood, have their termination there.

The Cerebral Nerves are generally reckoned *Nine* or *Ten Pairs*, besides a particular Pair, which has the name of *Sympathetic*, or by some late Authors they are considered as consisting of only eight pairs, viz.

The Olfactory, the Optic, the common Oculo-Muscular, the Internal Oculo-Muscular, the External Oculo-Muscular, the Trigeminal, the Facial, and the Auditory Nerves.

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 Vertebrae, 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 Pairs of Nerves.

NERVES WHICH PASS THROUGH THE BASE OF THE CRANIUM.

FIRST PAIR.

The FIRST PAIR, or OLFACTORY NERVES, arise, on each side of the Brain, by three separate Striæ, from the Corpora Striata. The Striæ unite into Trunks at the under and back part of the Anterior Lobes, near

where the Carotid Arteries enter the *Fissures of SYLVIVS*.

The Trunks are of a flattened or rather triangular form, with one of the angles upwards, are more tender than the other Nerves, and also differ from them in not being composed of Fasciculi.

They run each in a Furrow, covered by the Tunica Archnoidea, upon the outer Surface of the Anterior Lobes of the Brain, converging a little, and becoming somewhat larger, till they reach the Cribriform Plate of the Ethmoid Bone.

Upon this Plate, each forms an *Oval* or *Pyriiform Bulb*, which is widest anteriorly, and 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 into the Septum, the other upon the Os Spongiosum Superius, 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 that 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.

SECOND PAIR.

The SECOND PAIR, or OPTIC NERVES, which are of great size, arise from the posterior and inferior part of the Thalami Optici, and here they have the name of *Tractus Optici*; or, according to the opinion of some Authors, they have their origin from the Nates and Testes, and are connected in their passage to Tubercles, on the under part of the Thalami, at the root of the Infundibulum, which furnish them with an addition of Medullary Substance.

They are of a Cylindrical form, and 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 the *Tractus Optici* unite, have their Medullary Parts intimately intermixed, and afterwards form the Optic Nerves strictly so called. Some consider the Optic Nerves as taking their origin from the union of the *Tractus Optici*.

From this union they go obliquely outwards and forwards through the Foramina Optica into the Orbits; and advancing now in a waving direction, to prevent them from being overstretched in the motions of the Eye, they perforate the Balls, to be expanded into the Retinæ,—which have been already described.

The Optic Nerves differ from all others in this respect, that they are neither connected with any other Nerves by Branches, nor do they exhibit any Ramifications.

THIRD PAIR.

The THIRD PAIR, or MOTORES OCULORUM, or COMMON OCULO-MUSCULAR NERVES, smaller than the Optics, arise at the under, inner, and back part of the Crura Cerebri, 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 side of the Posterior Clinoid Process, and, running along the upper part of the Cavernous Sinuses, at the outside of the Carotid Arteries, they go through the Foramina Lacera into the Orbits.

Upon entering the Orbits, each of them divides 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 *Ophthalmic*, from which Twigs are sent off, to supply the Ball of the Eye.

FOURTH PAIR.

The FOURTH PAIR, or PATHETIC, or INTERNAL OCULO-MUSCULAR, 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, though this Fasciculus, by coagulation, may be divided into smaller parts.

Each of the Nerves of this Pair arises 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.

It afterwards turns round the Crus Cerebri, and some way behind the entrance of the Third Pair, perforates the Dura Mater at the edge of the Tentorium.

It then runs along the Cavernous Sinus, at the outer side of the Third Nerve, crosses over that Nerve; and passing out of the Cranium through the Foramen Lacerum, it goes obliquely over the Muscles at the upper part of the Orbit, to be entirely dispersed upon the Obliquus Superior vel Trochlearis.

FIFTH PAIR.

The FIFTH PAIR, or TRIFACIAL, or PAR TRIGEMINUM, which are the largest Nerves of the Brain, arise, each by an anterior small and posterior large Portion, from the side of the Tuber Annulare, where the Crura Cerebelli join it.

It is at first of a flat form, and enters the Dura Mater a little below the Tentorium, over the point of the Pars Petrosa of the Temporal Bone, to form a flat Plexus, 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 GASSERIAN.

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-Orbital*, 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 *Supra-Trochlearis*, runs under the Superciliary Ridge to the Upper Eye-lid and Fore-head.

The larger passes through the Foramen Supra-Orbitarium,—or over the Superciliary Ridge when the Foramen is wanting,—sends Branches to the Upper Eye-lid, and divides into several others, which run back, partly above, but chiefly under the Frontalis, 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 Levatores Palpebræ et Oculi ; 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 Anteriorius, re-enters the Cavity of the Cranium, and gets upon the Cribriform Plate of the Ethmoid 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 *Infra-Trochlearis*, 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, 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 the Foramen Opticum, 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 are flat, and run 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 Branches are larger than the rest; the others are 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 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 Nostril, 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 in the Canal leading to the Foramen Palatinum Posterius, and, having passed through the Foramen, runs near the Alveoli with considerable Blood-vessels, and 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 Face.

Small Filaments, which run down into the back part of the Superior Maxillary Bone, and supply the Sub-

stance 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-Orbital 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, and Incisores; and sometimes a Twig, the companion of a small Branch of the Internal Maxillary Artery, to the Membrane lining the Orbit.

The *Infra-Orbital 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 through 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.

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, and other parts of the Cheek.

A Nerve of considerable size, termed *Lingual* or *Gus-*

tatory, which passes between the Pterygoidei, to the inner of which it gives off 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 upon the upper and fore part of the Tongue, but more particularly upon its point, 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 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,

SIXTH PAIR.

The SIXTH PAIR, or ABDUCENTES, or EXTERNAL OCULO-MUSCULAR, arise from the beginning of the Me-

dulla 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 Cells of the Cavernous Sinuses, but so surrounded by Cellular Substance, as to seem to be protected from the Blood of that Receptacle.

While in the Sinus Cavernosi, each is situated between the Ophthalmic Nerve and Carotid Artery, upon the Surface of the latter of which it sends off two or three Filaments, to assist in forming the Great Sympathetic Nerve.

The Trunk of the Sixth Pair afterwards goes through the Foramen Lacerum, to be dispersed entirely upon the Abductor Oculi.

SEVENTH PAIR.

The SEVENTH PAIR is composed on each side of two portions,—the *Portio Mollis*, and the *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 Portio Dura.

The PORTIO DURA, sometimes also called *Sympathe-*

ticus Minor, or *Facial*, arises from that part of the Brain which is common to the Pons VAROLII, [Crus 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 Portionem Duram et Portionem Mollem*.

It comes off by minute Fibrillæ, which soon unite into a Trunk, from the posterior parts of the Pons VAROLII, or from the adjoining parts of the Medulla Oblongata, and is an Accessory Nerve of the Portio Dura.

The Portio Dura, considerably smaller than the Portio Mollis, gets into a *Cul de Sac* of the Meatus Auditorius Internus, and is there lodged in a kind of half-sheath, formed by the Portio Mollis, 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, NERVUS AUDITORIUS, vel NERVUS ACUSTICUS.—The Portio Mollis is formed of two Fasciculi, nearly of equal size, one of which belongs to the Cochlea, the other to the Vestibule and Semicircular Canals.

Each of the 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 upon 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 semi-transparent 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 Vestibule and Semicircular Canals, forms at first a Plexus, then a Gangliform Enlargement, previously to its entrance into the Labyrinth.

The Nerves which belong to the Vestibule 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, vel 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 Holes 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 semi-pellucid, disappear upon the beginning of the Membranaceous Canals.

PORTIO DURA, COMMUNICANS FACIEI, vel NERVUS FACIALIS.—The Portio Dura, or Facial Nerve, separates from the Portio Mollis at the bottom of the Meatus Auditorius Internus, and, by the Anterior Hole in the upper Fossula at the bottom of the Meatus, enters the *Aquæductus FALLOPII*.

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 Stapedius.

A little before its exit from the Aqueduct in an Adult, but at the outer end of it in a 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 soon after it has got out of the Cranium, it joins the Lingual Branch of the Fifth Pair.

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 Digastricus, and another to the Stylo-hyoideus; gives off a Filament which joins the Auricular Branch of the Inferior Maxillary Nerve, and goes to the fore part 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, so as to form a Plexus on the side of the Face.

This Plexus is expanded in such a manner as to constitute what has been called by some, *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, 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, 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.

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 to 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.

EIGHTH PAIR.

The EIGHTH PAIR arise from the Medulla Oblongata, at the outer part of the bases of the Corpora Olivaria, and consist, on each side, of the Nervus Glosso-pharyngeus, and Pars Vaga.

The GLOSSO-PHARYNGEUS is the smallest of the two, being only a little larger than one of the Nerves of the Fourth Pair.

The PARS VAGA, or PNEUMO-GASTRIC NERVE, comes off immediately under the former, and is composed of upwards of a dozen of separate 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 Bones, and are separated from each other, and from the Sinus, by a small Process 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.

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 called *Pharyngeus*, to the Pharynx; and immediately afterwards, a large one, termed *Laryngeus Superior*, 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.

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 Arytenoidei Obliquus et Transversus, and others to the Glandular Membrane of the Epiglottis; while the greater number and the largest 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 the 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.

NINTH PAIR.

THE NINTH PAIR, frequently termed *Linguales*, and sometimes also *Linguales Medii*, and *Hypo-glossal* Nerves, arise from the under and outer part of the Corpora Pyramidalia, on the fore side of the Medulla Oblongata, by numerous Filaments, which are collected into Fasciculi that are placed in a row, one over another in each side.

They gradually converge so as to form two Trunks which pass out at the Superior Condylloid 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 Sub-occipital 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-hyoideus and Sterno-thyroideus; 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-thyroideus, and to the Omo-hyoideus and Sterno-hyoideus.

The Ninth Nerve passes afterwards behind the Facial and Temporal Veins, or the Trunk formed by these, and over the root of the Facial Artery,—sending a Twig to the Hyo-thyroideus.

Upon the Hyo-glossus, the Trunk of the Nerve spreads out into many Branches, which go to the middle of the Tongue, and terminate chiefly in its Fleшы parts; a Twig extending as far as the Genio-hyoideus, and two, or sometimes only one Filament, anastomosing with the Lingual Branch of the Fifth Pair.

GREAT SYMPATHETIC NERVE.

The GREAT SYMPATHETIC NERVE,—obtaining its name from its numerous connexions 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, while in the Carotic Canal, the Branches of the Fifth and Sixth Nerves and Great Sympathetic making this connexion, are pulpy and tender, and form a Plexus which surrounds the Carotid Artery. From this Plexus the Trunk of the Sympathetic is most frequently considered as being sent out.

After escaping from the Carotic Canal, the Trunk, which is here of small size, is closely connected, for a short space, with the Trunks of the Eighth and Ninth Nerves, and, separating from these, it expands into a large Ganglion, termed *Ganglion Cervicale Superius*, of a long oval form, which is 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, and to the inner side of, the Pars Vaga of 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 towards the Larynx, the Sympathetic forms another Ganglion, termed by some Authors *Cervicale Medium*, and by others *Cervicale Inferius*.

The Inferior Cervical Ganglion is somewhat similar in shape and size to the Superior, 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*, vel *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 Sub-occipital Nerve :

One or two Pulpy Nerves, which run forwards behind the Internal Carotid Artery, and divide into many others. These, together with the Filaments from the Glosso-pharyngeus, form a Plexus which sends Branches to the Gangliform 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 Sympathetic Nerve.

From the Superior Ganglion, also, are sent off small Branches, which, uniting with Filaments from the Laryngeus Superior, form the *Ramus Cardiacus Supremus*, vel *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, the Superficial Cardiac 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, to the middle Ganglion of the Great Sympathetic.

From the opposite side of this Ganglion, Branches are sent down, which join and form the *Nervus 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 NERVI ACCESSORII arise by a series of small Filaments from the lateral parts of the Medulla Oblongata and Cervical 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 lowest Filaments are short, and lie close to the Spinal Marrow, those higher extend more outwards,

and become longer. The different threads unite by degrees into their respective Trunks, and while within the Dura Mater, they often have connexions with one or two of the Bundles of the uppermost Spinal Nerves.

The Trunk of each Accessory Nerve passes out 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-mastoideus 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-mastoideus, it is joined by an Arch to the Sub-occipital, 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.

SPINAL MARROW.

THE SPINAL, or VERTEBRAL MARROW, by some termed SPINAL CORD, is the continuation of the Medulla Oblongata, and has the same structure and general appearance with it. It begins directly behind the origin of the Ninth Pair of Nerves, and obtains its name from being contained in the Osseous Canal of the Spine. Its weight is from a twentieth to a twenty-fifth of that of the Brain.

In the Neck, where it sends off the Nerves of the Superior Extremity, it is about half an inch in diameter from one side to the other, and somewhat less from before backwards; in the Back it is a little narrower, and is more of a cylindrical form; in the Loins, where the Great Nerves of the Inferior Extremity are given off, it widens out a little, though not so much as in the Neck, and then gradually tapers to a point below.

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 Vertebrae, 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 of the edge of the Foramen Magnum of the Occipital Bone.

Below the first Vertebra of the Neck, this intimate connexion between the Dura Mater and inner Ligament of the Vertebrae is discontinued; a *Cellular, Fatty,* and *Slimy Substance*, which surrounds the Dura Mater throughout the rest of the Canal, being interposed between that 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 the latter, that, by making a puncture in it, and distending it with Air, it may 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 Medullary. It differs also from the Medulla Oblongata, in containing a smaller proportion of Medullary Matter. CHAUSSIER is of opinion, and this is confirmed by some other Authors, that the Medullary Sub-

stance here is firmer in its consistence, than the same Substance is in any part of the Brain, the Annular Protuberance excepted.

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 Vertebrae.

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 large anterior and small posterior Cord.

The lateral Portions are firmly united together by fine Cellular Substance, but, without lacerating either, may be separated from each other, before as well as behind, 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; or it represents something of a square form, with its opposite sides bent towards each other, and the angles projecting and curved at their extremities.

It is rendered firm by being immersed in Acids, Alcohol, &c.; and, when torn in this state, it has a fibrous appearance.

The Body of the Spinal Marrow descends in a Child to the Twelfth Dorsal, and in an Adult as far as the Second Lumbar Vertebra, and terminates there by

a Conical point, which is concealed by Fasciculi of Nerves.

SPINAL NERVES.

Each of the lateral Portions of the Spinal Marrow sends off from its anterior and posterior parts, a little to the outside of the middle Fissure, flat Fasciculi of Nervous Filaments, in regular succession, which are placed opposite to 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 converge, each into one bundle, and the two bundles perforate the Dura Mater very near each other, a small portion of this Membrane only being between them.

From the inner part of the Dura Mater, each Fasciculus is furnished with a proper Sheath, which is continued along it, and the Sheaths are connected by Cellular Substance only, till they get between the Vertebrae.

Between the anterior and posterior Fasciculi of Spinal Nerves, and between the Tunica Arachnoidea and Pia Mater, a slender 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 has a whitish, semi-transparent, and tendinous appearance, and adheres by Cellular Substance to the

Pia Mater. It sends off from its outer edge about twenty slender Processes, 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 *Ligamenta Denticulata* of the right and left sides, incorporate with the *Pia Mater* at the inferior extremity or conical point of the *Spinal Marrow*, and form a *Ligamentous Filament*, which is continued downwards among the *Nerves* that form the *Cauda Equina*. It 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 is termed by some Authors *Ligamentum Piae Matris*. It is of a whitish colour, of a fibrous nature, and was considered by the Ancients as the *Fortieth Pair* of *Nerves*.

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 of the *Nervous Fibrillæ* 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 Vertebrae, 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 Pair* are most commonly enumerated;—one going under the Head, and termed *Sub-occipital*;—seven passing under the Cervical,—twelve under the Dorsal,—and five under the Lumbar Vertebrae,—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 outwards from their origin to the Intervertebral Holes, or inclining downwards only in a small degree. 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 go still more obliquely downwards, and the inclination gradually increases among the Spinal Nerves, till at length the undermost of them become nearly longitudinal.

The size of the Fasciculi corresponds with that of the Trunks of the Nerves which they 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 three 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 where they pass through between the Vertebrae,—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 in this course the Artery is covered by the Tunica Arachnoidea. It 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 Intercos-

tal, and in the Loins from the Lumbar Arteries ; all of which 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* commonly arise 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 Origins of the Nerves, and Substance of the Vertebrae.

The *Veins* of the Spinal Marrow, like the Arteries, are remarkably small ; they accompany the ramifications of these, and afterwards terminate in the Sinus Venosi of the Spine.

The *Sinus Venosi* consist of one on each side of the Spinal Marrow, which runs exterior to the Dura Mater ; being chiefly lodged in the Cellular Substance, and in the Ligamentous Membrane which lines the fore and lateral parts of the Vertebral Canal.

They extend from the Foramen Magnum of the Oc-

cipital 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 Vertebrae, they are joined 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 Lateral Sinuses, and with the Occipital when present, 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 respect 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.

SUB-OCCIPITAL NERVE.

The SUB-OCCIPITAL NERVE was formerly called *Tenth Nerve of the Head*, and by many at present is termed *First of the Neck*.

It arises from the beginning of the Spinal Marrow by an anterior and posterior Fasciculus, like the rest of the Spinal Nerves; and, like these also, it has its Ganglion, where it passes out between the Bones.

It perforates the Dura Mater immediately under the entrance of the Vertebral Artery, and goes forwards under that Vessel, and over the Transverse Process of the Atlas.

It afterwards appears on the fore part of the Neck, and is connected above by an *Arch* to the root of the Ninth Nerve, and below by a similar Arch to the first Cervical Nerve.

Anteriorly, it is joined by one or two short Branches to the upper Ganglion of the Great Sympathetic Nerve.

It afterwards divides into Branches, which are distributed upon the Recti et Obliqui Capitis, and upon some of the Deep Extensors of the Head.

FIRST CERVICAL NERVE.

The FIRST CERVICAL NERVE comes out between the Atlas and Vertebra Dentata, 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

Gangliform Semi-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 Extensors 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 upon the upper and back part of the Cranium; some of its Filaments anastomosing with others belonging to the First Branch of the Fifth and Portio Dura of the Seventh Pair.

SECOND CERVICAL NERVE.

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 Cervical Nerve.

It sends several Branches to the Sterno-mastoideus, 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 Descens 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 Articulating 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 Articular 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 Extensors of the Neck and Head.

THIRD CERVICAL NERVE.

The THIRD CERVICAL NERVE, after emerging from between the Vertebrae, 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 the 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 Internal, 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.

FOURTH CERVICAL NERVE.

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.

FIFTH, SIXTH, AND SEVENTH CERVICALS, WITH THE FIRST DORSAL NERVE.

The FIFTH CERVICAL is united with the Fourth into a Common Trunk, which, after running a little farther, 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 Fifth, Sixth, and Seventh-Cervicals.

They pass out between the Scalenus Anticus and Medius, and afterwards run between the Subclavius and First Rib, at the outer side of the Subclavian Artery, to the Axilla.

AXILLARY, OR BRACHIAL PLEXUS.

In the Axilla, the Nerves mentioned above separate, unite, and separate again, forming an irregular Plexus, termed *Axillary* or *Brachial*, which surrounds the Axillary Artery.

In the Axillary Plexus, the Nervous Fibrillæ are so intermixed, that each of the Trunks passing out from it, may be considered as being formed of Fibres from most of the Nerves which enter into its composition.

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 *Pectorales*, *Mamma*, and *Integuments*.

The Plexus afterwards divides into Nerves, most of which are remarkably large, to supply the Superior Extremity.—They are as follow :

NERVUS SCAPULARIS.

The SCAPULARIS, which commonly arises from the combination of the Fourth and Fifth Cervicals, 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 that Bone.

It furnishes *Branches* to the Supra-Spinatus, and is ultimately spent upon the Infra-Spinatus.

NERVUS ARTICULARIS.

The ARTICULARIS 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 Circumflex 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 Deltoides.

NERVUS CUTANEUS.

The NERVUS CUTANEUS arises from the Trunk common to the last Cervical and first Dorsal Nerve; but is principally 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.

NERVUS CUTANEUS INTERNUS MINOR OF WRISBERG.

Besides the Nervus Cutaneus, there is another, termed *Cutaneus Minor Internus* of WRISBERG, which, like the rest of the Nerves of the Superior Extremité, takes its origin from the Axillary Plexus; but is more particularly connected with the Ulnar Nerve. It is considerably smaller than 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 upon the Skin of the Elbow.

NERVUS MUSCULO-CUTANEUS.

The MUSCULO-CUTANEUS, called also *Perforans CASSERII*, consists of Fibrillæ from almost all of the Nerves entering the Plexus.

The Cord formed by these Fibrillæ 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 part of the Hand.

NERVUS SPIRALIS.

The SPIRAL, or SPIRAL-MUSCULAR NERVE, is apparently formed by all the Nerves entering into the Axillary Plexus, and, when the Sheaths of the Nerves are slit open, it 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 two of the 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 and the Supinators of the Hand.

At the Head of the Radius, the Trunk of the Nerve divides into two nearly equal-sized Branches,—the *Superficialis* and *Profundus*.

The *Superficialis*, continued almost straight from the Trunk, transmits, first a Branch to the Extensores Ra-

diales and Supinator Longus, and then descends at the inner edge of the Supinator along with the Radial Artery.

A little below the middle of the Radius, it crosses between the Tendons of the Supinator and Extensores Radiales, and is divided into a Volar and Dorsal Branch.

The *Volar Branch*, after sending Twigs to the Annular Ligament, is distributed to the Muscles and Integuments of the Thumb.

The *Dorsal Branch* is again subdivided into numerous other Branches, some of which go to the Muscles in the interval of the Metacarpal Bones of the Thumb and Fore-Finger, a few Filaments being distributed to the Annular Ligament; while principal Branches run, one along each side of the Fore and Mid Finger, and likewise along the Radial side of the Ring Finger.

The *Ramus Profundus*, after sending several Branches to the Extensores Radiales and Supinator Brevis, perforates the latter, and gets to the back part of the Fore-arm.

After quitting the Supinator, it descends under the Extensor Primi Internodii Pollicis and Extensor Digitorum to the Back of the Hand.

In this course, it sends Branches to the different Extensors of the Thumb and Fingers, and at length degenerates into a slender Branch, which, at the Wrist, adheres closely to the Annular Ligament. It has here a Gangliform appearance, and is dispersed, partly upon this Ligament, and partly on the Membranes and Muscles on the back part of the Metacarpus.

NERVUS RADIALIS.

The RADIAL, or MEDIAN NERVE, comes from the middle and lower part of the Plexus. It is formed by Fasciculi from all the Nerves which enter the Plexus, and is nearly of a similar size with the Spinal Nerve.

It descends in the Arm, along the anterior Surface of the Humeral Artery, to which, and to the Deep Veins, it adheres closely by Cellular Substance.

In this course, it does not give off any considerable Branches:—Twigs, however, are sent from it to the Coats of the adjacent Vessels.

At the bending of the Elbow, it slips over the Tendon of the Brachialis Internus, and perforates the back part of the Pronator Teres.

It afterwards descends between the Flexor Radialis and Musculus 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 transmits Branches to the Pronator Teres and Integuments near that Muscle.

In the Flexure of the Arm, it furnishes Branches to the Pronator, Flexor Radialis, and Flexor Sublimis, and an Interosseous Branch, which, in some 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 Fingers.

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 corresponding parts of the Fingers, at the points of which they terminate, by numerous Fibres.

NERVUS ULNARIS.

The ULNAR NERVE, like the former, is of great size, and 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 Ole-

cranon of the Ulna. Here the seat of the Nerve, as well as its course, is sometimes severely felt, after receiving a stroke upon this part of the Elbow.

From this 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 in its course to the Hand.

Under the Axilla, it sometimes receives a Branch from the Spiral Nerve; and from this connexion, 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 end of the Triceps.

Under the bending of the Elbow, a Branch is given out to be dispersed upon the Belly of the Flexor Ulnaris.

Immediately below the former, another Branch is produced, which is distributed 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 Sheath and Coats of that Vessel, 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 Bone and the Flexor Ulnaris, 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 Spinal 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 Nerve* 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 Minimi Digiti, or perforates the Head of the latter, and forms an Arch, which accompanies the Deep Arch of the Arteries, under the Tendons of the Flexors and the Lumbricales.

The Deep Nerve gives—

A Branch to the Abductor Minimi Digiti, 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 Adductor Indicis.

The Nerves on the Palm and corresponding part of the Fingers, like the Arteries, are much larger than those of the opposite side of the Hand.

The Palmar Digital Nerves send off many lateral Branches to the Integuments and other parts of the Fingers, and at their Apices each terminates by a Brush of Fibres.

Between the Branches of the Radial and Ulnar Nerves, different Anastomoses are frequently found; and the same may be observed between the Nerves of the Palmar and Dorsal sides of the Fingers.

NERVI 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 *Cutaneus 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 two 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 concealed by the Pleura, till they are exposed by Dissection.

NERVUS PHRENICUS.

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, and enters the Thorax behind the anterior extremity of the First Rib, between the Subclavian Artery and corresponding Vein.

In the Thorax, it passes first over the root of the Lungs, and then proceeds 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 manner upon the Fleishy sides of that Muscle.

PARS VAGA.

The PARS VAGA, upon approaching the Thorax, sends one, and sometimes two Filaments, termed *Cardiac Nerves*, which join the Cardiac Branch of the Sympathetic, as already observed.

It enters the Thorax between the Subclavian Artery and Vein, and, after giving off the *Recurrent Nerve*, passes behind the root of the Lungs.

NERVUS RECURRENS.

The RECURRENT NERVE 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 parts 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 Gangulia of the Great Sympathetic Nerve; and from the opposite side of its root it sends considerable Branches to join other Nerves of the Eighth Pair, in the formation of the 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 Fibræ 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 on the different Muscles fixed to the Arytenoid Cartilage of the corresponding side.

It has also some connexions, 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.

PULMONARY AND ESOPHAGEAL BRANCHES OF THE
PARS VAGA.

The Pars Vaga, having transmitted the Recurrent Nerve, gives off Filaments, which form connexions 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 Trunk of 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, Nerves are sent off, which form a Plexus, that is dispersed, partly upon the Fleшы Glandular Substance of the Trachea, and partly upon the Esophagus, which it embraces, forming upon it the *Small Esophageal 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 connexions 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 Esophageal Plexus*, which surrounds the Esophagus, 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.

NERVUS SYMPATHETICUS, AND CARDIAC NERVES.

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 HAL-
 LER, 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 also 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 also 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, going 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 the Plexuses have repeated connexions 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.

SYMPATHETIC NERVE CONTINUED.

The Great Sympathetic, having produced the principal Cardiac Nerves, consists of an anterior and posterior part,—the former going over, and the latter under the Subclavian Artery, where they unite into a Trunk, which descends into the Thorax over the Heads of the Ribs.

At the Head of each Rib, it forms a small flat 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 Vertebrae to the Coats of the Aorta.

NERVUS SPLANCHNICUS.

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*, vel *Accessorius*, is generally observed, arising from one or two of the *Dorsal Ganglia*, below the Origin of the *Splanchnicus*, which it joins near its termination,—or runs separate from it into the Abdomen.

NERVI INTERCOSTALES.

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 the *Intercostal Muscles*.

Immediately after getting out from between the *Vertebræ*, each is connected, as already taken notice of, by short Branches to the *Sympathetic Nerve*.

Opposite to this connexion, 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 send off Branches to the *Intercostales*, to the other *Muscles*, and to the *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 send 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 into 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 CHYLO- POIETIC VISCERA.

THE NERVES of the Chylopoietic and Assistant Chylopoietic Viscera are formed by *Branches* of the *Par Vagum*, and by the *Rami Splanchnici* of the *Great Sympathetic Pair*; all of which, like the Blood-vessels, are covered by the Peritoneum, in their course towards the Viscera.

PAR VAGUM.

The PARS VAGA of the *Left Side*, descending from the Great Esophageal 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 connexions 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.

RAMI SPLANCHNICI.

The RAMUS SPLANCHNICUS, and SPLANCHNICUS SECUNDARIUS, have their origins from the Sympathetic, 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 incorporate with the lateral part of the Great Semilunar Ganglion.

SEMILUNAR GANGLION.

The SEMILUNAR GANGLION is formed by the Rami Splanchnici of the Right and Left Sympathetics, with the addition of the Branches of the Eighth Pair.

It is of a long curved shape, with the convex edge undermost, and is composed of many smaller Ganglia, termed *Cæliac*, which are of different sizes, and of irregular forms.

The CÆLIAC GANGLIA are placed over the Aorta, about the roots of the Cæliac and Superior Mesenteric

Arteries, and extend some way upon the Fleishy Pillars of the Diaphragm.

From the Cœliac Ganglia innumerable Nerves issue out 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.

HEPATIC PLEXUS.

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 Plexus, 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 sends Branches to the corresponding parts of the Pancreas, to the small end of the Stomach, and beginning of the Duodenum, and gives origin to the Right Gastro-Epiploic 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 Plexus surrounds the Hepatic Artery and Vena Portæ, and, after sending several Filaments to the Biliary Ducts and Gall-Bladder, follows the Branches of the Blood-vessels through the Substance of the Liver.

SPLENIC PLEXUS.

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.

SUPERIOR MESENTERIC PLEXUS.

The SUPERIOR MESENTERIC PLEXUS forms a Vagina, which surrounds, and in great part conceals, the Trunk to the corresponding Artery.

From this Plexus, numberless Filaments, many of them extremely minute, are produced, 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 the Mesenteric Glands, are distributed to the small Intestines in general, and to the right Portion of the Colon.

The Nerves of the Colon, corresponding with the parts they have to supply, are 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.

INFERIOR MESENTERIC PLEXUS.

From the Aortic Vagina or Plexus, a Process is sent off, termed INFERIOR MESENTERIC 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.

AORTIC AND HYPOGASTRIC 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.

N E R V E S

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*.

RENAL PLEXUS.

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 Plexus, which extend along the corresponding Surfaces of the Renal Artery, accompanying the Branches of that Vessel in 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.

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 Branches to the Rectum, Bladder, and Spermatic Vessels in a Male; and to the Rectum, Bladder, Uterus, and Vagina, in a Female.—The Nerves of the Uterus are proportionally small.—they pass into its Substance at the Cervix Uteri, and follow the course of the Blood-vessels.

NERVI SPERMATICI.

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 or Aortic Plexus, and accompany the Spermatic Blood-vessels in their course through the Abdomen, and afterwards in their descent to the Testicle.

The latter are sent off from a Branch of the second Lumbar Nerve, which, running near the Spermatic Vessels, detaches a Filament, which, in a Male, goes in the Spermatic Cord towards the Testicle, but is more particularly dispersed upon the Cremaster. In a Female, Filaments are reflected from it along the Ligamentum Rotundum to the Uterus.

NERVI PUDICI.

The NERVUS PUDICUS arises in two Fasciculi,—a *Superior* and *Inferior*,—which are formed by Fibrillæ from all the Cords entering into the composition of the Sciatic Nerve.

The Superior Fasciculus consists, more particularly, of 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 go between the Sacro-Sciatic Ligaments, and follow the Pudic Blood-vessels, anastomosing in some places with each other by oblique Filaments.

They send many Branches to the Muscles and other parts about the Anus and Perinœum, 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 this Organ.

The *Nervus Dorsalis*, which is the most considerable Nerve of the Penis, runs forwards between the corresponding Artery and the Vena Magna, expanding into many Branches, which, after supplying the Corpus Caverosum and Teguments of the corresponding side, terminate in the Substance of the Glans.

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 *Lumbar* and *Sacral* Nerves.

NERVUS SYMPATHETICUS.

The SYMPATHETIC NERVE, after reaching the Abdomen, makes a sweep forwards first upon the lateral and then upon the anterior part of the Lumbar Vertebrae, between the Tendinous Crura of the Diaphragm and the Psoas.

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 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 on 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 its fellow 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 between the Bones, communicate with each other. They are also connected with the Sympathetic Nerve by Branches which run over the sides of the Vertebrae, and send large Branches backwards to the Muscles and Integuments on the posterior part of the Loins.

By their connexions with each other, they compose a Plexus termed *Lumbar*, which is situated behind the Psoas. This Plexus 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.

After giving Twigs to the Muscles of the Loins, it detaches a principal Branch, which passes over the Quadratus Lumborum towards the Spine of the Os Ilium, where it sends Branches to the Integuments of the Pelvis, to the upper and outer part of the Thigh, to the under end of the Abdominal Muscles, to the In-

teguments of the Groin, and to the Pubes and Scrotum.

The SECOND LUMBAR perforates the Psoas, to which it gives Branches, and afterwards runs into the Third.

From the Second Lumbar, and partly also from the First, the *Spermaticus Internus* is sent off, which perforates the upper end of the Psoas, and descends near the Spermatic Vessels to the under part of the Abdomen. Near POUPART'S Ligament, and sometimes much higher, it splits into two Branches. In a Male, one of those Branches goes through the Abdominal Rings, to be dispersed upon the Pubes, Spermatic Cord, Scrotum, and Testis. In a Female, this Branch sends Filaments along the Round Ligament to the Uterus; the remaining part going through the Abdominal Rings to the Mons Veneris and Labia Externa.

The other Branch passes out with the Femoral Vessels, and sends Branches to the Inguinal Glands, and to the Integuments of the fore part of the Thigh.

Another Branch is sent from the Second, or from the Second and Third Lumbar, termed *Cutaneus Externus*, which passes behind the Psoas, and across the Iliacus Internus, to the Superior-anterior Spinous Process of the Os Ilium. It afterwards bends over the outer end of POUPART'S Ligament, and descends in the anterior and external part of the Thigh; dividing into Branches, which are chiefly dispersed upon the Integuments covering the Vastus Externus; some Twigs extending as far as the Joint of the Knee.

Branches of the Second, Third, and Fourth Lumbar, form a Nerve of considerable size, called *Obturator* or *Sub-pubial*, which passes between the External

and Internal Iliac Blood-vessels, and along the side of the Pelvis.

NERVUS OBTURATOR.

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 Obturators and Pectineus, it divides into an Anterior and a Posterior Fasciculus; the former dispersed upon the two small Adductors and Gracilis, the latter upon the Adductor Magnus Femoris.

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 Femoral*.

NERVUS CRURALIS.

The CRURAL NERVE, after bestowing Branches upon the Iliacus Internus, and Psoas, passes behind, then at the outside of the Psoas, to get to the Thigh.

In its course from the Abdomen, and at the upper part of the Thigh, it is situated a little to 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, termed *Saphenus*, descending upon the Leg.

The Branches are as follow :

The *Cutaneus Medius*, which descends in the fore part of the Thigh, opposite to the inner edge of the Rectus, and supplies the Integuments near it as far as the Knee, —one Branch of it connecting itself with another of the *Cutaneus Anterior*.

The *Cutaneus Anterior*, more internal than the *Cutaneus Medius*,—which crosses over the middle of the Sartorius, 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 the Skin, 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 also furnish Twigs to the Femoral Blood-vessels.

The *Nervus 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 oblique-

ly 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, or that portion which does not enter into the composition of the Crural, unites with the Fifth into a Trunk which descends into the Pelvis, to assist in the formation of the Sciatic Nerve.

SACRAL NERVES.

The SACRAL NERVES consist of small *Posterior*, and large *Anterior* Trunks.

POSTERIOR SACRAL NERVES.

The POSTERIOR SACRAL NERVES pass out by the Holes in the back part of the Os Sacrum, and are at first concealed by the Ligamentous and Tendinous Expansion which covers that Bone.

After their exit from the Sacral Foramina, they 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 and their Integuments.

ANTERIOR SACRAL NERVES.

Of the Five Anterior Sacrals the two uppermost are the largest; the rest suddenly diminish in size, the last being the smallest of the Spinal Nerves.

The Third is only about half the size of the Second; the Fourth, half the size of the Third; and the Fifth, half the size of the Fourth.

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 SACRAL NERVES.

The FIRST, SECOND, and THIRD SACRALS, join into a Trunk, which receives the common one sent down from the Fourth and Fifth Lumbar, and forms a Plexus which sends out the SCIATIC, the largest Nerve in the Body.

The roots of the Sciatic Nerve give origin to the Fasciculi which compose the Pudic Nerve, formerly described, and also the Gluteal Nerves which are dispersed upon the Muscles of the Hips.

NERVI GLUTEI.

The GLUTEAL NERVES run in two Fasciculi, a Superior, arising immediately from the Trunk formed by the two last Lumbar, and an Inferior, coming off from the two last Lumbar and first Sacral.

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 Pyriformis, to be distributed upon the Gluteus Maximus and Integuments.

The FOURTH *and* FIFTH SACRAL NERVES.

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, passes forwards between the extremity of the Os Sacrum and the beginning of the Os Coccygis. After giving Twigs to the Coccygeus, it perforates the Sacro-Sciatic Ligaments, and terminates in the Muscles and Integuments of the Anus.

NERVUS SCIATICUS.

The SCIATIC, or ISCHIATIC NERVE, passes obliquely through the Notch of the Ilium, under the Pyriformis. 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 *Cutaneus Superior Posterior*, which arises within the Pelvis, and, passing out with the Sciatic, is divided into Branches, some of which are reflected to the Scrotum in a Male, and to the posterior parts of the Labia in a Female ; and in both to the Skin about the Anus and Perinæum.—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, Semi-membranosus, Biceps, and Semi-tendinosus.

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 *Popliteus Externus*, or *Fibular*, and the latter *Popliteus Internus*, or *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.

NERVUS FIBULARIS.

The FIBULAR, termed 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 to 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 descends upon the Gastrocnemius, and, after anastomosing with a Branch of the Tibialis, goes along the outer part of the Leg, and terminates in the Integuments of that 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 part of the Leg.

It sends Branches to the Metatarsus, and 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 connexion with each other, and supply the Extensor Digitorum Brevis.—Some Filaments continued from these Branches run to the 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.

NERVUS TIBIALIS.

The TIBIAL NERVE passes between the Heads of the Gastrocnemius, and, 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.

PLANTAR NERVES.

In the hollow of the Os Calcis, after detaching Branches to the parts adjacent, the Tibial Nerve 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 Adductor 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 each side 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 first, splitting into two, runs to the adjacent sides of the Fourth and Fifth Toes; the second goes to the outer side of the Little Toe; the inner often anastomosing with the 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, Lum-

bricales, 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 do in the Hand.

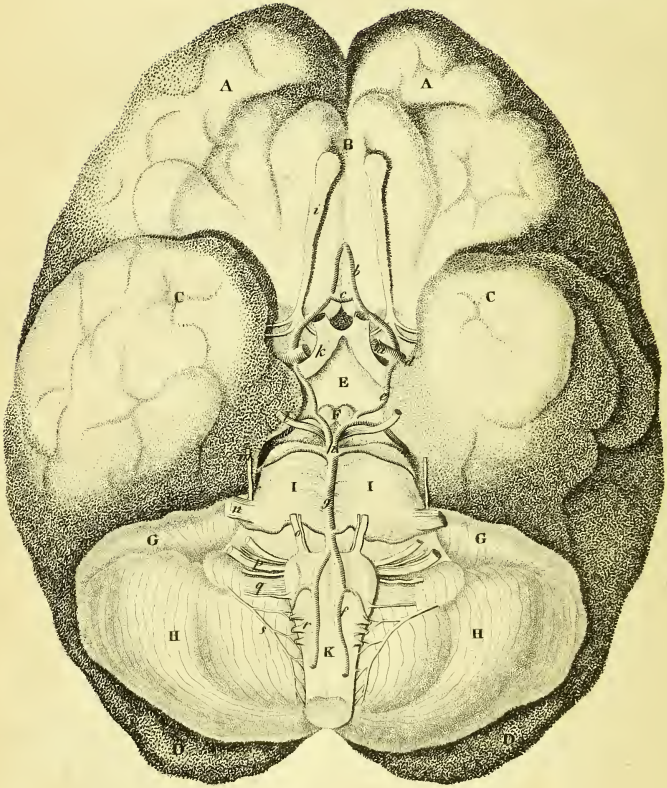


TABLE XXXVII.

A VIEW of the BASE of the BRAIN, and Trunks of its Principal ARTERIES, with the ORIGIN of the NERVES which go through the CRANIUM.—The Arteries are lettered on the one side, and the Nerves on the other.

- A, A, The anterior lobes of the brain.
- B, The division of the anterior lobes.
- C, C, The lateral lobes.
- D, D, The posterior lobes.
- E, The infundibulum, supported upon the union of the optic nerves.
- F, The corpora albicantia.
- G, G, H, H, The cerebellum. G, G, Its superior anterior lobules.
- I, The tuber annulare.
- K, The medulla oblongata, and beginning of the spinal marrow.
- a, A section of the internal carotid artery, after it has entered the cranium.
- b, The anterior branch of the internal carotid, approaching its fellow of the opposite side.
- c, A cross branch, by which the two anterior branches communicate.
- d, The lateral branch of the internal carotid, disappearing in the fossa of SYLVIVS.
- e, The branch by which the internal carotid communicates with a branch of the basilar artery, to form part of the circle of WILLIS.

T A B L E X X X V I I . C O N T I N U E D .

- f*, The vertebral artery, sending branches to the cerebellum and spinal marrow.
- g*, The basilar artery, formed by the union of the vertebral arteries, and sending branches to the tuber annulare, and a large branch on each side to the cerebellum.
- h*, The division of the basilar artery into four branches; the two posterior going chiefly to the cerebellum, and the two anterior, after communicating with the internal carotids, dispersed upon the brain.
- i*, The olfactory, or first pair of nerves, having different roots behind, and a bulbous extremity before.
- k*, The optic nerve, united before the infundibulum to its fellow of the other side.
- l*, The third pair.
- m*, The fourth pair.
- n*, The fifth pair, formed of fasciculi.
- o*, The sixth pair.
- p*, The seventh pair, composed of the portio dura before, and the portio mollis behind; with some small communicating threads between them.
- q*, The eighth pair, formed before of the nervus glosso-pharyngeus, and behind of the par vagum, composed of small fasciculi.
- r*, The ninth pair, arising in fasciculi.
- s*, The accessory nerve of the eighth pair.

Fig. 1.

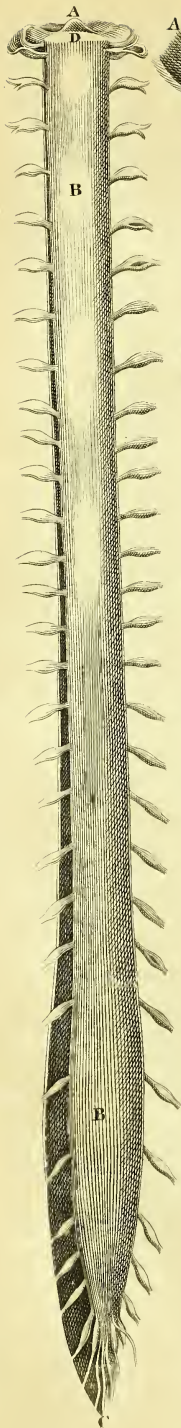


Fig. 2.

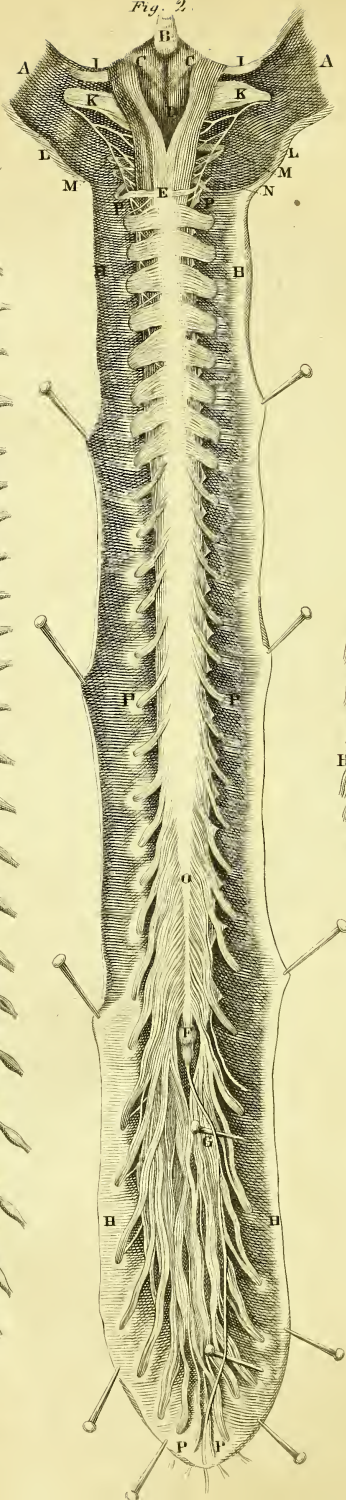
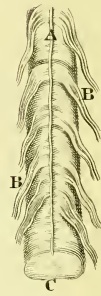


Fig. 3.



T A B L E X X X V I I I .

VIEWS of the SPINAL MARROW.

F I G . 1 .

Presents a Posterior View of the Production of the DURA MATER, investing the SPINAL MARROW and its NERVES ; together with the Direction, Situation, and proportional Size, of the VERTEBRAL NERVES in the SPECUS of the SPINE.

A, A portion of the first vertebra, and the processus dentatus of the second.

B, B, The covering of the spinal marrow, produced from the dura mater, continued from the foramen magnum of the occipital bone to the middle of the os sacrum.

C, A ligament continued from the spinal marrow to the os coccygis.

D, A section of the spinal marrow at its origin.

On each side of the spinal marrow are seen the thirty pair of spinal nerves with their ganglia, also covered with the dura mater.

F I G . 2 .

Gives a Posterior View of Part of the MEDULLA OBLONGATA, and the whole of the SPINAL MARROW produced from it, lying in its natural Situation within the Sheath of the VERTEBRÆ, which is concealed by the Sheath of the DURA MATER being laid open longitudinally, and pinned back.

A, A, Portions of the os petrosum and os occipitis covered with the dura mater.

T A B L E XXXVIII. CONTINUED.

- B, The vermiform process of the cerebellum.
- C, C, Part of the medulla oblongata.
- D, The calamus scriptorius, in the bottom of the fourth ventricle.
- E, The beginning of the spinal marrow.
- F, The termination of the spinal marrow in two little eminences.
- G, A ligament running from the under end of the spinal marrow, through the dura mater, to be fixed to the os coccygis.
- H, H, &c. The dura mater cut and pinned back.
- I, I, The seventh pair of nerves.
- K, K, The eighth pair.
- L, L, The nervus accessorius, arising by different roots from the upper end of the spinal marrow.
- M, M, The ninth pair of nerves.
- N, The upper end of the ligamentum denticulatum of this side, adhering to the dura mater. In the interstices of the spinal nerves the teeth of this ligament are seen inserted into the dura mater, as far as the under end of the spinal marrow.
- O, The under part of the spinal marrow, sending off the nerves which form the cauda equina.
- P, P, &c. The posterior origins of the thirty pair of spinal nerves, and their situation within the dura mater; together with the appearance of the filaments which form them.

T A B L E XXXVIII. CONTINUED.

FIG. 3.

Represents a PORTION of the SPINAL MARROW, taken from the Upper Part of the Back viewed anteriorly.

A, A ligament produced about the pia mater, inserted into the medullary substance.

B, B, The anterior origins of the spinal nerves, formed of fasciculi of filaments.

C, A section of the spinal marrow, shewing the medullary circumference and crucial figure of the cineritious centre.

T A B L E X X X I X .

REPRESENTS the BLOOD-VESSELS and NERVES seen on the Fore Part of the SUPERIOR EXTREMITY. The Figures belong to the Right Side.

F I G. 1.

The ARM of a Young Subject, with the ARTERIES injected, and the MUSCLES dried.

MUSCLES.

- A, The deltoid.
- B, The pectoralis major.
- C, The coraco-brachialis.
- D, The biceps.
- E, The triceps.
- F, The supinator longus.
- G, The extensores carpi radiales.
- H, The pronator teres.
- I, The flexor carpi radialis and palmaris longus pulled towards the radius.
- K, The flexores digitorum sublimis et profundus drawn towards the ulna.
- L, The flexor carpi ulnaris.
- M, The pronator radii quadratus.
- N, The ligamentum carpi annulare.

ARTERIES.

- a*, The axillary artery.
- b*, The subscapularis interna.

Fig. 1.



Fig. 2.

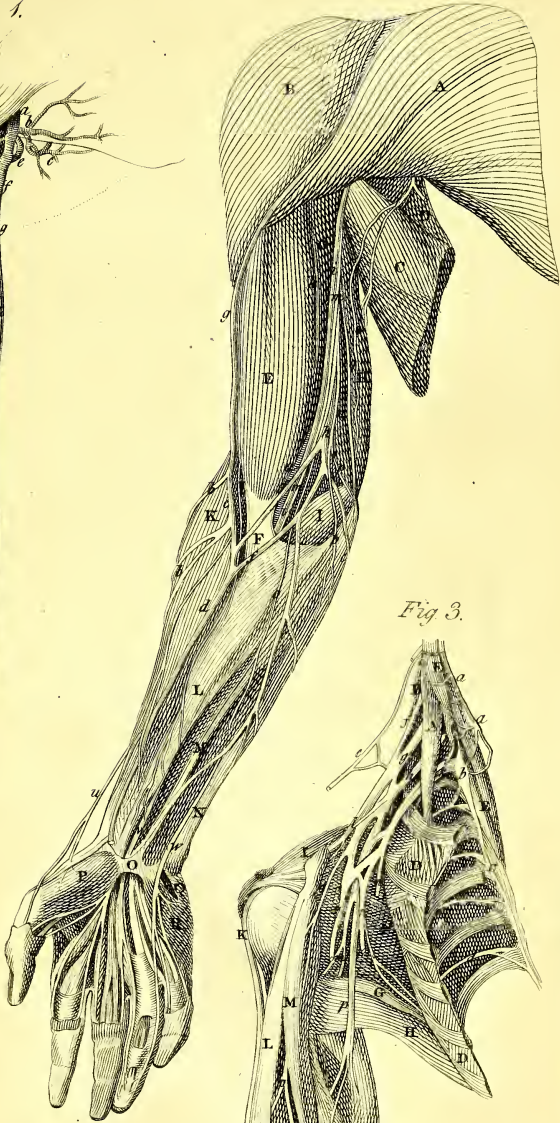
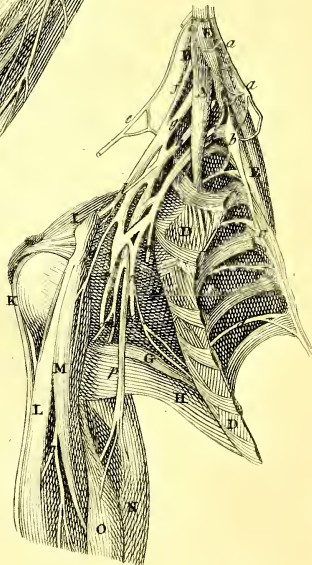


Fig. 3.



T A B L E XXXIX. CONTINUED.

- c*, The dorsalis scapulæ inferior, turning round the under edge of the scapula.
- d*, The circumflexa anterior.
- e*, The circumflexa posterior.
- f, f*, The trunk of the humeral artery, sending branches to the biceps and other muscles of the arm.
- g*, The profunda, or spiralis.
- h*, The profunda minor.
- i*, The ramus anastomoticus magnus.
- k*, The division of the humeral artery into radial and ulnar arteries.
- l*, The radial artery, sending numerous branches to the muscles next the radius.
- m*, The recurrent branch of the radial artery.
- n*, The under end of the radial artery, after giving off the superficial volar branch, turning between the metacarpal bones of the thumb and fore finger, to form,
- o*, The deep arch of the palm.
- p*, The ulnar artery, pulled a little towards the inner side of the arm, to shew the branches it sends to the corresponding muscles.
- q*, The superficial palmar arch, formed by the ulnar artery.
- r*, The deep palmar branch of the ulnar artery, anastomosing with the arcus profundus of the radial artery, behind the tendons of the flexors of the fingers.
- s*, A branch to the inner side of the little finger.
- t, t, t*, The three large digital branches of the ulnar artery, sending branches to the fingers.
- u*, A branch from the conjoined radial and ulnar arteries to the radial side of the fore-finger.

T A B L E XXXIX. CONTINUED.

- v, A similar branch from these arteries to the thumb.
 w, Another branch to the thumb from the ulnar artery.

F I G. 2.

Represents the First Layer of MUSCLES, with the Subcutaneous BLOOD-VESSELS and NERVES of the Superior Extremity.

- A, The pectoralis major.
 B The deltoides covered with cellular membrane.
 C, The latissimus dorsi.
 D, Part of the intercostales.
 E, The biceps flexor cubiti.
 F, The round tendon of the biceps, with its aponeurosis extending to the inside of the fore-arm.
 G, The coraco-brachialis.
 H, The triceps extensor cubiti.
 I, The pronator teres.
 K, The supinator radii longus.
 L, The flexor carpi radialis, and,
 M, The palmaris longus, lying over the flexor digitorum sublimis.
 N, The flexor carpi ulnaris.
 O, The ligamentum carpi annulare.
 P, The abductor pollicis.
 Q, The abductor minimi digiti.
 R, The flexor parvus minimi digiti.
 S, The adductor pollicis.
 T, The abductor indicis.
- Upon the palm of the hand, and corresponding side of the fingers, the tendons of the flexores digitorum ap-

T A B L E X X X I X . C O N T I N U E D .

pear, with the lumbricales, and part of the sheath of the tendons.

B L O O D - V E S S E L S .

- a*, The brachial artery, appearing near the inner edge of the tendon of the biceps, where it may always be felt.
- b, b*, Superficial radial veins passing to the cephalic vein.
- c, c*, Superficial ulnar veins running to the basilic.
- d*, The mediana longa.
- e*, The mediana cephalica.
- f, f*, Two median basilic veins, found in the subject the figure was taken from.
- g*, The vena cephalica.
- h*, The basilica.
- i, i*, Deep humeral veins accompanying the artery.

N E R V E S .

- k*, The musculo-cutaneous.
- l*, The trunk of this nerve getting from behind the biceps, and dividing into branches, which extend along the fore-arm as far as the wrist.
- m, m*, The trunk of the radialis, covering part of the humeral artery.
- n*, The cutaneous.
- o, o*, The branches of the cutaneous passing partly over, and partly under, the cutaneous veins, some of its twigs proceeding as far as the wrist.
- p, p*, Branches of that nerve to the inner and back part of the fore-arm.
- q*, The ulnaris.
- r*, A branch from the second intercostal nerve.
- s*, A branch of that nerve to the inner side of the arm.

T A B L E XXXIX. CONTINUED.

- t*, Another branch of that nerve which gives branches to the mamma.
- u*, The volar branch of the spiral nerve running to the muscles of the thumb.
- v*, The trunk of the radial nerve, passing under the annular ligament of the wrist, and afterwards sending two branches to the thumb, two to the fore-finger, and one branch to the radial side of the ring-finger.
- w*, The trunk of the ulnar nerve, sending branches to the inner side of the palm, and afterwards two branches to the little finger, and one to the ulnar side of the ring finger.

FIG. 3.

Shews the BRACHIAL PLEXUS of NERVES, and the Union of the INTERCOSTALS with the GREAT SYMPATHETIC NERVE.

MUSCLES.

- A, The scalenus anticus.
- B, The scalenus medius.
- C, The scalenus posticus.
- D, D, The intercostales.
- E, E, The longus colli.
- F, The subscapularis.
- G, The teres major.
- H, The latissimus dorsi.
- I, The supra-spinatus.
- K, The long head, and,
- L, The short head of the biceps.
- M, The corāco-brachialis.
- N, The long, and,
- O, The short head of the triceps.

T A B L E X X X I X . C O N T I N U E D .

N E R V E S .

a, a, The trunk and middle cervical ganglion of the great sympathetic nerve, with its connexion to the cervical nerves.

b, The inferior cervical, and first dorsal ganglia of the great sympathetic nerve, conjoined in this figure.

c, The trunk of the great sympathetic nerve within the thorax, with its connexions to the intercostals.

d, The trunk of the fifth intercostal nerve.

e, The trunk of the phrenic nerve, which is here turned aside, arising from, or connected with, the third and fourth cervicals.

f, The fourth,

g, The fifth,

h, The sixth, and,

i, The seventh cervical nerve.

k, The first dorsal nerve, joined to the seventh cervical.

From the four inferior cervical nerves and first dorsal, the *axillary plexus* is formed, which sends off the following nerves to the superior extremity, viz.

l, The scapularis.

m, The articularis.

n, The cut trunk of the cutaneus.

o, o, The musculo-cutaneus, perforating the coracobrachialis muscle.

p, The spiralis.

q, The radialis cut across.

r, The ulnaris also cut across.

s, A branch to the teres major and latissimus dorsi.

T A B L E X L.

SHews the MUSCULAR NERVES of the INFERIOR EX-
TREMITY of the Right Side,

FIG. 1.

*Gives a VIEW of the PRINCIPAL MUSCULAR NERVES
seen on the Fore part of the inferior Extremity.*

- A, The iliacus internus.
- B, The psoas magnus.
- C, The psoas parvus.
- D, The quadratus lumborum.
- E, Part of the gluteus medius.
- F, The gluteus minimus.
- G, The cruralis.
- H, The vastus externus.
- I, The vastus internus.
- K, The tendon of the rectus inserted into the patella.
- L, The pectineus.
- M, The adductor longus femoris, divided to shew the
nervus obturatorius.
- N, The gracilis.
- O, The adductor magnus femoris.
- o, The femoral artery.
- P, The biceps flexor cruris.
- Q, The tendon of the gracilis, inserted into the tibia.
- R, The peroneus longus.
- S, The peroneus brevis.
- T, Part of the fibula.
- U, The tibialis posticus.

Fig. 1.

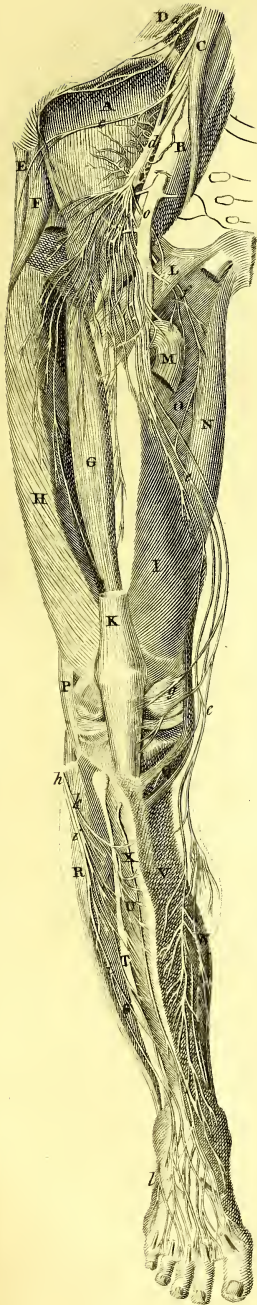


Fig. 2.

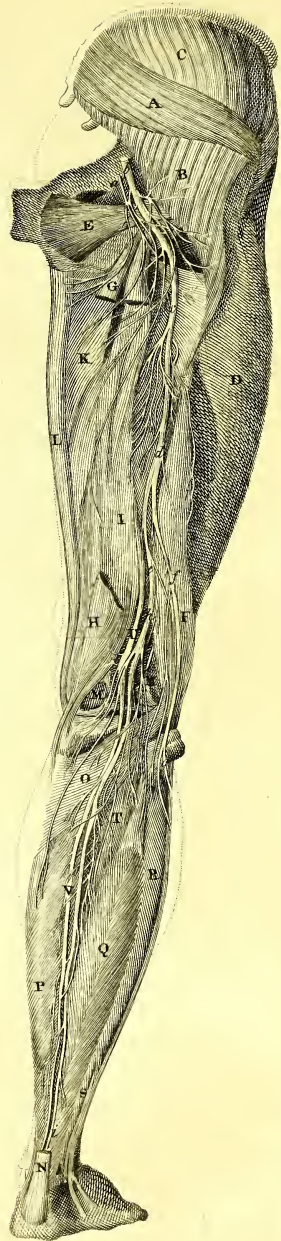
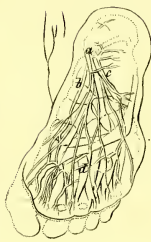


Fig. 3.



T A B L E XL. CONTINUED.

V, The tibia.

W, The soleus.

X, The anterior tibial artery

NERVES.

a, A branch of the first lumbar nerve.

b, A branch of the second lumbar nerve.

c, The external cutaneous nerve.

d, The crural nerve, with its division into the branches which supply the muscles on the fore part of the thigh.

e, e, The nervus saphenus, sent from the crural nerve to the inner parts of the leg.

f, The anterior portion of the obturator nerve.

g, Branches of the crural nerve, terminating upon the knee.

h, The trunk of the fibular nerve.

i, The superficial fibular nerve.

k, The deep fibular nerve.

l, A branch of the tibial nerve to the outer part of the foot.

FIG. 2.

The principal MUSCULAR NERVES seen in the Back Part of the Inferior Extremity.

MUSCLES AND ARTERIES.

A, B, The gluteus maximus. B, Part of the muscle cut from its origin, and turned aside.

C, The gluteus medius.

D, The vastus externus.

E, The obturator internus.

T A B L E XL. CONTINUED.

- F, The biceps flexor cruris.
 G, H, Sections of the semi-tendinosus. Contiguous to
 G, is a section of the long head of the biceps cruris.
 I, The semi-membranosus.
 K, The adductor magnus femoris.
 L, The gracilis.
 M, M₂, The two heads of the gastrocnemius externus.
 N, The tendo Achillis.
 O, The popliteus.
 P, The flexor longus digitorum pedis.
 Q, The flexor longus pollicis pedis.
 R, The peroneus longus.
 S, The peroneus brevis.
 T, The tibialis posticus.
 U, The crural artery.
 V, The posterior tibial artery.

NERVES.

- a*, The posterior-superior cutaneous nerve.
b, The sciatic nerve, passing out of the cavity of the
 pelvis.
c, The trunk of this nerve, sending branches to the
 muscles in the back part of the thigh.
d, The division of the sciatic nerve into,
e, The tibial nerve, and,
f, The fibular nerve.
g, The fibular nerve, dividing into the superficial and
 deep fibular nerves.
h, The tibial nerve, sending branches to the muscles
 in the upper and back part of the leg.
i, The tibial nerve passing to the sole.

T A B L E XL. CONTINUED.

F I G. 3.

- a*, The division of the tibial nerve into external and internal plantar nerves, and these again into several branches.
- b*, The internal plantar artery.
- c*, The external plantar artery.
- d*, The arch formed by the external plantar artery.

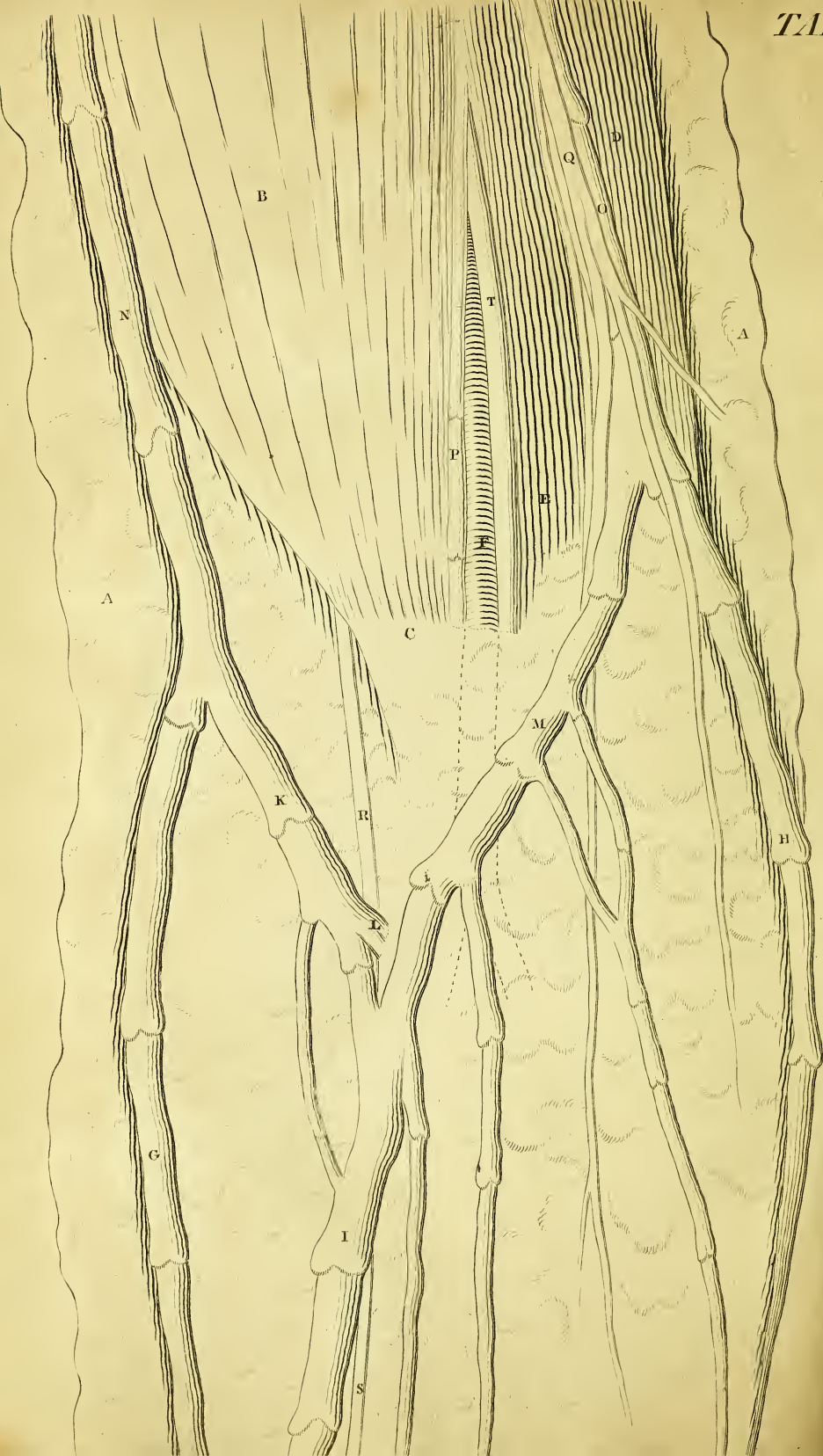


TABLE XLI.

REPRESENTS part of the MUSCLES, with the SUBCUTANEOUS VESSELS and NERVES, on the anterior Part of the RIGHT JOINT of the ELBOW.

- A, A, The integuments cut and reflected from the muscles on the upper arm, and from the fat on the fore arm.
- B, The biceps flexor cubiti.
- C, The tendon of the biceps.
- D, Part of the triceps extensor cubiti.
- E, Part of the brachialis internus.
- F, The humeral artery.
- G, Trunk formed by the deep radial veins.
- H, Trunk formed by the deep ulnar veins.
- I, The vena mediana longa.
- K, The mediana cephalica.
- L, A deep vein in the median cephalic.
- M, The vena mediana basilica, receiving different venæ medianæ longæ minores.
- N, The vena cephalica.
- O, The vena basilica.
- P, A deep humeral vein.
- Q, The nervus cutaneus, dividing into branches, some of which pass over the cutaneous veins, and others under them.
- R, The nervus musculo-cutaneus, passing under the median cephalic vein.
- S, The same nerve descending behind the beginning of the long median vein.

TABLE XLII.

Gives a View of some of the BLOOD-VESSELS of the LIVER, and of the TRUNKS of the BILIARY and PANCREATIC DUCTS.

FIG 1.

Represents the Branches of the VENÆ HEPATICÆ, with their termination in the VENA CAVA.

- a, a, a,* The branches of the venæ hepaticæ, where they arise from those of the vena portæ.
- b,* The vena cava inferior.
- c, c,* The trunks of the venæ hepaticæ, termed *Venæ Cavæ Hepaticæ*.
- d,* The vena cava inferior, near that part where it perforates the diaphragm, receiving the venæ cavæ hepaticæ.
- e,* Part of the right auricle, with the cava terminating in it.

FIG. 2.

Gives a View of the GALL-BLADDER, with the Termination of the BILIARY and PANCREATIC DUCTS.

- a,* The ductus hepaticus, formed by a branch from the right, and one from the left lobe of the liver.
- b,* The fundus.
- c,* The body, and,
- d,* The cervix of the gall-bladder.

Fig. 1.

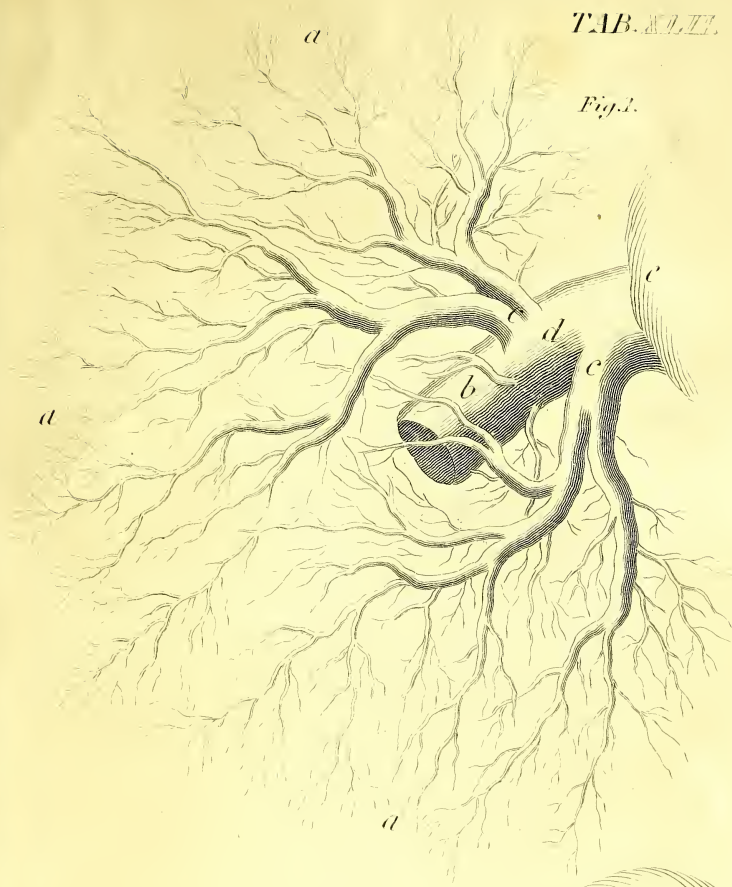


Fig. 2.

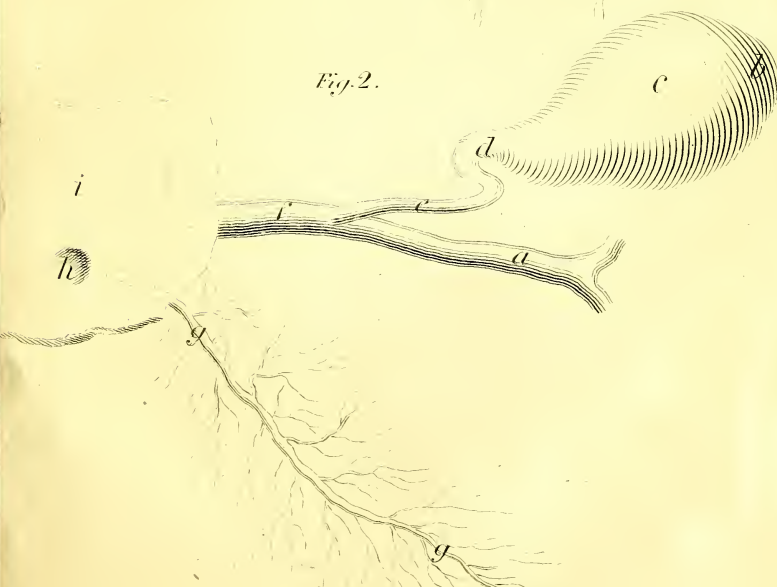


TABLE XLII. CONTINUED.

- e*, The ductus cysticus.
- f*, The ductus communis choledochus.
- g, g*, The trunk and branches of the ductus pancreaticus.
- h*, The termination of the ductus communis choledochus, and ductus pancreaticus, in
- i*, The duodenum, which is slit open.

T A B L E X L I I I .

SHEWS the System of the VENA PORTARUM.

- a*, The trunk formed by the inferior mesenteric, splenic, and some of the gastric veins.
- b, b*, Branches of the superior mesenteric veins, running nearly in straight lines, where they arise from the intestines.
- c, c*, Areolæ, or meshes, of different sizes, formed by these veins.
- d, d*, The trunks of the superior mesenteric veins, joining to form,
- e*, The vena porta abdominalis.
- f*, The vena porta hepatica, where it is about to enter the liver.
- g, g*, The branches of the vena portæ, as they are distributed in the substance of the liver.
- h, h*, The extreme branches of the vena portæ, where they terminate in the venæ hepaticæ.



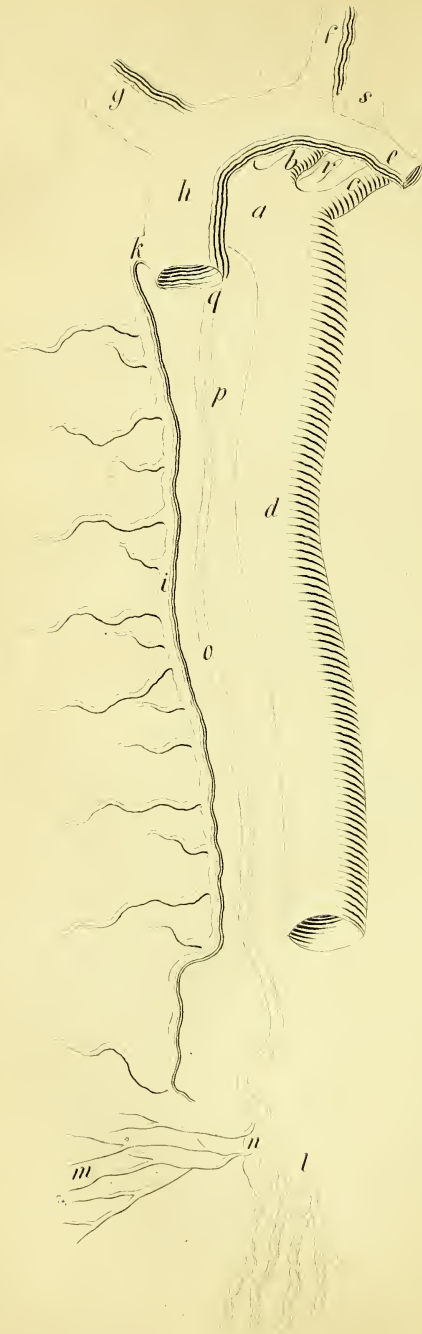


TABLE XLIV.

EXHIBITS Part of the AORTA, with the VENA CAVA
SUPERIOR, VENA AZYGOS, and THORACIC DUCT.

- a*, The arch of the aorta.
- b*, The left carotid, and,
- c*, The left subclavian artery.
- d*, The aorta descendens.
- e*, The left subclavian, and,
- f*, The left internal jugular veins, joining to form the great left subclavian vein.
- g*, The right great subclavian vein.
- h*, The vena cava superior.
- i*, The vena azygos.
- k*, The termination of the vena azygos in the superior vena cava.
- l*, Absorbents of the inferior extremities, pelvis, and loins, and,
- m*, Lacteals entering,
- n*, The receptaculum chyli.
- o*, The thoracic duct.
- p*, A division in this duct.
- q*, The duct passing behind the arch of the aorta.
- r*, Another division of the duct. \
- s*, The termination of the duct in the angle formed by the joining of the left subclavian, and left internal jugular veins.

PART VIII.

OF

THE GLANDS.

THE

REVOLUTION

or

THE GLANDS.

OF THE GLANDS IN GENERAL.

GLANDS are circumscribed organic Substances, of a peculiar appearance and structure, belonging to the soft parts. They are inclosed in proper Membranes, and are destined for altering or secreting particular Fluids from the general mass of Blood, or for making certain changes upon the Fluids absorbed, so as to answer various purposes in the animal economy.

The name has been originally derived from the word *Glans*, a Nut or Acorn, to which some of them bear a sort of resemblance.

Some Glands are placed near the Surface of the Body, as the Cutaneous Glands, the Mammæ, &c. ; others are deep-seated, as the Liver and Pancreas. Some are single, as the Spleen ; others double, as the Kidneys and Testes.

The Glands vary extremely in figure, size, colour, consistence, and office in the same person, and in number and size in different persons; and, though readily known from their appearance, it is difficult to give such a correct definition of them as to include all true Glands, and exclude every other part of the Body.

Some are of a round or oval form, as the Lymphatic Glands, and the Spleen; others are oblong, as the Pancreas; or some are of a triangular shape, as the Renal Glands, &c.

Some are hard and firm, with unequal surfaces, as the Mamma; others soft, loose, and tender, and smooth externally, as the Spleen;—their softness or firmness depending much on the nature of their Cellular texture.

Some are of great size, as the Liver; others remarkably small, as the Ceruminous Glands of the Ear.

Some are of a whitish colour, as the Mamma; or pale-red and yellowish, as the Salivary Glands. Some of a red colour, as the Kidneys and Thyroid Gland; or yellow or brownish, as the Glandula Renalis; or purple, and verging upon black, as the Bronchial Glands.

Glands are composed of Arteries, Veins, Lymphatic Vessels, and Nerves; connected together by Cellular Substance. They are destitute of Flethy or Muscular Fibres, and have little or no Fat.

They have a structure different from that of every other part of the Body.

Some of them are a little Spongy; and when deprived of their Blood, many of them have the appearance of Wool.

With respect to their ultimate structure, different

opinions are entertained ;—the most prevalent are those of MALPIGHI and RUYSCH.

According to the idea of the former Author, Glands contain Acini, the extreme Arteries of which terminate, partly in corresponding Veins, and partly in Corpora Globosa; Cryptæ, or little Follicles, from the opposite sides of which Excretory Ducts are sent out.

In the Mamma, after a minute Injection, the Folliculous appearance is more distinct than in other Glands. In the Liver it is much less so. In the Salivary Glands there is an appearance like the Cells of the Lungs, the Follicles seeming to communicate and to open into Ducts, as the Cells do into the Branches of the Trachea.

According to RUYSCH, the Arteries in the Glands, wonderfully convoluted, terminate, partly in Red Veins and partly in Excretory Ducts, without the intervention of Follicles ; and he asserts, that the Follicles described by MALPIGHI may, by a good Injection, be entirely converted into Vessels, and all of these having a Cylindrical form.

Of the two opinions mentioned above, that of RUYSCH appears to have gained most advocates, though the question is certainly by no means yet sufficiently decided ; nor does it even seem to be more so than when it was at first proposed.

Most of the English Authors consider the Glands to be a composition of Arteries convoluted, or not convoluted, from the extremities, or sides of which, but particularly from the former, the Excretory Ducts are supposed to arise, so as to receive the proper Juices.

The Glands are divided by Authors into different

Classes, according to their Fabric, or to the Liquor they secrete.

The most general division is the original one of SYLVIVS into Conglobate and Conglomerate, the former of a roundish shape, and belonging to the Lymphatic System; the latter formed into Lobes, and these into Lobules, that are composed of still smaller Corpuscles, and the Lobules having proper Ducts, into which the secreted Liquor is discharged; or they are formed of small Corpuscles, or little Kernels, termed Acini, collected into a Mass.

WINSLOW retains this division, but makes a subdivision of the Conglomerate, into Simple and Compound Glands.

MALPIGHI adds what he calls the Simple Glands, or Simple Folliculous Glands, as those in the Fauces, &c.

To the above some add Conglutinate, Congregate, Vesicular, Vascular, and Anonymous.

Some divide them according to the Fluids they discharge, viz. the Lymphatic, Secretary, and Anonymous, which discharge every species of secreting Substance.

Or they are divided, according to their Fabric, into Simple, Conglobate, and Compound or Conglomerate.

The *First* of these consist of hollow Follicles, Mucous Sinuses, or Cylindrical Mucous Fistulæ, inclosed in a proper Membrane, and having no Excretory Duct.

In this Class are included the Mucous Follicles of the Nose, Fauces, Intestines, &c. When these are separate, they are termed *Simplices Solitariae*, and when collected into a group, they are called *Simplices Aggregatae*.

The *Second* Class includes the Conglobate Glands

which belong to the Absorbent System, where the Glands appear first to have got their name.

They are inclosed in a proper Membrane, are Orbicular or Oval, of different sizes, and situated near the Blood-vessels.

They have no proper Duct, but receive the Lymph, and soon discharge it again.

The *Third* Class comprehends those formed of Acini collected into a Mass, or of a Congeries of Lobules and Acini joined within a common Membrane by loose Cellular Substance, which braces them, and allows the Vessels and Nerves to pass between them.

The Acini in some Glands are visible to the naked eye, but in others can only be seen by the aid of a Microscope. When viewed by a good Magnifier, the Acini are observed to be subdivided by Cellular Substance into smaller parts, and these into parts still smaller, till the Eye loses sight of the division.

From the Acini innumerable Excretory Ducts are sent out, which by degrees join into one or more common Tubes, that carry out the Liquor they receive.

To this Class belong the Mucous Glands of the Lips, Palate, and Root of the Tongue ; the Salivary Glands, Pancreas, Liver, and Kidneys ; some of the Glands of the Organs of Generation, as the Testes, Prostate, &c. The Brain, also, may be looked upon as a Gland, and ranked in this division.

Besides these there are Anomalous Glands, Conglomerate in their structure, but destitute of any apparent Excretory Duct. This Class includes the Thyroid, the Thymus, the Renal Glands, and the Spleen.

VESSELS AND NERVES OF GLANDS.

The Arteries of Glands are larger, and more numerous, than in any other part of the Body.

They are derived from those of the adjacent parts, and have their size proportioned to the quantity of Fluids they are destined to secrete;—examples of which are seen in the Kidneys, Testicles, &c.

The Surculi, or Branches of Arteries in Glands, are innumerable. They are formed into Racemi and Pedunculi, as may be seen after Maceration for some time in Water.

The Veins of Glands are destitute of Valves, excepting those from the Testicle, and sometimes also those from the Mamma.

They are fewer in number, but many of them are larger and more lax than in other parts, and may be either larger or smaller than the corresponding Arteries.

The communications between the Arteries and Veins are more remarkable in some Glands than in others. Thus, in the Kidney, an Injection passes with greater facility from the Artery to the Vein than it does in the Brain.

The Absorbents are generally very numerous, and divided into a Superficial and a Deep Set. They are plentifully supplied with Valves, and have many anastomoses with each other, both in the Substance and on the Surface of the Gland.

The Nerves of Glands are rather numerous than large; like the Arteries, they generally go in at a particular part of the Gland. They accompany the Blood-

vessels, but become extremely small before they reach the surface of the part upon which they are spent.

The Excretory Ducts begin by innumerable Branches continued from the Acini, but are at first invisible, being considered to be still smaller than the Arteries which give origin to them;—and smaller also than the Veins, for LEEUENHOECK, by means of his Glasses, could perceive the origins of the one, but was unable to discover those of the other.

They generally unite into larger Branches, and these, in their progress, into still larger, till a Trunk is formed; or they join something in the manner of the Roots of a Tree, as is the case in the Liver, &c.; or they form different Trunks, as in the Mamma and Prostate Gland.

The Excretory Ducts are proportionally of a stronger texture than either the Arteries or the Veins; but in this they vary much among themselves,—some, as the Parotid Duct and Vas Deferens, being thick and strong, —while others, as the Pancreatic, are so thin as to be semi-transparent.

Each is composed of an outer and inner Membrane, and these, in the Ureter, have a Muscular Coat between them; but in other Ducts their Muscularity is not apparent.

The Inner Coat, or lining, probably continued from the Arteries, is a Mucous Membrane, in which, as in the Biliary Ducts, the Mouths of the Mucous Follicles can frequently be distinctly seen.

The Excretory Ducts are straight in some Glands, as the Kidney; tortuous in others, as the Testicle;—or short in some, and long in others, in consequence of

which the Fluids may be transmitted with different degrees of facility.

The Excretory Ducts are destitute of Valves, though in some, as the Cystic Duct of the Liver, there is a Cellular Structure within, which retards the motion of the Secreted Fluids.

The Ducts discharge their contents in consequence of a *Vis a Tergo* from the Heart and Arteries,—of pressure from the surrounding parts,—of the Pulsation of the Arteries near them, to which may probably be added, a small degree of contractility in the Ducts themselves.

Many of the Ducts terminate obliquely, others are surrounded at their termination by a Papilla, both of which circumstances contribute to prevent the return of the Fluids they discharge.

Many of them have Receptacles attached to them, which vary much in size in different parts of the Body. These serve to receive the Fluids from the Ducts, and retain them till an occasion occurs for their being discharged.

The Receptacles are termed *Aperta*, or *Cæca*, according as they possess outlets, or the reverse, for the discharge of the Excretions, and all of them are considered to be lined by a Mucous Membrane.

The Receptacula *Aperta* have orifices by which the Humours are allowed to escape, as in the case of the Bladder of Urine, Gall-bladder, &c.; and these are shut or opened as circumstances may require, and this owing to the irritability of the part,—its mechanical power,—the action of the surrounding Viscera,—the acrimony and quantity of the Fluids contained, &c.

The Receptacula Cæca are shut Sacs, destitute of any visible opening for the discharge of the Excretions, as is the case with the Cavities of the Joints, the only outlet here being the Absorbent Vessels.

LIST OF THE PARTICULAR GLANDS.

In the Cavity of the Cranium.—The Glands of PACCHIONI, upon the Surface of the Dura Mater,—Glo-bular Bodies frequently met with in the Choroid Plexus, sometimes considered as Glands,—Glandula Pinealis,—Glandula Pituitaria.

Upon the Outer part of the Head.—The Temporal, Occipital, and Maxillary Lymphatic Glands.

About the Eye.—The Glandulæ Sebaceæ of the Eye-lids,—Glandula Lacrymalis,—the Caruncula Lacrymalis at the Inner Corner of the Eye.

Glands of the Nose.—Glandulæ Membranæ Pituitariæ, the Glandulæ Sebaceæ of the Integuments of the Nose.

Glands of the Ear.—The Glandulæ Ceruminosæ of the Meatus Auditorius,—the Glandulæ Sebaceæ in the Integuments of the Ear.

Glands of the Mouth.—Glandulæ Parotides,—Maxillares Inferiores,—Linguales,—Buccales,—Molares,—Labiales,—Palatinæ.

Glands of the Fauces.—Amygdalæ, Glandulæ Palatinæ,—Uvulares.

Glands of the Neck.—Glandula Thyroidea,—Glandulæ Jugulares, seu Concatenatæ Colli,—Laryngææ,—Tracheales,—Pharyngææ,—Esophageæ.

Glands of the Thorax.—Glandula Thymus,—

Glandulæ Bronchiales,—the Mammæ,—the Sebaceous Glands of the Areolæ of the Mammæ,—the Lymphatic Glands of the Mammæ, and other parts of the Thorax in general.

Glands of the Abdomen.—The Liver,—Spleen,—Pancreas,—Kidneys,—Renal Glands,—Glandulæ Intestinales,—Mesentericæ,—Lumbares, and various other Conglobate Glands belonging to the Abdominal viscera.

Glands of the Pelvis, and Organs of Generation in a Male.—The Testes,—Glandula Prostata,—COWPER'S Glands,—the Mucous Glands of the Urethra,—the Odoriferous Glands of the Penis,—the Sebaceous Glands of the Skin of the Penis, Scrotum, and Anus,—the Conglobate Glands in the vicinity of the Principal Blood-vessels, as the Iliac, Sacral, &c.

Glands of the Parts of Generation in a Female.—The Ovaria,—the Glands in the Cervix Uteri and in the Vagina,—the Odoriferous Glands of the Labia Externa, Nymphæ, and Clitoris,—the Conglobate Glands in the vicinity of the principal Blood-vessels, as the Iliac, Sacral, &c.

Glands of the Extremities.—The Popliteal,—Inguinal,—Brachial,—and Axillary Conglobate Glands,—and the Axillary and Inguinal Sebaceous Glands.

OF SECRETION.

With respect to the manner in which Glands operate in performing Secretion, Anatomists are entirely ignorant, though much must depend upon the structure of the Organ where the Secretion is made,—the distribu-

tion of the Arteries,—the velocity of the passage of the Fluids,—the Intestine motion,—and the mixture produced.

Secretion has been supposed by some Authors to be owing to the Glands acting as Filters upon certain Fluids which have been considered to pre-exist in the Blood; and this filtering has been thought to depend upon the Diameters of the Vessels or parts through which they pass, or it has been thought to be owing to the action of the Vessels,—or to absorption from Follicles, after the Fluids have been thrown into them,—or to the power of Glands, of converting part of the Blood into these Fluids,—or to a kind of Fermentation in the Fluids themselves, or to several or all of these powers, assisted by a variety of other circumstances;—as the situation of the Glands with respect to the Heart,—the size of the Arteries entering the Glands,—the difference of communication between the Arteries and Veins,—the convolutions of the former,—the number of Branches sent off from them,—the angles they form,—the thickness of their Coats,—their sensibility,—certain chemical attractions, combinations, and decompositions produced, according to the different diameters of the Secreting Vessels, &c.

PART IX.

GENERAL RULES

FOR

DISSECTION.

PART IX

GENERAL PRINCIPLES

DIRECTION

GENERAL RULES

FOR

DISSECTION.

1. **I**N dissecting the different parts of the Body, where there is no great abundance of Subjects, and where a Student means to prepare the whole, or one side only, he ought to begin with those parts which are most liable to putrefaction; as, first the Brain, then the Eye, next the Bowels of the Abdomen and Pelvis; and having finished these, with their adjacent Muscles, the Viscera of the Thorax should next be examined; and, last of all, the Muscles, &c. of the Face, of the Posterior Parts of the Trunk, and of the Superior and Inferior Extremities.

2. He ought not at any time to remove more of the Integuments than is absolutely necessary, as exposure to the Air materially injures the appearance of the parts.

3. The Scalpel should be held somewhat after the manner of a writing pen, with its edge turned obliquely inwards, with respect to the Muscular Fibres, and car-

ried along in the direction of these, so as to separate the Cellular Substance entirely from them, and render their Surface perfectly distinct.

4. In dissecting the Muscles, they ought to be laid in the position which puts the Fibres most upon the stretch.

5. When a Muscle is to be raised to show others deeper seated, it should always be cut from within a little of its origin, to allow it afterwards, if necessary, to be replaced.

6. The Cellular Substance ought, in general, to be removed entirely away, along with the Integuments; though, in certain parts of the Body, it may be better to clear away the Integuments by themselves, so as to prepare for the nicer parts of the Dissection.

7. In removing the Cellular Matter by itself, attention should be paid to the keeping of it as much as possible in an entire web, as time is lost in removing it in patches.

8. When the Muscles are covered by Tendinous Fasciæ, the Surface of the latter ought to be first examined. They should next be raised, to allow the Muscles, &c. which they cover, to be properly dissected.

9. In dissecting a first Subject, the Blood-vessels ought not to be injected, for the parts have a more natural appearance when free from the Injection. The Trunks only of the Vessels and Nerves should in this case be examined, reserving the minuter Ramifications of these to be dissected in a Subject well injected, and dedicated to that purpose.

10. In the various Dissections, attention should be

paid to the performance of the different Surgical operations, and to the proper application of Bandages; besides, the Dissector ought to familiarize himself to the introduction of Probes into the Lacrymal Passages, —of a Probang into the Throat, —of a Tube into the Nose or Mouth, so as to conduct a Ligature into the Pharynx for the extirpation of Polypi, &c.—or of Forceps there, for the extraction of Substances sticking in the Throat, —to the throwing of Air into the Lungs, as in cases of drowning, —or Fluids into the Stomach, as in Palsy, or Stricture of the Esophagus, —to the extracting of Extraneous Bodies occasionally found in the Meatus Auditorius Externus, —to the best method of introducing the Sound or the Catheter into the Bladder, —to the administering of an Injection by the Anus, without endangering the Bladder or Rectum, —to examining, by means of the Finger, the state of the Prostate Gland in a Male, or of the Mouth of the Uterus in a Female, —to the extracting of Substances fixed in the Urethra, or growing in the Vagina, —to the taking up of the principal Arteries, as in cases of puncture, or of aneurism; —and, after dissecting the Muscles, he ought to attend to the different kinds of dislocations.

DISSECTION OF THE UPPER PART OF THE HEAD, AND OF THE INTEGUMENTS IN GENERAL.

Previously to the examination of the Brain, the soft parts covering the Skull-Cap ought to be examined. For this purpose,

Cut the Skin from the root of one Ear, to that of the other, across the upper part of the Head, and invert

the flaps; or an incision may be made from the root of the Nose to the middle of the Occiput; or it may be done in a crucial direction.

In raising the Integuments, guard against dividing the Occipito-frontalis, which forms a close connexion with the Skin. After exposing the whole of this Muscle, introduce a probe under it, before and behind, to shew the thickness, or rather thinness, of its fleshy Substance.—See Vol. I. p. 181. Tab. V. VIII.

Right Side.—Dissect the Attollens Aurem, and shew at its sides a portion of the Aponeurosis of the Temporal Muscle; shew also the anterior and posterior Auris.—See Vol. I. p. 184. Tab. V. VIII.

Left Side.—Dissect, then turn down, the Attollens Aurem, to expose the whole surface of the Aponeurosis Temporalis.—See Vol. I. p. 184.

Turn down next, the Aponeurosis, and observe part of the Temporal Muscle taking its origin from the inner side of it.

Examine the surface of the Temporal Muscle,—Vol. I. p. 184,—and trace its course under the Zygoma, where a probe can be pushed down, shewing the course which purulent Matter has sometimes taken into the Substance of the Cheek.

Cut the Tendon of the Occipito-frontalis across, and bring it forwards, to exhibit the Pericranium. Raise part of the Pericranium, to shew its connexion with the surface of the Bones. Raise the insertion of the Occipito-frontalis, and expose the Corrugator Supercilii.—Vol. I. p. 182. Tab. V. Fig. 2.

Cut a piece of the Integuments, a few inches square, from the Crown of the Head, from the Nates, and from

the Sole of the Foot. Examine these first, without any preparation. After this stretch and pin them to a board, then plunge them for a short time into boiling water, till the Cuticle can be separated from the parts underneath, so as to admit of their farther examination.

—See Vol. II. p. 3.

DISSECTION OF THE BRAIN AND ITS MEMBRANES.

Vol. II. p. 17. Tab. XVIII. &c.

Turn down the Muscles on each side of the Head, and scrape the Pericranium opposite to the greatest circumference of the Skull, to make way for the Saw.

Saw the Cranium round, about a finger's breadth above the Orbits and lateral Sinuses, and continue the operation, till, by a few slight strokes with a Chisel and Mallet, the Bone can be divided, which will save the Dura Mater from being injured, and of course will leave the Brain entire.

Raise the Skull-Cap from the Dura Mater, which requires considerable force, on account of their close adhesion to each other.

Lay the Body on its Breast, and support the Chin, to allow the Dura Mater to be properly divided.

Cut the Dura Mater near to, and parallel with, the left side of the Superior Longitudinal Sinus. On the right side cut the Membrane where the Cranium has been sawed, then divide both sides of the Tentorium, near the Lateral Sinuses, to allow the Brain to be removed from the Head.

The Subject ought now to be turned upon its Back, and the Falx cut from the Crista Galli, if the Brain is

to be examined out of the Cranium, otherwise the Body may remain in the same situation.

If the Brain is to be removed, the Cerebrum, Cerebellum, Tuber Annulare, and Medulla Oblongata, are to be taken out in one piece, after dividing the Bloodvessels and Nerves; beginning the division of these at the fore part of the Head.

Cut the Internal Carotid Arteries, Infundibulum, and Nerves, close to the Skull, to allow these to be properly examined. Divide the Vertebral Arteries, and the Medulla Oblongata, as deep in the Spinal Canal as the Scalpel can reach.

After removing the Brain from the Head, examine the nature of the Dura Mater, and the different Processes into which it is divided.—Vol. II. p. 19.—Attend next to the four large Sinuses of this Membrane, and slit them open, to shew their size, situation, and course.—Vol. II. p. 22.

Take next a view of the different parts on the outer Surface of the Brain, and of the two inner Membranes which cover it.—Vol. II. p. 23.

Previously to cutting into the Brain, it may be proper to examine the parts seen on its under Surface, the general course of the Trunks of the Arteries, and origin of the Cerebral Nerves.—See Vol. II. p. 40.

After becoming acquainted with the under part of the Brain, lay it on its Base to shew its upper Surface, and trace its different parts, as described Vol. II. p. 24. &c.

Having examined the Hemispheres, Lobes, and Circumvolutions of the Brain, separate the two Hemi-

spheres from each other by means of the Fingers, after which the Corpus Callosum will be brought into view.

An incision is next to be made horizontally, upon a level with the Corpus Callosum, to shew the Centrum Ovale, and the Cortical and Medullary Substance of the Brain.

Cut next longitudinally through the Corpus Callosum at the sides of its Raphè, by which the Lateral Ventricles will be seen.

After examining the different parts of the Lateral Ventricles, the Fornix is to be divided transversely, near its anterior Extremity, and the Crura reflected in opposite directions, to get a view of the Tela Choroidea.

Detach next the Choroid Web, and divide the Commissura Thalami Optici, to shew the Third Ventricle, the Pineal Gland, with the Tubercula Quadrigemina.

Having seen these, introduce a probe under the latter, and cut upon it in a vertical direction, through the Cerebellum, to shew the Substance of this, and the situation of the Fourth Ventricle.

DISSECTION OF THE EYE AND ITS APPENDAGES.—

See Vol. II. p. 47. Tab. XXI.

Dissect the Orbicularis Palpebrarum, and lay in view the Inferior Oblique Muscle, by cutting in at the under edge of the Orbicularis.

Open the Lacrymal Sac below the Tendon of the Orbicularis, which, while it shews the situation of this Passage, will point out the place where the operation for Fistula Lacrymalis ought to be performed.

Cut off the Supra-orbital Plate of Bone, observe the

thinness of the Partition between the Eye and the Brain, and dissect the different Muscles in the Orbit ;—attend to the large quantity of soft Fat surrounding the Muscles.

Lay in view the Lacrymal Gland, and shew the situation of the Optic Nerve.—Vol. II. Tab. XXI.

Next remove the Eye-lids and Orbicularis from the edges of the Orbit, then separate the Levator Palpebræ, and all the other Muscles within the Orbit, with the Lacrymal Gland, the Tunica Conjunctiva, Eye-lids, and Lacrymal Sac, from the Ball of the Eye.

Put Wires into the Puncta Lacrymalia, and pass them into the Lacrymal Sac.

Cut upon one of the Wires, to shew the size of the Lacrymal Passages.

Introduce a Probe, bent near its point, from the Nose upwards, into the Lacrymal Sac.

Shew the Lacrymal Gland, and Chain of Glands from it.

Dissect the inner Lining from the Eye-lids to expose the Glandulæ Sebaceæ.

Pin down the sides of the Eye-ball to a wooden Plate, to allow the different Coats, Humours, &c. to be exposed.

Slit open the Dura Mater of the Optic Nerve, and afterwards divide the Sclerotic Coat, longitudinally, from the insertion of the Nerve to the edge of the Cornea.

A little behind the edge of the Cornea, cut the Sclerotic half round, and turn its Flaps in a lateral direction.

Cut the Choroid Coat also longitudinally, and reflect it to each side, to shew the Retina.

Divide the Cornea across its middle, from behind forwards; separate it also at its root, in such a manner as to allow the section to be turned forwards, that the Iris and Pupil may be examined.

Attend to the different Humours, first in their natural situation, and afterwards when turned out of their places.

DISSECTION OF THE MUSCLES SITUATED ON THE ANTERIOR AND LATERAL PARTS OF THE ABDOMEN.

—Vol. I. p. 210. Tab. IX. X.

In dissecting the Muscles situated on the Anterior and Lateral Parts of the Abdomen, an incision should be made through the Integuments, from the under end of the Sternum to the Umbilicus, and from it to the Superior-anterior Spinous Process of each Os Ilium. The three Flaps of the Skin thus formed are to be reflected, the inferior to conceal the Pubes, and the lateral to go over the sides of the Abdomen and Thorax, till a hand-breadth of the under part of the latter is exposed.

When less attention is required, the cut may be made at once from the Sternum to the Pubes, and this may be crossed by another at the Umbilicus, and the Integuments afterwards turned aside, to make way for the nicer parts of the dissection.

Lay in view first the Superficial Fascia described in Vol. I. p. 210. The others may be reserved for the dissection of the Thigh.

Clean the Obliquus Externus, which is done with difficulty, on account of the close connexion with the

Cellular Substance, which in former times was considered here as part of the Tunica Propria Musculorum. Then shew the Digitations of this Muscle, and their intermixing with those of the Serratus Magnus.

Dissect the Ring of the External Oblique Muscle, and the Passage through it; the top of the Spermatic Cord in a Male, or the insertion of the Round Ligament of the Uterus in a Female.

Cut the External Oblique Muscle within an inch of its origins, except at the Crural Arch, where the Tendon of the Muscle ought to be divided some way above the external Abdominal Ring. After cutting the Muscle, raise and turn it forwards as far as the Linea Semilunaris.

Clean next the surface of the Internal Oblique Muscle, and turn it also forwards from its origins, till where its Tendon joins that of the External Oblique.

Dissect also the Surface of the Transversalis, leaving the Muscle itself entire, excepting where a small cut ought to be made into it, to expose a part of the Peritoneum.

Replace the two Oblique Muscles, then cut the edge of the Linea Alba through its whole length, and turn back the anterior part of the Sheath of the Rectus, which requires attention, on account of the adhesions of the Lineæ Transversales.—Vol. I. p. 221.

Raise the Rectus, to shew the posterior Layer of the Sheath, the under end of the Tendon of the Transversalis, and the surface of the Peritoneum, at the lower part of the Abdomen.

DISSECTION OF THE LIGAMENTS ON THE ANTERIOR
SURFACE OF THE PERITONEUM.

To shew these Ligaments, mentioned in Vol. II. p. 212, make an incision through the Parietes of the Abdomen, in the same direction with that in the Integuments; but leave the Peritoneum entire, to allow them to be examined. They are seen projecting on the outer side of the Peritoneum, and intermixing at the Umbilicus with the Tendinous Fibres of the Linea Alba.

After examining the Ligaments, puncture the Peritoneum near the Umbilicus, then divide it carefully, so as to allow the Parietes of the Abdomen to be raised and turned back without wounding the Intestines.

DISSECTION OF THE CHYLOPOIETIC AND ASSISTANT
CHYLOPOIETIC VISCERA.

Previously to the disturbing of the Viscera, observe their general situation in the Abdomen—Vol. II. Tab. XXVII. ;—the smooth shining appearance of the Peritoneum; its rough external surface; and the manner in which it lines the Abdomen, and covers its contents.

Attend next to the situation of the Lobes and Ligaments of the Liver,—Vol. II. p. 240,—the Capsule of GLISSON, and Foramen of WINSLOW, with the extent and connexions of the two Omenta.—Vol. II. p. 228.

Trace after this, the situation and course of the Stomach and different Intestines; the small Guts occupying the middle of the Abdomen, and the Colon surrounding them.—Vol. II. p. 212. Tab. XXVI.

Observe the nature of the Mesentery, the manner in which the Intestines are inclosed in it, and its attachments to the Spine.—See Vol. II. p. 226.

The Spleen is to be examined by pulling the Stomach towards the right side ;—when the one Viscus will follow the other, the Pancreas is to be seen by tearing through the Great Omentum between the large Curve of the Stomach and Arch of the Colon.

Before farther Dissection, make a puncture into the end of the Duodenum, and inflate the Stomach and all the Intestines, to shew their size and inverted Conical form.

Remove next the Small and Great Intestines for Dissection, excepting the Duodenum and Rectum, which are to be left in their places.

Separate the Mesentery, and then distend with Air about six inches of the upper end of the Jejunum, and under end of the Ilium, to allow their relative diameters to be compared ; but leave about a hand-breadth of the under end of the Ilium attached to the Cæcum.

Invert a piece at the top of the Jejunum, and under end of the Ilium, to shew the difference with respect to the Valvulæ Conniventes.

From a piece at the upper part of the Jejunum, cut the Mesentery, invert the Gut, tie up one end, and blow Air forcibly into the other, till the Villous Coat is inflated.

Hang up in a Jar of clear Water a piece of the Jejunum inverted and washed, to shew the Valvulæ Conniventes. In another piece, raise the Peritoneal from the Muscular Coat, and that from the Cellular, then

invert a piece, and scrape off the villous Coat, by which the inside of the Cellular one will again appear.

Cut a large portion of the Mesentery and small Intestines from the Spine; spread them out, raise one Layer of the Mesentery, and examine the Lacteal Glands.

Take out the Intestinum Cæcum, with the remaining portion of the Ilium. Lay open the Cæcum longitudinally at the fore part, and examine the Valve of the Colon; then scrape off the Villous Coat from one side of the Valve, to shew the Muscular Coat projecting into the Cavity of the Cæcum.

Slit open the Appendix Vermiformis, and put a Probe into it, and another into the Valve of the Colon, and observe their distance and situation.

Separate from its connexions, then inflate, a Portion of the Arch of the Colon, to shew its shape and general appearance; after which cut cautiously across the three Ligamento-muscular bands, that their effect on the length of the Gut may be seen.

Invert and inflate another Portion, to allow its Internal Surface to be examined.

Raise one Layer of the Mesocolon, and trace it over the Gut, to shew that it assists in the formation of the Omentum.

Dissect the Mesocolic Glands, then raise the different Coats of the Intestine from each other.

Blow up the Sigmoid Flexure, to shew the three Muscular Bands expanding and giving a general covering to the Rectum.

Introduce Air into the cut end of the Duodenum, till it and the Stomach are moderately distended, which

will give a more complete view than formerly of the situation of these Viscera ; or try to make this inflation by blowing Air through a slightly curved Tube, introduced by the Mouth into the Esophagus, after putting a Ligature round the Duodenum.

While the Duodenum is distended, make a cut longitudinally through the fore part of its second Curvature, to shew the termination of the Biliary Ducts.

Examine next more distinctly, the situation and External Parts of the Liver, Spleen, and Pancreas ; then remove them, with the Stomach and Duodenum, from the Body, for farther Dissection, by dividing the Cardia, and the different Ligaments, Blood-vessels, &c. which form the Adhesions.

Dissect the different Coats of the Stomach, and a band of Muscular Fibres which runs along its Small Curvature ;—trace the Lymphatic Glands on both Curvatures ;—split open the Stomach, to allow its Inner Coat and Rugæ to be seen ; dissect also the Sphincter Muscle of the Pylorus.

Expose the Trunks of the different Vessels, and the Lymphatic Glands, &c. in the Capsule of GLISSON.

Introduce a Probe by the Mouth of the Ductus Choledochus in the Duodenum, and pass it into the Hepatic Duct,—then slit open the Biliary Tubes as far as their exit from the Liver and Gall-bladder, and attend to their structure.

Peel off a portion of the Tunica Propria Hepatis, and examine the substance of the Liver. Distend the Gall-bladder, separate its Coats from each other, then lay it open and attend to the Rugæ, &c.

Endeavour to separate the two original Coats of the

Spleen from each other ; attend to its structure, and to its Lymphatic Glands.—Vol. II. p. 253.

Dissect the Pancreas, and Pancreas Minus.—Vol. II. p. 257.—Cut along the anterior Surface of the former, and expose the Pancreatic Duct ;—then introduce a Probe into the Duct from its termination in the Duodenum ; or, if this be found impracticable, make a Puncture into it, and convey the Probe into the Duodenum.—Shew the termination of the Duct of the Pancreas Minus, in that of the Pancreas Majus.

DISSECTION OF THE ORGANS OF URINE AND GENERATION IN A MALE.—Vol. II. p. 261. Tab. XXX.

Dissect the Peritoneum from the Diaphragm, and also from the Parietes of the Abdomen, and examine the Muscles there.

Remove the Tunica Adiposa from the fore part of the Kidneys, and examine their situation, shape, size, and general appearance, and the course of their Vessels.—Vol. II. Tab. XXVIII.

Attend to the Capsula Renalis at the top of the Kidney ;—trace the course of the Ureters from the Kidneys to the Bladder ;—then make a puncture in one of them, and inflate the Bladder and Pelvis of the Kidney.

Remove the Kidneys and Renal Glands from the Body, with a considerable portion of the upper end of the Ureters. Cut open one of the Renal Glands, to shew its structure.

Separate the proper Membrane from part of one of the Kidneys, and examine the Surface of the latter ;—then make an incision, by means of a long thin Scalpel,

from the outer edge of the Kidney towards its Pelvis, to shew the internal structure. In the other Kidney, slit open the Pelvis, by making an incision from the inner towards the outer part, to allow the Papillæ, &c. to be more fully examined.

Introduce a Quill into one of the Ureters, and dissect its different Coats.

Dissect the Muscles situated in the back part of the Abdomen. Attend to the different Fasciæ,—Vol. I. p. 218,—and to the course of the Aorta and Vena Cava.

Trace, next, the Spermatic Blood-vessels in the Abdomen, and the structure of the Internal Abdominal Ring.—Vol. I. p. 220.

Shew the origin of the Cremaster Muscle, and lay bare the Spermatic Cord. Introduce a Blow-pipe into the Sheath of the Cord, and inflate it, to shew the original Peritoneal Coat now shrivelled into Cellular Substance.

Cut open the Scrotum, at the side of the Raphè; make a puncture in the Vaginal Coat, and blow it up, to shew its extent; next lay it open anteriorly, to let the Tunica Albuginea be seen, and divide the latter, to allow the Substance of the Testicle to be examined.

Attend to the situation of the Epididymis, and trace the Vas Deferens from it through the Abdominal Rings to the Vesicula Seminalis.

Shew the Muscles and other parts about the Anus and Perineum, for which purpose the Body ought to be secured in the same manner as is done in the Lateral Operation of Lithotomy.

An incision is now to be made at the Left Side of the Perineum along the Crura of the Os Pubis and Is-

chium, first through the common Integuments, then through the Cellular Substance, Fat, and Tendinous Expansions, to shew the Muscles, &c.

Upon laying the Muscles fully in view, the Bladder may be distended with Air, a Staff introduced, and a Ligature tied round the Penis, to prevent the Air from escaping.

After dissecting the Muscles, and attending to the parts cut in the Lateral Operation of Lithotomy, the *Transversalis Perinei* and *Accelerator Urinæ* may be raised from their Origins, and left suspended by their insertions.

In the deep parts, shew the *Levator Ani*, Neck and parts of the Body of the Bladder, Prostate Gland, *Vesicula Seminalis*, COWPER'S Gland, part of the *Vas Deferens* and *Ureter*, Membranous portion of the *Urethra*, and Bulb and Crus of the Penis. Attend also to the connexion between the Rectum and Bladder, and to the extent of the Peritoneum on each of these.

To give a fuller view of the situation of the parts mentioned above, remove next the Left Os Innominatum and Thigh attached to it.—See Tab. XXX.—For this purpose,

Cut from their origins the *Transversalis Perinei*, Crus, and *Erector Penis*, *Accelerator Urinæ*, *Levator Ani*, and Ligaments of this side of the Bladder.

Dissect the *Ligamentum Suspensorium Penis*, and leave it attached to the Right Side of the Pelvis; then divide the *Symphysis Pubis*, and separate the two Bones from each other.

Cut the Capsular Ligament joining the Left Os Innominatum to the Os Sacrum. Turn back and remove

the Left Side of the Pelvis, and Lower Extremity attached to it, from the Viscera or contained parts. After dividing the Reflection of the Peritoneum, termed Posterior Ligament of the Bladder, with the different Blood-vessels, Nerves, &c. which form a connexion, turn down the Levator Ani, and leave it attached to the back part of the Rectum.

Shew now more sufficiently the connexion of the Bladder and Rectum, and the extent of the Peritoneum on these. Distend the Rectum, and also the Bladder. Shew the Muscular Coat of the Bladder, the Sphincter Vesicæ, Termination of the Ureter, Vesicula Seminalis, Vas Deferens, and their Common Duct.

Dissect the left side of the Prostate Gland, the Membranous part and Bulb of the Urethra.

Clean the surface of the Corpus Caverosum Penis, and Corpus Spongiosum Urethræ.

Introduce a Blow-pipe, at a puncture made in one of the Crura Penis, and distend the Cells. Do the same at the Cells of the Bulb of the Urethra, and inflate the Corpus Spongiosum, and the Glans of the Penis.

Examine the Integuments of the Penis, and the formation of the Prepuce. Attend to the situation of the Prostate Gland, how it may be examined by the Finger *in Ano*.

View also the Urethra, with respect to the Symphysis Pubis, the Triangular Ligament of the Urethra, the course of this passage, and the place of resistance in the introduction of the Staff or the Catheter; and familiarize the Hand to the introduction of these, previously to the Passage being laid open.

The contents of the Pelvis may next be separated

from the Body. After removing them, dissect more fully the Surface of the Prostate Gland.

Open the Bladder anteriorly, then cut from its Fundus downwards, leaving a small part of its Cervix entire. Examine its Coats, and introduce Probes from the Ureters into the Bladder.

Lay open the Membranous part of the Urethra on its fore side, and introduce small Wires into the common Seminal Ducts, and bring them out at the termination of the Ducts in the Urethra.

Cut open one of the Corpora Caverosa at the side of the Penis, and the Corpus Spongiosum and Urethra at the under part, to examine their internal structure.

Separate from each other the different Coats of the Rectum; then lay it open, and shew its inner surface.

Dissect now the Internal Obturator and Coccygeus Muscles.—Vol. I. p. 228, 229.

Examine the situation and appearance of the Lymphatic Glands on the side of the Viscera, and on the corresponding Blood-vessels.

DISSECTION OF THE ORGANS OF URINE AND GENERATION IN A FEMALE.—Vol. II. p. 297. Tab. XXXI.

Expose the Kidneys, as in a Male Subject, then shew the course of the Ureters as far as the Bladder of Urine. Trace in a general way the Spermatic Blood-vessels and their terminations.

Dissect the Rings of the Abdominal Muscles, and the termination of the Round Ligaments of the Uterus in the Groins.

Shew the course of the Ureters.

Examine fully the situation and general appearance of the Contents of the Pelvis, while they are still *in situ*.

Attend next to the External Parts, and to the introduction of the Catheter to discharge the Urine, and of the Finger by the Vagina, to examine the Os Tincæ.

In the dissection of the External Parts, divide the Skin from the Groin to the Anus; remove the Cellular Substance, to shew the Crus of the Clitoris, and the different Perineal Muscles. Raise the Sphincter Vaginæ, to expose the Corpus Caverosum Vaginæ.

After dissecting the parts seen in the Perineum, separate the left Os Innominatum, as in a Male. Attend to the Lymphatic Glands, which are numerous; some round the Blood-vessels, and on the sides of the Bladder, Uterus, and Vagina, and others between the Layers of the Mesocolon.

Distend the Bladder and Rectum moderately with Air, to shew their relative situation, and the extent of the Peritoneum upon them; and trace the Ureter to its termination.

After attending to the situation, separate the Contents entirely from the Pelvis, to admit of their farther investigation.

Slit open the Urethra, leaving its extremities entire; then cut open the Bladder along its fore part, and examine its internal Surface, and the termination of the Ureters.

Lay open also the Vagina, leaving the Os Externum and Os Tincæ in their natural state.

Cut open the Uterus, from near the Os Tincæ to the

Fundus; then make a transverse incision at the Fundus, between the inner ends of the FALLOPIAN Tubes.

Distend one of the Tubes, slit open the other. Cut into one of the Ovaria, and examine the Ova.

Clean out the Rectum, and dissect its different Coats; slit it next open, to shew its internal appearance.

DISSECTION OF THE MUSCLES ON THE FORE AND LATERAL PARTS OF THE THORAX.—See Vol. I. p. 233. Tab. IX. X.

Make a circular incision about the Areola which incloses the Nipple. Cut the Integuments along the fore part of the Sternum, and reflect them towards the Shoulders.

Dissect the Fat from the Glandular part of the Mamma, to shew its connexion to the Large Pectoral Muscle, and examine its structure.—Vol. II. p. 160.

Put Bristles into a few of the Lactiferous Ducts, and trace them into the Substance of the Mamma.

Expose the under end of the Platysma Myoides, and the whole of the Pectoralis Major, excepting its termination, which ought to be left entire. Expose also the Digitations of the Serratus Magnus.

Cut next the large Pectoral Muscle, an inch from its origin, and turn it and the Mamma outwards, to shew the Pectoralis Minor.

Cut and turn back the Serratus Magnus from its origin, and bring into view the Subclavius, the Cartilages of the Ribs, and the Ligaments covering the Sternum.

Dissect the External Intercostal Muscles. Raise part of these to shew the Internal Set, and attend to the

motions of the Ribs. Shew the Tendinous Fasciæ, occupying the Place of the External Intercostals at the fore part of the Thorax.

Raise carefully some of the Internal Intercostals, to expose the Pleura, and the Lungs appearing obscurely through, and in close contact with it.

Raise the Pectoralis Minor from its origin, and examine the Trunks of the Axillary Vessels and Nerves, together with the Absorbent Glands.

DISSECTION OF THE CONTENTS OF THE THORAX.—See
Vol. II. p. 165.

Introduce a crooked Pipe into the Trachea, and by means of the Mouth, or of Bellows, have the Lungs distended, so as to allow the motions of the Diaphragm, in the different states of Respiration, to be examined.

Cut cautiously through the Cartilages of the Ribs, at the sides of the Sternum, from the Second to the Seventh Rib inclusive, and raise them slowly, to shew the Sterno-costalis.—Vol. I. p. 237. Tab. X. Fig. 2.

Divide the Intercostal Muscles between the First and Second, and between the Seventh and Eighth Ribs, as far as the lateral part of the Thorax, on each side, guarding against injuring the Diaphragm.

Turn the Ribs outwards, by sawing or breaking them, so as to obtain a full view of the Contents of the Thorax.

Examine the situation of the Pleura, Mediastinum, Pericardium, and Lungs, previously to making any farther Dissection.

Lay open next the Pericardium longitudinally, at its

fore part, in the left side of the Thorax. Examine the situation of the Heart in its empty state; then, by introducing a Pipe into the cut Vena Cava, under the Diaphragm, inflate the Right Auricle and Ventricle.

In a similar manner, by a Pipe introduced through the divided Cœliac Artery into the Aorta, distend the left side.

While the Heart is kept distended, observe the situation of its different Cavities with respect to the Ribs and Sternum, and of the large Vessels communicating with the Heart.

After distending the Heart, inflate the Lungs, and observe their general appearance.

Having examined the situation of the Heart and Lungs, the Sternum may be removed, to allow them more readily to be separated from the Body for farther investigation. In raising the Bone, attend to the formation of the Anterior Mediastinum, and to the original seat of the Thymus Gland.

In perforating this piece of Dissection, divide the Superior Cava at its origin, and the Inferior one where it perforates the Diaphragm. Cut across the Ascending Aorta, directly below the origin of the Carotid and Subclavian Arteries. Divide the Trachea as high in the Thorax as possible, and separate the Heart and Lungs from the Thorax; leaving the Posterior Mediastinum, and the parts it contains, for future examination.

Previously to laying open the Cavities of the Heart, distend them again with Air, and examine their shape, size, and general appearance. Afterwards slit open longitudinally, with Scissars, the Right Auricle at its fore side, and examine the different parts within it.

Make next an incision from the Mouth of the Pulmonary Artery to the Point of the Heart, guarding against injuring the two Sets of Valves. Then cut open the whole length of the Pulmonary Artery, excepting its beginning, and the Valves, which ought to be left entire.

Lay open two of the Pulmonary Veins, then the left Auricle and Ventricle, in a similar manner with what was done to the corresponding parts of the right side.

Inject the Thoracic Duct from its under extremity, and as many Lymphatics as possible going into it, with coarse Injections of a soft consistence; but first tie up the Left Subclavian Vein, to prevent the Injection from escaping.—Vol. II. p. 206. Vol. III. p. 160, 162.

Separate from each other the two Layers of the Mediastinum, and then examine the structure of the different parts it contains. Raise a portion of the Platysma Myoides, and origin of the Sterno-mastoideus in the left side of the Neck, and shew the termination of the Thoracic Duct.

Examine the structure of the Lungs, Vol. II. p. 193, as far as can be done by the assistance of a Knife. Dissect the different Coats of the Trachea, and the Mucous and Bronchial Glands.

Distend the whole, and then a part of the Lungs, and attend to the communication between the Tracheal Branches and Cells.

In one of the Lobes of the Lungs slit open and follow a Branch of the Trachea into the Cells, and trace next the corresponding Artery and Vein.

In the left side of the Thorax, attend to the motions, and shew the Capsular Ligaments of the Heads of

the Ribs, and open one or two of them. Observe their joinings with the Transverse Processes of the Vertebrae. Examine the termination of the Internal Intercostal Muscles, and dissect the Depressores Costarum
COWPERI.

Take a slice off the fore-side of the anterior extremity of the Osseous part of the Ribs, and corresponding extremity of the Cartilages, to shew the connexion between these. Attend next to the Membranes on the fore part of the Sternum, to the Ligaments connecting it to the Ribs, and to the Cavity of the corresponding Joints.

Shew more fully the Small Muscle of the Diaphragm, and the passage of the Aorta through it.

DISSECTION OF THE MUSCLES OF THE FACE AND NECK.
Vol. I. p. 181, &c. Tab. V. VII.

Remove the Integuments from the Face, and also the Fat, which is commonly in considerable quantity, and is separated with difficulty. Dissect the different Muscles belonging to the Nose and Mouth. The Depressor of the Upper, and Levator of the Under Lip, are to be exposed by inverting the Lips, and dividing the lining Membrane of the Mouth at the sides of the Frænum, which unites the Gums and Lips to each other.

Dissect the Parotid Gland and Duct.—See Vol. II. p. 120. Expose also the Masseter, and the upper end of the Platysma Myoides.

After laying bare the Parotid Gland, put a Wire into its Duct, and bring it out at its termination in the Mouth, then raise the Gland, and some Lymphatics

which lie near it, and turn them forwards. Shew the Salivary Glands on the outside of the Buccinator Muscle.

Cut the Masseter below, and expose the insertion of the Temporalis, the origin of the Buccinator, and the Muscles of the Face continued into the Orbicularis.

Lay bare the Ligament of the Lower Jaw; observe the motions of the Bone, then examine the two Cavities of the Joint.

Dissect all the Muscles described from p. 181, to p. 195. After dissecting the Platysma Myoides, raise it from the Clavicle and Lower Jaw, and turn it back, to shew the Digastricus. Raise the Mylo-hyoideus from the Jaw, to lay in view the Inferior Maxillary Gland, and some Lymphatic Glands connected with it.—See Vol. II. p. 122.—Put a Wire into the Duct, and pass it into the Mouth. Then turn the Gland forwards, and attend to the course of the Lingual Branch of the Fifth Pair of Nerves, which runs near it.

In dissecting the Muscles about the Throat, observe the Ligament from the Styloid Process to the Lower Jaw, and that from the same Process to the Os Hyoides. Expose the Lobes and middle Portion of the Thyroid Gland, and as much as can be seen, in this stage of the Dissection, of the Pterygoideus Internus Muscle.

DISSECTION OF THE DEEP PARTS OF THE MOUTH, NOSE, AND THROAT.

Shew more fully the Muscles of the Lower Jaw and Os Hyoides. Dissect the Membrane of the Palate, the Azygos Uvulæ, and Muscles inserted into the Palate.

The outer side of the three Constrictors of the Pharynx, then turn them back.

Slit open one side of the Pharynx, and shew the passages from the Mouth and Nose into it, and those which lead from it downwards to the Lungs and Stomach.

Dissect the Lymphatic Glands of the Neck, which are numerous, some being placed between the *Platysma Myoides* and *Sterno-mastoideus*, but the greater number accompanying the Deep-seated Blood-vessels; these last are the *Glandulæ Vagæ Colli*.

Cut the Lower Jaw in its middle, and detach the Muscles of the Lips from it. Separate the Cheek, Membranes, and Muscles, from the side of the Jaw, and dissect, still more distinctly, the two *Pterygoidei*, *Palato-pharyngeus*, *Azygos Uvulæ*, and Glandular Substance of the Palate. Turn back the Membrane of the Palate as far as the Uvula, and shew the *Circumflexus Palati*, *Levator Palati*, *Constrictor Isthmi Fau-cium*, Outer Side of the *Amygdala*, and Salivary Glands of the Cheek and Lips.

Take out the Larynx, Pharynx, Tongue, *Os Hyoides*, Palate, &c. joined together. Separate them from the Base of the Cranium, and from the Jaws; from the *Vertebræ* of the Neck, and from the top of the Thorax. Examine the different parts of the Throat described in Vol. II. p. 146.

Raise the Membrane covering the inner or back part of the Larynx, and shew the different Muscles of the Glottis.—See Vol. I. p. 207.

Cut open the Nose, by a perpendicular Section, through the Head and Face, directly at the side of the *Septum Narium*, guarding against injuring the

Spongy Bones ; and shew the different parts connected with the Nares.—See Vol. II. p. 105.

Dissect next the Muscles contiguous to the Anterior part of the Vertebrae of the Neck,—Vol. I. p. 238, and also the three Musculi Scaleni.—Vol. I. p. 251.

DISSECTION OF THE MUSCLES SITUATED UPON THE POSTERIOR PART OF THE TRUNK OF THE BODY.—Vol. I. p. 240. Tab. XI.

In the Dissection of these Muscles, their connexions are found to be so complicated, and their fibres so intermixed, that in many parts they cannot be separated from each other without using considerable freedom with a Knife.

Remove the Integuments from the posterior part of the Neck, Back, and Loins, after which the Trapezius, Latissimus Dorsi, and part of the Rhomboideus, will appear. Here the Cellular Substance is detached with some difficulty, on account of its close connexion with the surface of the Muscles, but ought to be entirely separated from them, to shew them distinctly.

Turn back the Trapezius from the Head and Spine. Cut the Latissimus Dorsi from within an inch of the origin of its Flethy Fibres, and turn it back, to expose the Serratus Inferior. Then remove from the Spine, and turn outwards, the Tendon sometimes called *Fascia Lumborum*, common to the Serratus and Latissimus Dorsi.

Turn back the Rhomboideus from the Spine, and also the Serratus Superior, which requires attention, on

account of the thinness and close connexion of their Tendons.

Cut the Splenius, and also the Complexus, from the Head and Spine. Next remove the Tendinous Fascia, which crosses and binds down a number of deep-seated Muscles in the Back. Shew the Sacro-lumbalis, Longissimus Dorsi, and Spinalis Dorsi, which are so intimately connected, that some of their Fibres are necessarily divided before they can be separated from each other.

Shew next all the other Muscles belonging to this part of the Body, also the Levatores Costarum, and Quadratus Lumborum.

Clean the Ligaments of the back part of the Head and Vertebrae; or it may be sufficient to dissect the surfaces of a few of the Ligaments of the different classes of the Joints, then cut into them and attend to their Cavities.

Dissect some of the Ligaments between the Spinous, and also between the Oblique Processes of the Vertebrae. Clean some, and open others, of the Capsular Ligaments, between the Transverse Processes of the Ribs.

After examining the Muscles, Ligaments, &c. on the back part of the Trunk of the Body, saw off the posterior portion of the Spinal Canal to shew the Spinal Marrow with its Involucra. Slit open the Dura Mater, then make a puncture in the Tunica Arachnoidea, and distend it with Air. Lay it also open, and examine the origin of the Nerves.—See Vol. III. p. 206.

DISSECTION OF THE MUSCLES ON THE SHOULDER
AND ARM, p. 256. Tab. XIV. XV.

Dissect the Sebaceous Glands, which adhere closely to the inner side of the Skin of the Axilla.

Remove the Integuments from the Shoulder and Arm, to a little below the Elbow. Dissect the Deltoides, and shew the Tendinous Fasciæ which cover the two Spinati Muscles; also a Fascia, which, though thin, is distinct, that covers the Arm.

Trace to their terminations the Muscles arising from the Trunk of the Body, and inserted into the Extremity.—See Vol. I. p. 233, &c.

Clean and turn down the Deltoides from near its origin, to shew the Muscles seated about the Shoulder-Joint. Dissect the different Muscles described in Vol. I. p. 256, 262, but none require to be removed from their places.

Examine the Absorbent Glands, and the Vessels and Nerves of the Axilla, leaving the Branches of these to be traced in the injected Subject. Trace also some Glands, placed near the Humeral Artery, a little above the inner Condyle of the Humerus.—Vol. III. p. 165.

DISSECTION OF THE MUSCLES OF THE FORE-ARM.

See p. 265.

Remove the Integuments, and shew the Aponeurosis of the Fore-arm and Palm, but preserve the Posterior Ligament of the Wrist entire.

Attend to the Processes of the Fascia which sink

between the Muscles. Remove all that part of the Fascia from which the Muscles do not directly take their origin, except what forms the Posterior Ligament of the Wrist.

Cut the *Palmaris Brevis*, with part of the Skin, and turn it towards its origin. Preserve entire the *Ligamentum Annulare Anterius*. Clean the Sheaths of the Tendons of the Fingers, cut and open the Sheath of the Middle Finger, to shew the difference this produces with respect to the Tendons.

DISSECTION OF THE BURSÆ MUCOSÆ OF THE SUPERIOR EXTREMITY.

Clean their Surfaces, and then cut into them and examine their Cavities.—See Vol. I. p. 320—323.

DISSECTION OF THE LIGAMENTS OF THE SUPERIOR EXTREMITY.—Vol. I. p. 343.

Previously to the Dissection of the Ligaments, consider how far it may be proper to attend here to the Dislocations.

Clean the surfaces of the different Ligaments, by separating all the Muscles, &c. entirely from them, except the *Interossei*.

Examine the effects of the Ligaments on the Bones, then lay open the several Joints. Attend now to the *Interosseous Muscles*, which can be seen to more advantage than formerly. Take a view also of the *Ossa Sesamoidea*.—Vol. I. p. 171.

DISLOCATIONS OF THE JOINTS OF THE SUPERIOR
EXTREMITY.

In an Extremity where the Muscles are dissected, cut as much of the Ligaments of the Joints as to allow the different Dislocations to be imitated, and their Reductions afterwards effected. In forming the Dislocations, divide no more of the Muscles than is absolutely necessary, so as to judge of the appearance of the Joint when in a state of Dislocation.

DISSECTION OF THE MUSCLES, &c. ON THE PELVIS
AND THIGH.—See Vol. I. p. 284.

Remove the Integuments from the Pelvis and Thigh, as far as a hand-breadth below the Knee. Dissect the Superficial Fascia, Vol. I. p. 210, the Inguinal Glands, Vol. III. p. 147, the Absorbents of which are sometimes seen running into, or out from them, filled with Lymph.

Dissect also the Fascia Lata, with its different Processes, Vol. I. p. 211.; and the continuation of this Fascia, p. 284.

Examine the situation of the Trunks of the Femoral Vessels and Nerves, and the insertion of the Vena Saphena.

On the fore side of the Thigh divide the Fascia Lata longitudinally, and turn it to each side, to shew the Muscles described, Vol. I. p. 285, &c.

Observe the passage of the Femoral Artery between

the Adductor Magnus and Os Femoris, and clean the surface and Ligament of the Patella.

Dissect the Gluteus Maximus, and then cut it from its origin, to shew the Gluteus Medius, and raise it to expose the Gluteus Minimus, and the other Muscles on this part of the Pelvis, p. 288.

Divide the Aponeurosis on the back part of the Thigh, and leave it adhering to the Linea Aspera. Dissect the different Muscles which are here situated.

Lay in view the Tendinous Fascia stretched across the Ham; then remove it, and examine the situation of the Popliteal Vessels and Nerves, and search for the Popliteal Glands, which are imbedded in the Fat that surrounds the Vessels, and are so small as to require a careful Dissection to discover them.—Vol. III. p. 146.

DISSECTION OF THE MUSCLES, &c. OF THE LEG AND FOOT.—See Vol. I. p. 298, &c.

Remove the Integuments from the whole of the Leg and Foot. Attend to the situation of the Venæ Saphenæ. Dissect the Aponeurosis of the Leg and Sole, and observe the Processes of this Membrane sent in among the Muscles, separating these from each other, and giving origin to part of them.

Preserve entire the Anterior Ligament of the Ankle, and its division into two Processes or Bands; and observe part of the Tendinous Fascia stretched between the Malleolus Internus and inner and back part of the Os Calcis, bending down the Flexor Muscles of the Toes, &c.

Remove next the Aponeurosis, leaving only that por-

tion entire which gives origin to some of the Muscles at the upper part of the Leg.

In dissecting the Muscles, cut the inner Head of the Gastrocnemius Externus, to shew the Gastrocnemius Internus, and between them the Plantaris.

After dissecting the Muscles of the Leg, cut the Aponeurosis Plantaris from the Roots of the Toes, and turn it back towards the Heel. Divide also the Flexor Brevis Digitorum, and turn it towards the Toes.

DISSECTION OF THE BURSAE MUCOSÆ OF THE INFERIOR EXTREMITY.

Dissect and lay open the different Bursæ Mucosæ described in Vol. I. p. 324, &c. Attend to the different Dislocations.

DISSECTION OF THE LIGAMENTS ON THE FORE PART OF THE SPINE, AND ON THE PELVIS AND INFERIOR EXTREMITY.

Remove the Muscles, and clean the surface of all the Ligaments described in Vol. I. p. 333, 354—365.

Cut across the Spine in the Loins, to shew the Inter-vertebral Substances; then separate the Muscles, Vessels, and Nerves, from the Pelvis and Inferior Extremity, but leave the Interossei to be further examined, together with the different Ossa Sesamoidea.

In dissecting the Ligaments, attend to their effects on the Bones; then lay them open, and examine the Cavities of the Joints.

DISLOCATIONS OF THE BONES OF THE INFERIOR
EXTREMITY.

In a Limb where the Muscles have been dissected, cut as much of the Ligaments as may be sufficient for allowing the different Dislocations to be imitated, and their subsequent Reduction effected.

OF THE INJECTION AND DISSECTION OF A VASCULAR
SUBJECT.

Cut the Sternum longitudinally, and fix a Pipe into the Ascending Aorta ; or if less attention be required, introduce one Pipe upwards and another downwards into the Femoral Artery. After the Pipes are secured, the Body ought to be immersed for some hours in warm Water, or for such length of time as to allow the interior parts to be sufficiently heated.

The Matter to be thrown into the Vessels consists of two kinds,—one is termed the *fine*, and the other the *coarse* Injection. The *fine* is thrown in first, so as to fill the smaller Branches; and this is immediately followed by the *coarse*, which forces the *fine* into the smaller Branches, and afterwards keeps the large distended.

For the *fine* Injection take ten parts of Oil of Turpentine, and one part of Vermilion. The *coarse* may consist of six parts Tallow, three parts Wax, two parts Resin, one part Venice Turpentine, and one part Chinese Vermilion.

The quantity of Injection to be used must depend upon the size of the part to be injected. It should be

heated, especially the coarse, to something more than the Finger immersed in it can easily bear, and then thrown in quickly, so as not to be in danger of being cooled till the operation is finished, and with a force sufficient to drive it to the extreme Vessels, but without occasioning any rupture. After the Vessels have been injected, and the Body sufficiently cooled, it is ready for Dissection; and the Arteries being now filled with Substances which greatly resist putrefaction, the parts are less liable to decay; the Dissection, therefore, may be performed *a Capite ad Calcem*.

DISSECTION OF THE BLOOD-VESSELS AND NERVES BELONGING TO THE PARTS COVERING THE SKULL-CAP.

Dissect off the Integuments as thinly as possible, from the upper part of the Head, as far as the Superciliary Ridges, Zygomatic Processes of the Temporal Bones, and the large Arch of the Occipital Bone. Shew the Branches of the Frontal Artery,—Vol. III. p. 34,—of the Temporal Artery, p. 29,—of the Occipital Artery, p. 24,—of the corresponding Veins, p. 41,—and Nerves, p. 185, 196.

DISSECTION OF THE BLOOD-VESSELS OF THE BRAIN.

Cut the Integuments from the Nose to the Occiput, and turn them down over the sides of the Head.

Saw the Cranium in a circular direction, a finger's breadth above the Superciliary Ridges and Lateral Sinuses, and remove the Skull-cap.

On the Left Side, cut the Dura Mater near to, and parallel with, the Superior Longitudinal Sinus. On the Right Side, divide the Membrane where the Cranium has been sawed.

Turn the Subject on its Breast, and cut the Tentorium at its root on both sides of the Head. The Body ought again to be turned, to allow the Falx to be separated from the Crista Galli and reflected, and the Brain and its Appendages to be removed in one piece. For this purpose, divide the Trunks of the different Blood-vessels and Nerves, and top of the Spinal Marrow. In doing so, attend to the passage of the Arteries through the Cranium to the Brain, and of the Nerves from the Brain, through the Foramina of the Cranium.

Cut the Carotids half way between the origin of the Ocular Artery and Circle of WILLIS, and divide the under end of the Infundibulum. Cut the Nerves close to the Brain on the Left Side, and half way between the Brain and Skull on the Right.

Leave as much as possible of the Left Accessory Nerve in the Cranium. Separate the Right one, along with the Medulla Oblongata, and cut the Vertebral Arteries close to the side of the Foramen Magnum.

After removing the Brain, invert it, and dissect off the Tunica Arachnoidea, to shew the Circle of WILLIS, and the origin of the different Nerves.

Follow the Branches of the Carotid Arteries, and also those of the Vertebrales, and trace them to their terminations.—Vol. III. p. 34.

Cut open the different Sinuses described in Vol. III. p. 47, &c. and examine their situation, size, and terminations.

DISSECTION OF THE BLOOD-VESSELS AND NERVES OF
THE EYE AND ITS APPENDAGES.

Cut off the Supra-orbital Plate by means of a Chisel and Mallet, to shew first the Periosteum ; then divide this, to expose the Fourth Nerve and Frontal Branch of the Fifth one. Next separate as much of the Cellular Substance and Fat as possible, to allow the different Vessels and Nerves to be traced, as described in Vol. III. p. 31, 43, and 182.

DISSECTION OF THE COMMON AND OF THE EXTERNAL
CAROTID ARTERIES, AND THEIR CORRESPONDING
VEINS.

Right Side.—Divide the Integuments longitudinally at the fore part of the Neck, and reflect them outwards. Remove also the Skin from the side of the Face, and trace the different Branches of the Facial Artery,—see Vol. III. p. 21,—and Vein, p. 41.

Left Side.—Dissect the parts corresponding with those seen in the Right Side, then cut the Platysma Myoides from the Lower Jaw and Clavicle, and turn it outwards. Divide the Sterno-mastoideus at its origin and insertion, and turn it back ; guarding against cutting the Nerves which pass through it.

Lay in view the Carotis Communis, its division into External and Internal Carotids ; and afterwards the different Branches of the External Carotid,—see Vol. III. p. 18,—and the corresponding Veins, p. 41.

Preserve the Muscles as entire as the nature of the

dissection will allow, but divide the Parotid Gland length-ways, to allow the Vessels to be traced.

By means of a Mallet and small Chisel, cut along the middle of this side of the Lower Jaw, and expose the Vessels and Nerves in the Maxillary Canal.

Divide the Lower Jaw in its middle, and afterwards separate from it the Muscles and the Membrane of the Gums, but leave the soft parts surrounding the hole at the side of the Chin. Next, saw the Bone across a little above the Posterior Maxillary Foramen, guarding the Inferior Maxillary Vessels and Nerves, by placing a Spatula between them and the Bone. Turn the processes of the Jaw upwards, to shew parts deeper seated.

Saw the Frontal Bone through at the outside of the Foramen Supra-orbitarium, and the Upper Jaw obliquely downwards at the outside of the Infra-orbital Canal. Divide next the Root of the Zygoma, and saw the Squamous part of the Temporal Bone as far as the Base of the Cranium. Cut, by means of a Chisel, the Skull at the outer part of the Foramen Rotundum, Ovale, et Spinale, and at a sufficient distance, to save the Chorda Tympani from being injured. Turn now the cut parts outwards, and divide the Pterygoid Muscles to shew the distribution of the Internal Maxillary Vessels.—See Vol. III. p. 25, 42.

DISSECTION OF THE NERVES CORRESPONDING TO THE BLOOD-VESSELS MENTIONED ABOVE.

Right Side.—Divide the Parotid Gland by means of a pointed instrument, and trace the different Branches of the Portio Dura of the seventh pair of Nerves.

Expose also the second and third portions of the Fifth Pair, where they pass through the Inferior-orbitar and Anterior Maxillary Foramina. Trace minute connexions which are formed by these three Nerves upon the Face.

Left Side.—Dissect the second and third parts of the Fifth Pair, and root of the Portio Dura. Follow the Lingual portions of the Fifth, Eighth, and Ninth into the Tongue, and the Eighth, Accessory and Sympathetic Nerves in the Neck.—See p. 187, &c.

DISSECTION OF THE ORGAN OF HEARING.

Right Side.—Examine the different parts on the Surface of the External Ear.—Vol. II. p. 81.

Left Side.—Dissect the Muscles common to the Head and Ear, then remove the Integuments from the Outer Ear, and expose the Muscles peculiar to it.

Trace the Blood-vessels from the Temporal and Occipital to the External Ear. Shew Nerves from the third of the Fifth Pair, and from the Portio Dura of the Seventh to the fore part of the Ear, and Branches from the First and Second Cervicals to its back part.

Slit open the fore side of the Meatus Externus, and shew the Ceruminous Glands, and the Membrana Tympani.

Lay open the Tympanum, by cutting in at the upper, outer, and fore part of the Pars Petrosa, to lay in view the Ossicula Auditus, the Muscles of these Bones, the Chorda Tympani, &c. Cut open the posterior portion of the EUSTACHIAN Tube, and raise a Layer of Bone at the inner side of it, to expose the Belly of the

Tensor Tympani. Take a slice off the Mammillary Process to shew the Mastoid Cells.

By means of a small Chisel and Mallet, lay open, at their upper part, the different Cavities of the Labyrinth, and shew in it the course of the Portio Mollis and Portio Dura of the Seventh Pair of Nerves.—See Vol. III. p. 191.

Put a Probe into the EUSTACHIAN Tube, to allow the passage to be laid open, that its situation may be examined.

DISSECTION OF THE DEEP-SEATED BLOOD-VESSELS AND NERVES IN THE NECK, AND THOSE OF THE SHOULDER AND UPPER ARM.

Remove the Integuments from the Shoulder and Arm, saving as much as possible the Subcutaneous Vessels and Nerves. Cut across the large and small Pectoral Muscles, tracing at the same time Branches of the External Thoracic Vessels and Nerves into them.

Divide the Deltoid Muscles below the Head of the Os Humeri; cut through also the two Spinati, and shew the Arteries described Vol. III. p. 50—59.; Veins, p. 68—71.; Nerves, p. 214.

DISSECTION OF THE BLOOD-VESSELS AND NERVES OF THE FORE-ARM AND HAND.

Separate the Integuments from the Fore-Arm and Hand, and remove the Aponeurosis Palmaris; saving the principal Subcutaneous Vessels and Nerves.

Cut across the Bellies of such Muscles as obstruct

the view of the parts to be examined. Trace the Arteries described in p. 59—66. ; the Veins in p. 67, &c. ; Nerves, p. 220, &c.

DISSECTION OF THE BLOOD-VESSELS AND NERVES ON
THE ANTERIOR AND LATERAL PARTS OF THE THO-
RAX.

Divide the Integuments along the Sternum, and turn them outwards. Cut and turn back the Serratus Magnus, and shew the Arteries described p. 53, 54, and the Branches of the Internal Mammary and Intercostal Arteries passing out between the Ribs to the Mamma and Pectoral Muscles. The Veins corresponding with these, and the Nerves from the Axillary Plexus and Intercostals.—Vol. III. p. 69, 219.

DISSECTION OF THE BLOOD-VESSELS AND NERVES
WITHIN THE THORAX.

Cut the Sternum longitudinally in its middle, from near its upper end, to the Cartilago Ensiformis, on the Left side. Raise and turn outwards the Section of the Sternum, with the corresponding Ribs from the second to the seventh inclusive, from the External Mammary Vessels, which are to be left entire, adhering to a portion of the Pleura. Leave also the Diaphragm entire. Divide the Ribs at the Lateral part of the Thorax ; turn them back, guarding against injuring the Intercostal Vessels and Nerves. The Ribs may be divided by means of a Mallet and Chisel at the inner side of the Thorax, or by a Saw applied externally.

On the right side cut across the Trunks of the Mammary Vessels, at the upper and under parts of the Thorax, and turn back the Ribs, and section of these, as on the left side, with the Mammary Vessels adhering to them.

Cut the Pleura on both sides of the Spine, and peel it off, to shew the Vessels described in Vol. III. p. 71, &c. and Nerves, p. 230.

DISSECTION OF THE VESSELS AND NERVES OF THE MUSCLES SITUATED ON THE ANTERIOR AND LATERAL PARTS ON THE ABDOMEN.

After removing the Integuments, dissect and turn forwards the External and Internal Oblique Muscles, from their origins as far as the Linea Semilunaris. Divide the Tendon of the Obliquus Externus above the Ligament of POUPART.

Push up to a certain extent the Peritoneum, without wounding it, to shew the origins of the Epigastric Artery, and the Circumflex one of the Os Ilium.—See Vol. III. p. 110, 112.

Cut at the side of the Linea Alba, and turn outwards the Tendon covering the Rectus Muscle. Then raise the Muscle, and shew the course of the Epigastric Artery and Vein behind it, and the communications between these Vessels and the Internal Mammary.

Shew the Branches of the above Vessels, and of the Lumbar, with corresponding Nerves to the Muscles, and other parts of the Parietes of the Abdomen in general.

DISSECTION OF THE BLOOD-VESSELS OF THE DIAPHRAGM, AND OF THE BLOOD-VESSELS AND NERVES OF THE CHYLOPOIETIC AND ASSISTANT CHYLOPOIETIC VISCERA.

Cut the Parietes of the Abdomen in a crucial direction, at the Umbilicus.—Dissect first the Diaphragmatic Vessels.—See p. 77. Divide next the Omentum Majus near its root, to allow the Stomach and Colon to be separated from each other, so as to give a view of the distribution of the Cœliac Artery.

Blood-vessels.—Dissect and expose the different Branches of the Cœliac Artery.—See Vol. III. p. 79.—89.

After examining the Branches of the Cœliac, turn up the Great Arch of the Colon, and the Omentum, and push the Small Intestines over to the left side of the Body. Peel off one side of the Mesentery, and trace the different Ramifications of the Superior Mesenteric Artery, which are much concealed by Cellular Substance.—See Vol. III. p. 89.

Upon fully exposing the Superior Mesenteric Artery, turn the Small Intestines over to the right side, and dissect the under part of the Aorta and the Inferior Mesenteric Artery, but save the Sheath which lies over the Aorta, on account of the Nerves.—See p. 86.

Dissect next the corresponding Veins.—See p. 87.

Nerves.—Trace the Nerves corresponding with the Cœliac and Mesenteric Arteries.—See p. 240.

DISSECTION OF THE VESSELS AND NERVES OF THE ORGANS OF URINE AND GENERATION.

Separate the Peritoneum from the back part of the Abdomen, and from the sides of the Pelvis, and follow the different Vessels and Nerves to their places of destination.

In tracing the Branches in the Perineum, the parts are to be exposed somewhat after the same manner as formerly pointed out in dissecting a Muscular Subject.—See description of the Blood-vessels, Vol. III. p. 92, and of the Nerves, p. 245.

DISSECTION OF THE BLOOD-VESSELS AND NERVES OF THE LOINS, PELVIS, AND THIGH.

Separate the Psoæ Muscles from their origins, to expose the Vessels described in Vol. III. p. 102, &c., and Nerves, p. 246.

Remove the Integuments from the Nates, and raise the Gluteus Maximus from its origins, saving as entire as circumstances will allow the Branches of Vessels and Nerves which pass into it. In like manner raise the Gluteus Medius, to shew the Gluteal and Sciatic Vessels and Nerves on the back part of the Pelvis.—See Vessels, Vol. III. p. 106—109, 129.—Nerves, p. 252.

Make next a longitudinal incision in the fore part of the Thigh, and turn aside the Integuments, preserving entire the Subcutaneous Vessels and Nerves. Dissect first the Inguinal Glands, see Vol. III. p. 147.; then the Arteries described in p. 112,—the Femoral Sheath,

Vol. I. p. 219,—and the Veins, Vol. III, p. 129.
Trace next the different Nerves, p. 248.

DISSECTION OF THE VESSELS AND NERVES OF THE
LEG AND FOOT.

Dissect off the Integuments, to shew the Arteries described in Vol. III. p. 121,—Veins, p. 128,—and Nerves, p. 248.

Cut the inner Heads of the Gastrocnemius Externus and Soleus Muscles, to expose the parts deeper seated. In the fore side of the Leg separate the Tibialis Anticus from the Extensors of the Toes, to shew the Anterior Tibial Artery.

Remove the Aponeurosis Plantaris, and cut the Flexor Digitorum Brevis from its origin, so as to reach the Branches on the deep parts of the Sole.

DISSECTION OF THE VESSELS AND NERVES ON THE
POSTERIOR PART OF THE TRUNK OF THE BODY.

Remove the Integuments from the posterior part of the Neck, Back, Loins, and Os Sacrum, then separate the Muscles from the Spine, and a certain way from each other, and trace small Branches which pass backwards from the Cervicals, Intercostals, and Lumbar, to the different Muscles.

Dissect the Muscles and Ligamentous Covering from the back part of the Os Sacrum, to shew minute Branches of Blood-vessels from the Gluteal, Sciatic, and others which pass through the Posterior Foramina of the Os Sacrum, to be dispersed upon the under part

of the Spinal Marrow and its Involucra. Shew also small Nerves running through these Foramina from the Cauda Equina, which communicate with each other, and send Twigs to the neighbouring Muscles and Membranes.

Having examined the Vessels and Nerves on the posterior part of the Trunk, cut off, by means of a Chisel or Saw, the back part of the Spinal Canal. Slit open the Dura Mater, and examine the Arteries and Veins of the Spinal Marrow, and the Venous Sinuses which are seen on the outside of the Dura Mater.—See Vol. III. p. 210.

GLOSSARY.

ABDOMEN, (*abdere*, to hide), the lower venter or belly, containing or hiding the intestines, &c.

ACANTHA, (*ακαζω*, to sharpen), sometimes used for the spine.

ACEPHALA, *α*, priv. *κεφαλη*, the head), animals of the oyster tribe, destitute of a head.

ACETABULUM, (*acetum*, vinegar,) the socket for the head of the thigh-bone, resembling an ancient vinegar-cruet.

ACINI, (*acinus*, a grape), the internal structure of several glands.

ACROMION, (*ακρος*, the extremity, and *ωμος*, the shoulder), a process of the scapula.

ADENOLOGY, (*αδη*, a gland, and *λογος*, a discourse), the doctrine of the glands.

ADNATA, (*adnascor*, to grow to), the external coat of the eye.

ALLANTOIS, (*αλλας*, a gut, and *ειδος*, shape), a membrane which receives the urine from the bladder in a foetal quadruped.

- ALVEOLI, (*alveus*, a conduit-pipe), the sockets for the teeth.
- AMNIOS, (*αμια*, blood, *αμνιον*, a vessel used by the ancients to receive the blood in sacrifices, *αμνος*, a lamb's skin), the soft membrane immediately surrounding the fœtus.
- AMPHIBIA, (*αμφι*, about, and *εο*, to go), such as live in land or water.
- AMPHYARTHROSIS, (*αμφω*, both, and *αρθρον*, articulation), an articulation admitting of an obscure motion.
- ANASTOMOSIS, (*ανα*, through, and *στομα*, a mouth), the communication of vessels with one another.
- ANATOMY, (*ανα*, through, and *τεμνω*, to cut), dissection, or that knowledge of animal bodies acquired by dissection.
- ANCON, the elbow, (from *ασπαζομαι*, to embrace), because the bones, being there united, are folded one into another. Hence also,
- ANCONEUS, a muscle situated there, and,
- ANCONOID, a process of the cubit, from *αγκων*, the elbow, and *ειδος*, a shape.
- ANGIOLOGY, (*αγγειον*, a vessel, and *λογος*, a discourse), a description of the vessels.
- ANTAGONIST, (*αντι*, against, and *αγων*, a struggle,) an epithet of a muscle acting contrary to another.
- ANTENNÆ, (*ante*, before, and *teneo*, to hold), the horns of insects.
- ANTIHELIX, (*αντι*, against, and *ειλω*, to turn about), the external part of the ear opposite to the helix.
- ANTITHENOR, (*αντι*, against, and *θεναρ*, the palm

of the hand), one of the muscles extending the thumb.

ANTITRAGUS, (*αντι*, against, and *τραγος*, a goat), a prominence of the ear opposite to the tragus.

ANUS, (a contraction of *Annulus*, a little ring), the extremity of the rectum, so called from its circular form.

AORTA, (*αορτη*, a vessel), the great artery of the heart.

APODES, (*α*, priv. and *πους*, a foot), having no ventral fins to serve as feet.

APONEUROSIS, (*απο*, from, and *νευρον*, a nerve), a tendinous expansion, supposed by the ancients to be that of a nerve.

APOPHYSIS, (*αποφυω*, to spring from), the process of a bone, and part of the same bone.

APSERA, (*α*, priv. and *πτερον*, a wing), insects without wings.

ARACHNOIDES, (*αραχνης*, a spider, and *ειδος*, likeness), a cob-web like membrane, one of the coats of the brain.

ARTERIA, (*αηρ*, air, and *τηρειω*, to keep), because the ancients thought that only air was contained in the arteries.

ARTHRODIA, (*αρθρον*, a joint), that kind of articulation which is shallow.

ARYTENOIDES, (*αρυταινα*, a ewer, and *ειδος*, shape), two cartilages of the larynx.

ASPERA ARTERIA, (*asper*, rough, and *arteria*, an air-vessel), the trachea or wind-pipe.

ASTRAGALUS, (*αστραγαλος*, a die), a bone of the tarsus resembling an ancient die.

- ATLAS**, (*ατλαω*, to sustain), the first of the cervical vertebræ, so named from supporting the head, as Atlas was supposed to support the world.
- AURELIA**, a chrysalis, having a golden hue, or shining appearance, previously to its becoming a perfect insect.
- AZYGOS**, (*α*, priv. and *ζυγος*, a yoke), a term applied to any part, not having a corresponding part.

B.

- BASILICA**, (*βασιλευς*, a king), an epithet, by way of eminence, given to one of the veins of the arm.
- BICEPS**, (*bis*, twice, and *caput*, a head), composed of two heads.
- BRACHIUM**, (*βραχυσ*, short), because, in general, from the shoulder to the hand is shorter than from the hip to the foot.
- BRADYPODA**, (*βραδυς*, slow, *πους*, a foot), slow moving animals.
- BRANCHIÆ**, (*βραγχια*, a gill.)
- BRANCHIOSTEGI**, (*βραγχια*, a gill, and *οστειον*, a bone), having osseous gills.
- BREGMA**, (*βρεχω*, to moisten), the opening of the head through which the superfluous humours of the brain were supposed to pass.
- BRONCHIA**, (*βρογχος*, the throat), the ramifications of the trachea.
- BUCCINATOR**, (a trumpeter), a muscle of the cheek, much used by trumpeters.

BURSALOGY, (*βυρσα*, a purse, and *λογος*, a discourse), a description of the *bursæ mucosæ*.

C

CAILLER, (*caillèr*, to curdle or coagulate), the fourth stomach of Pecora.

CALCANEUM, (*calx*, the heel), the name of the os calcis.

CALVARIA, or CALVA, (*calvus*, bald), the upper part of the cranium, which turns first bald.

CANCELLI, (lettice-work), the reticular substance in bones.

CAPILLARY VESSELS, (*capillus*, a little hair), the small ramifications of the arteries.

CAPUT GALLINAGINIS, a wood-cock's head, a little eminence at the termination of the seminal vessels of the Penis.

CARDIA, (*καρδια*, the heart), the superior opening of the stomach, so called from being situated near the heart.

CARNIVORA, (*caro*, flesh, and *voro*, to devour), animals that live on flesh.

CAROTID, (*καρωω*, to induce sleep), arteries of the head and neck, which if tied, the animal becomes comatose, or has the appearance of being asleep.

CARPUS, (*καρπος*), the wrist.

CARTILAGE, a matter softer than bone, but harder than ligament.

CEPHALIC VEIN, (*κεφαλη*, the head), the ancients being accustomed to open this vein in disorders of the head.

- CERATOGLOSSUS, (*κερας*, a horn, and *γλωττα*, a tongue), a muscle running from one of the cornua of the os hyoides to the tongue.
- CERATOPHYTA, (*κερας*, a horn, and *φυω*, gigno), animal plants having a horny axis, and fleshy substance.
- CEREBELLUM, dim. of CEREBRUM, the brain, (*καρη*, the head).
- CERVIX, the hinder part of the neck.
- CETACEA, (*cete*, a whale), belonging to the whale tribe.
- CHALAZÆ, (*χαλαζω*, *suspendo*), white flakes attached to the yolk of an egg.
- CHIRURGERY, (*χειρ*, the hand, and *εργον*, work), the profession of a surgeon.
- CHEIROPTERA, (*χειρ*, the hand, and *πτερον*, a wing), claw or forked-winged animals.
- CHEPHALOPODA, (*κεφαλον*, the head, and *πες*, a foot), animals of the class molusca possessing head and feet.
- CHOLEDOCHUS DUCTUS, (*χολη*, bile, and *δεχομαι*, to receive), the common bile-duct.
- CHONDROPTERYGII, (*χονδρος*, cartilage, and *πτερυγιον*, a wing), animals of the skate tribe.
- CHORION, (*χωριου*, domicilium), the outer membrane involving the fœtus; or *χορος*, a chorus, this membrane being supplied with many blood-vessels in quadrupeds.
- CHOROIDES, so called on account of its many blood-vessels, resembling the chorion.
- CHRYSALIS, (*χρυσος*, gold), from the golden colour.
- CLAVICULA, (dim. of *clavis*, a key), the clavicle or

- collar-bone ; so called from its resemblance to an ancient key.
- CLINOID, (*κλινη*, a bed, and *ειδος*, shape), processes of the sella Turcica of the sphenoid bone, so called from their resemblance to a couch.
- CLITORIS, (*κλειτω*, to conceal), a part of the female pudendum concealed by the labia majora.
- CLOACA, a receptacle for the fæces, &c.
- COCCYX, (*κοκκυξ*, a cuckoo), the lower end of the spina dorsa, so called from its resemblance to the beak of that bird.
- CŒLIACA, (*κολια*, the belly), the name of an artery in the abdomen.
- COLEOPTERA, (*κολιος*, a sheath, and *πτερον*, a wing), sheath-winged insects.
- COLLIQUAMENTUM, (*colliquesco*, to melt or dissolve), the liquor in which the chick *in ovo* is immersed.
- COLLUM, the fore part of the neck.
- COLON, (*κοιλος*, hollow), the first of the large intestines.
- CONDYLE, (*κονδυλος*, a joint, a knuckle, a knot), an eminence in several of the joints.
- CONGLOBATE, (*conglobatus*, gathered together in a circle), a gland subsisting by itself, like those of the absorbent system.
- CONGLOMERATE, (*conglomeratus*, heaped together), a gland composed of various glands.
- CORACO, names compounded with this word belong to muscles which are attached to the coracoid process of the scapula.
- CORACOID, (*κοραξ*, a crow, and *ειδος*, resemblance), like the beak of a crow.

- CORONARY, (*corona*, a crown), vessels so called from surrounding the parts like a crown.
- CORONOID, (*κορωνη*, a crow, and *ειδος*, shape,) a process shaped like a crow's beak.
- CORPUS CALLOSUM, (*corpus*, a body, and *callus*, hard), part of the medullary substance of the brain, supposed to be firmer than the rest.
- CORTICALIS SUBSTANTIA, (*cortex*, bark), the cortical substance of the brain.
- COSTÆ, (*custodio*, to guard), the ribs, because they guard the heart, &c.
- COTYLEDONS, (*καὶλυλη*, a cavity), glands, in some animals, dispersed over the chorion.
- COTYLOID, (*κοτυλη*, an old measure, and *ειδος*, shape), the cavity for receiving the head of the thigh-bone, resembling the rotuli.
- CRANIUM, (*κρανιον*, the skull, quasi *κερανιον*, from *κερα*, the head).
- CREMASTER, (*κρεμασω*, to suspend), a muscle so called, because it suspends the testicle.
- CRIBRIFORM, (*cribrum*, a sieve), perforated like a sieve.
- CRICOID, (*κρικος*, a ring, and *ειδος*, shape), annular.
- CRISTA GALLI, a portion of the ethmoid bone, so called from its resemblance to a cock's comb.
- CROTOPHITE, (*κροταφος*, the temple), the temporal muscle.
- CRURA, (*crus*, a leg), applied to some parts, from their resemblance to a leg.
- CUBITUS, (a *cubando*), that part of the arm from the elbow to the wrist; because the ancients, during meals, used to recline upon it.

CUBOIDES, (*κυβος*, a cube, and *ειδος*, shape,) a bone of the foot resembling a cube.

CUCULLARIS, (*cucullus*, a cowl or hood), the first muscle of the scapula, so called from its shape.

CUNEIFORM, (*cuneus*, a wedge), wedge-shaped.

CUTICULA, (the dim. of *cutis*, the skin), the scarf-skin.

CUTIS, the skin.

CYSTICUS DUCTUS, (*κυστις*, a bladder, *ductus*, a duct), the duct leading from the gall-bladder.

D

DARTOS, (*δειρω*, to excoriate), an imaginary muscle of the scrotum.

DELTOID, (*Δελτα*, the fourth letter of the Greek alphabet, and *ειδος*, shape), resembling the Greek letter Δ.

DIAPHRAGM, (*διαφρασσω*, to divide), the transverse muscle which separates the thorax from the abdomen.

DIASTOLE, (*διαστελλω*, to send through), the dilatation of the heart, auricles, and arteries, opposed to SYSTOLE, the contraction of the same parts.

DIARTHROSIS, (*διαρθρω*, to articulate), a moveable connexion of bones.

DIGASTRIC, (*δισ*, twice, and *γαστηρ*, a belly), having two bellies.

DIPLOE, (*διπλω*, to double), the spongy substance between the two tables of the skull.

DIPTERA, (*δισ*, twice, *πτερον*, a wing), two-winged insects.

- EPIDERMIS**, (*επι*, upon, and *δερμα*, the skin), the scarf-skin.
- EPIDIDYMIS**, (*επι*, upon, and *διδυμος*, twins, the testicles), the small oblong body which lies above the testicle.
- EPIGASTRIC**, (*επι*, upon, and *γαστηρ*, the belly), the superior part of the abdomen.
- EPIGLOTTIS**, (*επι*, upon, and *γλωττα*, the tongue), one of the five cartilages of the larynx, situated about the glottis.
- EPIPHIPIUM**, (*επι*, upon, and, *ιππος*, a horse), part of the os sphenoides, so called from its resemblance to a saddle.
- EPIPHYSIS**, (*επι*, upon, and *φύω*, to grow), a process attached to a bone, and not a part of the same bone.
- EPIPLOON**, (*επι*, upon, and *πλεω*, to sail), the omentum, or that membranous viscus of the abdomen which covers the intestines, and hangs from the bottom of the stomach.
- EPISTROPHÆUS**, (*επιστροφειω*, to turn about,) the second cervical vertebra,—the head is turned upon it.
- ESCHARA**, fishes which are said to chew the cud.
- ESOPHAGUS**, (*οιω*, to carry, *φαγω*, to eat), the canal leading from the pharynx to the stomach, carrying what is swallowed into the stomach.
- ETHMOID**, (*εθμος*, a sieve), so called because it is perforated like a sieve.

F.

FALCIFORM, (*falx*, a scythe), shaped like a scythe.

FASCIA, (*fascis*, a bundle), an expansion of a muscle, inclosing others like a band.

FAUCES, (the plural of *fauces*), the top of the throat.

FERÆ, (*ferus*, fierce, savage), wild beasts.

FIBULA, (a clasp), the lesser bone of the leg, which is thus named from being placed opposite to the part where the knee-buckle or clasp was formerly used.

FOETUS, a child in the womb past the third month, and fully formed.

G.

GALACTOPHEROUS, (*γαλα*, milk, and *φερω*, to carry), conveying the milk.

GANGLION, a knot in the course of a nerve.

GALLINACEA, (*gallus*, a cock), poultry.

GASTEROPODA, (*γαστηρ*, the belly, and *πυς*, foot), animals which crawl upon the belly, that serves as feet.

GASTROCNEMIUS, (*γαστηρ*, the belly, and *κνημη*, the leg), the muscle forming the thick of the leg.

GASTRO-EPIPLOIC, (*γαστηρ*, the stomach, and *επιπλοον*, the caul), belonging to the stomach and omentum.

GENIO, (*γενειον*, the chin), names compounded with this word belong to muscles attached to the chin.

GINGLYMUS, (*γυγγλυμος*, a hinge), articulation admitting flexion and extension.

GLANDULA, (dim. of *GLANS*, a nut or acorn).

GLENOID, (*γληνη*, a cavity), a part having a shallow cavity.

- GLIRES, animals of the dormous kind.
- GLOMER, a convoluted bundle of glands.
- GLOSSO, (*γλωσσα*, the tongue), names compounded with this word are applied to muscles attached to the tongue.
- GLOTTIS, (*γλωττα*, the tongue), the superior opening of the larynx at the root of the tongue.
- GLUTEUS, (*γλυστος*, the buttock), muscles forming part of the buttocks.
- GOMPHOSIS, (*γομφοσω*, to drive in a nail), an articulation of bones, like a nail in a piece of wood.
- GRALLÆ, (*gradiendo*, from walking, or wading), wading birds.
- GRANDINES, (*grando*, a hail stone), white flakes resembling hail stones, attached to the yolk of an egg.

H.

- HALONES, (*χαλω*, to breathe, or cast out concentric circles, *corona circa stellas*), little circles surrounding the tread of the cock on the yolk of an egg.
- HARMONIA, (*ἀρμωνα*, to fit together), a species of immovable articulation.
- HELIX, (*ελω*, to turn about), the outer bar or margin of the external ear.
- HERMAPHRODITES, (*Ἑρμης*, Mercury, and *Αφροδιτη*, Venus), such as have the genitals of both sexes.
- HYALOID, (*υαλος*, glass), the capsule of the vitreous humour of the eye, so called from its glassy appearance.

- HYMEN**, (the god of marriage), the membrane situated at the entrance of the virgin vagina.
- HYMENOPTERA**, (*ὑμην*, a membrane, and *πτερον*, a wing), insects with membranous wings.
- HYO**, names compounded with this word belong to muscles which are attached to the
- HYOIDES OS**, (*υ*, and *ειδος*, shape), a bone of the tongue resembling the Greek *υ* (upsilon.)
- HYPOCHONDRIUM**, (*ὑπο*, under, and *χονδρος*, a cartilage), the upper region of the abdomen, under the cartilages of the ribs.
- HYPOGASTRIC**, (*ὑπο*, under, and *γαστηρ*, the belly), the lower region of the fore part of the abdomen.
- HYPOGLOSSIS**, (*ὑπο*, under, and *γλωττα*, the tongue), parts which lie under the tongue.
- HYPOTHENAR**, (*ὑπο*, under, and *θεναρ*, the palm of the hand), one of the muscles contracting the thumb.

I.

- JEJUNUM**, (empty), one of the intestines, so called from being generally found empty.
- ILEUM**, (*ιλω*, to turn, a portion of the small intestines, so called from being found convoluted.
- INCISORES**, (*incidere*, to cut), the fore-teeth.
- INCUS**, (an anvil), a small bone of the internal ear, with which the malleus is articulated.
- INDEX**, (*indico*, to point out), the fore-finger.
- INNOMINATUM**, parts which have no proper name.
- INTERFEMINEUM**, *vide* PERINEUM.

IRIS, (the rain-bow), the membrane round the pupil of the eye, deriving its name from its various colours.

ISCHIUM, (*ισχυω*, to support), that part of the os innominatum upon which we sit.

JUGALE OS, the zygoma.

L.

LUCANÆ, (little cavities), the excretory ducts of the urethra, vagina, &c.

LAMBDOIDAL, resembling the Greek Λ (lambda).

LAMINA, a scale or plate. It is used for the tables of bones.

LARVÆ, masks or caterpillars of insects before they unfold themselves.

LARYNX, the superior part of the trachea.

LEPIDOPTERA, (*λεπις*, a scale, and *πτερον*, a wing), insects with scaly wings.

LINEA ALBA, a white line formed by the meeting of the tendons of the abdominal muscles.

LITHOPHYTA, (*λιθος*, a stone, and *φυω*, to beget), animal plants with a stony axis.

LUMBRICALES, (*lumbricus*, a worm), four muscles of the hand and foot.

M.

MARSUPIAL, (*μαρσупιον*, a purse or pouch), animals having a pouch on the abdomen.

MASSETER, (*μασσαιμαι*, to chew), a muscle which assists in chewing.

- MASTOID**, (*μαστος*, a breast), shaped like a nipple or breast.
- MAXILLA**, (*μασσω*, to chew), the jaw.
- MEDIANA VENA**, the middle vein of the arm, between the basilic and cephalic.
- MEDIASTINUM**, (*medium*, the middle), a middle portion separating parts from each other.
- MEMBRANA NICTITANS**, (*nicto*, to wink), a membrane with which birds can occasionally cover the eye.
- MENINGES**, (*μηνιγξ*, a membrane), the dura and pia mater.
- MESENTERY**, (*μεσος*, the middle, and *εντερον*, the intestine), the membrane in the middle of the intestines, by which they are attached to the spine.
- MESERAIC**, (*μεσος*, the middle, and *αραια*, the belly), the same as the last article.
- MESOCOLON**, (*μεσος*, the middle, and *κολον*, the colon), that part of the mesentery in the middle of the colon.
- METACARPUS**, (*μετα*, after, and *καρπος*, the wrist), that part of the hand between the carpus and fingers.
- METATARSUS**, (*μετα*, after, and *ταρσος*, the tarsus), that part of the foot between the tarsus and toes.
- MITRALIS VALVULA**, (*mitra*, a mitre), valves at the left ventricle of the heart, like a mitre.
- MOLLUSCA**, animals, as the cuttle-fish, slug, &c. with a soft covering.
- MYLO**, (*μυλη*, a grinder-tooth), names compounded of this word belong to muscles that are attached near the grinders.

MYOIDES PLATYSMA, a muscular expansion on the neck. *See* PLATYSMA.

MYOLOGY, (*μυων*, muscular), the doctrine of the muscles.

N.

NAVICULARE, (*navicula*, a small boat), a bone of the carpus, and also of the tarsus.

NEUROLOGY, (*νευρον*, a nerve), the doctrine of the nerves.

NYMPHA, (*νεος*, new, and *φαινω*, to appear), a young insect at its appearance.

NYMPHÆ, two semicircular glandular membranes in the *Pudendum Muliebre*, so called because they direct the course of the urine, as the Nymphs were supposed to direct the course of the waters.

Q.

OBOMASUM, the fourth stomach of pecora, which succeeds to OMASUM, the many plies.

ODONTOIDES, (*οδεις*, a tooth, and *ειδος*, shape), tooth-like.

OLECRANON, (*ωλενη*, the cubit, and *κρανον*, the head), the elbow, or head of the ulna.

OMENTUM, (*omen*, a guess), an abdominal viscus, so called because the ancient priests pretended to reveal the secrets of heaven by inspecting this viscus.

OMO, (*ωμος*, the shoulder), names compounded of this word belong to muscles attached to the scapula.

OMO-PLATA, (*ωμος*, the shoulder, and *πλατυς*, broad), the scapula or shoulder-blade.

OSTEOLOGY, (*οσσειον*, a bone), the doctrine of the bones.

P.

- PACHYDERMATA**, (*παχυς*, thick, and *δερμα*, a hide), thick skinned animals.
- PALPI**, (*palpo*, to grope or feel one's way), feelers.
- PANCREAS**, (*παν*, all, and *κρεας*, flesh), a gland of the abdomen.
- PANNICULUS CARNOSUS**, (*pannus*, a covering, and *caro*, flesh), a fleshy covering.
- PARENCHYMA**, (*παρεγγχειω*, to pour through), a substance connecting the vessels, &c. of the lungs, liver, &c.
- PARIETALIA**, (*paries*, a wall), bones of the cranium, serving as a wall to the brain.
- PAROTID**, (*παρεα*, near, and *ωτος*, the gen. of *ος*, the ear), a gland situated near the ear.
- PATELLA**, (dim. of *patina*, a pan), the knee-pan.
- PATHETICA**, (*παθος*, passion), the fourth pair of nerves, because, by means of these, the eyes express certain passions.
- PECORA**, large cattle, as oxen, &c.
- PECUDES**, small cattle, as sheep, &c.
- PELVIS**, (*πελυξ*, a basin), the basin of the kidneys, or the lower part of the abdomen, in which the bladder and rectum (and in women also the uterus) are contained.
- PERICARDIUM**, (*περι*, around, and *καρδια*, the heart), the membrane surrounding the heart.
- PERICRANIUM**, (*περι*, around, and *κρανιον*, the cranium), the membrane covering the bones of the cranium.

- PERINEUM**, (*περινω*, to flow round, because that part is generally moist), the space between the external parts of generation and the anus. It is sometimes called **INTERFEMINEUM**, (*inter*, between, and *femen*, the inside of the thigh).
- PERIOSTEUM**; (*περι*, against, and *οστειον*, a bone), the membrane surrounding the bones.
- PERISTALTIC**, (*περισιλλω*, to contract), the motion of the intestines.
- PERITONEUM**, (*περιτενω*, to extend round), the membrane lining the abdomen, and covering its viscera.
- PETROSUM OS**, (*πετρα*, a rock), part of the temporal bone.
- PHALANX**, (an army), the bones of the fingers and toes are called phalanges, from their regularity.
- PHARYNX**, (*φερειν*, to convey, because it conveys the food into the stomach), a membranous bag at the back of the mouth.
- PHRENIC**, (*φρενες*, the diaphragm, *φρην*, the mind, because the diaphragm was supposed to be the seat of the mind), the name of a nerve, &c.
- PHYSIOLOGY**, (*φυσις*, nature), an account of the actions and functions of an animated body.
- PIA MATER**, the innermost membrane around the brain.
- PLACENTA**, (*πλακως*, a cake), the after-birth.
- PLANTARIS**, (*planta*, the sole), parts situated in the sole.
- PLATYSMA-MYOIDES**, (*πλατυς*, broad, *μυων*, a muscle, and *ειδος*, shape), a muscle of the neck.
- PLEURA**, (*πλευρα*, the side), the membrane lining the cavity of the thorax.

- PLEXUS, (*plecto*, to weave together), a kind of network of blood-vessels or nerves.
- POPLITEUS, (*poples*, the ham), a muscle of the leg.
- PREPUCE, (*præputo*, to cut off before), the foreskin of the penis, which the eastern nations generally cut off.
- PROCESSUS, (*procedo*, to start out), a protuberance of a bone.
- PROSTATÆ, (*πρῶ*, before, and *ιστημι*, to stand), a gland situated before the *vesiculæ seminales*.
- PSOAS, (*ψοα*, the loin), a muscle so named from its situation.
- PTERYGOID, (*πτέρυα*, a wing), a process resembling a wing.
- PTERYGO-STAPHALINI, (*πτέρυξ*, a wing, and *σταφυλη*, the palate), muscles arising from the pterygoid process of the os sphenoides, and inserted into the uvula.
- PUDENDA, (*pudor*, shame), the parts of generation.
- PUPA, the embryo of an insect not yet formed.
- PUPILLA, (a little puppet), the round aperture in the iris of the eye.
- PYLORUS, (*πυλῶρος*, the keeper of a gate), the lower orifice of the stomach, guarding the entrance of the bowels.
- PYRAMIDALIS, shaped like a pyramid.

R.

- RACEMUS, (a bunch or cluster), the ovarium of birds.

RADIUS, (the spoke of a wheel), the small bone of the fore-arm.

RANULAR, like a frog or toad.

RAPHE, (*ραπτω*, to sew), a suture.

RECTUM, the straight gut, the last of the intestines.

RENES, (*ρῆω*, to flow), the kidneys through which the urine flows.

REPTILES, (*repto*, to creep).

RETINA, (*rete*, a net), the net-like expansion of the optic nerve on the inner surface of the eye.

RHOMBOIDES, a muscle so called from resembling a geometrical figure (*ρῶμβος*), the sides of which are equal, but not right angled.

RODENTIA, (*rodo*, to gnaw or cut), gnawing animals, as the mouse and rat.

ROTULA, (dim. of *rota*, a wheel), the knee-pan.

RUMINANTS, (*rumina*, to chew the cud).

S.

SACRUM, (sacred), a bone so called, because it was offered in sacrifice.

SAGITTALIS, (*sagitta*, an arrow), a suture in the cranium.

SALVATELLA, (*salvo*, to preserve), a vein of the foot, the opening of which was said to preserve health, and to cure melancholy.

SANGUIS, (*σῶω*, to preserve), the blood.

SAPHENA, (*σαφος*, manifest), a vein of the leg.

SARTORIUS, (*sartor*, a tailor,) the muscle by means of which a tailor lays his legs across.

- SCALENI, (*σκαληνος*, a geometrical figure with three unequal sides), muscles of the neck.
- SCAPHA, (a little boat), the depression of the outer ear before the antihelix.
- SCAPHOIDES, (resembling a boat), a bone of the carpus, and also of the tarsus.
- SCAPULA, the shoulder-blade.
- SCELETUS, (*σκελλω*, to dry), a skeleton.
- SCLEROTIC, (*σκληρος*, hard), the outermost or hardest membrane of the eye.
- SCUTELLUM, a little shield for the defence of an insect.
- SCUTIFORM, shaped like a shield.
- SELLA TURCICA, SELLA EQUINA, SELLA SPHENOIDES, are various names for a part of the sphenoid bone resembling a Turkish saddle.
- SEPTUM CORDIS, (*sepes*, a hedge), the fleshy substance which separates the right from the left ventricle of the heart.
- SESAMOID, (*σεσαμη*, an Indian bean), small bones in the hands and feet resembling the *semen sesami*.
- SIGMOID, resembling the Greek Σ (sigma.)
- SOLIPEDS, (*solus*, entire, and *pes*, a foot), animals, as a horse, with single hoofs.
- SPHENOID, (*σφην*, a wedge), shaped like a wedge.
- SPHINCTER, (*σφιγγω*, to shut up), the name of several muscles, the office of which is to shut up the apertures round which they are placed.
- SPLANCHNOLOGY, (*σπλαχνον*, an entrail), the doctrine of the viscera.
- SQUAMOUS, (*squama*, a scale), covering as the scales of fishes do each other.

- STAPES, (a stirrup), one of the small bones of the internal ear.
- STEMMATA, (*στημι*, to stand), the eyes of some insects which are supported on stalks, as the antheræ are supported on the filaments of plants.
- STIGMATA, the external openings of the trachea of insects compared to the stigma of the flowers of plants.
- STOMACHUS, (*σπουα*, a mouth, and *χωω*, to pour), the stomach, or upper orifice of the ventricle.
- STRUTHIONES, (*στρουθος*, a sparrow, also an ostrich), birds resembling the ostrich.
- STYLOID, (*stylus*, a pencil), a process like a pencil on the temporal bone.
- SUCCENTURIATUS, (*succenturiare*, to supply the place of another, to reserve).
- SYMPHYSIS, (*συμφωω*, to draw together), the connexion of bones which have no manifest motion.
- SYNARTHROSIS, (*συν*, with, and *αρθρον*, a joint), articulation without manifest motion.
- SYNCHONDROSIS, (*συν*, with, and *χονδρος*, a cartilage), articulation by means of intervening cartilage.
- SYNDESMOLOGY, (*συνδεσμος*, a ligament), the doctrine of ligaments.
- SYNDESMOSIS, the connexion of bones by ligaments.
- SYNEUROSIS, (*συν*, with, and *νευρον*, a nerve), the connexion of bones by tendon, formerly mistaken for nerve.
- SYNTHESIS, (*συντιθημι*, to put together), the anatomical connexion of the bones of the skeleton.

SYSSARCOSIS, (*συν*, with, and *σαρξ*, flesh), the connexion of bones by muscle.

SYSTOLE, (*συστέλλω*, to contract), *vide* DIASTOLE.

T.

TALUS, (a die), a bone of the heel.

TARSUS, the space between the bones of the leg and the metatarsus.

TENDON, (*τείνω*, to extend), the extremity of a muscle.

TENTACULA, (*tento*, to seize), organs by which certain animals attach themselves to surrounding objects.

TERES, (round), the name of a muscle.

TESTIS, (a witness, *quia est quasi testis virilitatis*), testicle.

THECA, (a sheath), the spinal canal is sometimes called *Theca Vertebralis*.

THENAR, (the palm of the hand), a muscle extending the thumb.

THORAX, (*θορᾶω*, to leap), the chest in which the heart leaps or beats.

THYMUS, (*thymus*, thyme), a temporary gland in the thorax.

THYRO, names compounded with this word belong to muscles which are attached to the

THYROID, (*θυρεός*, a shield), cartilage, shaped like a shield.

TIBIA, (a pipe), the great bone of the leg.

TONSILS, the round glands placed between the arches of the palate.

TRACHEA, (*τραχεύς*, rough), the wind-pipe.

TRAGUS, (a goat), a small eminence of the external ear, upon which hair often grows like the beard of a goat.

TRAPEZOID, like a trapezium.

TROCHANTER, (*τροχῶν*, to run or to roll), a process of the thigh-bone, the muscles inserted into which perform the office of running.

TROCHLEA, (*τροχός*, a wheel), a kind of cartilaginous pulley.

TROCHLEARIS, an articulation, where one part moves round another like a pulley.

TUBÆ FALLOPIANÆ, two passages in the womb like trumpets, described by FALLOPIUS.

TYMPANUM, the drum of the ear.

U.

ULNA, (*ωλενή*, the cubit), the large bone of the forearm.

UMBILICUS, (*umbo ilium*, the middle of the loins), the navel.

URACHUS, (*ὑρον*, urine, and *χέω*, to pour), a ligament of the bladder, occupying the place of the urinary passage of a fœtal quadruped, which goes into the allantois.

URETER, (*ὑρον*, urine), the canal that carries the urine from the kidney into the bladder.

URETHRA, the passage for the urine from the bladder.

UVEA, (*ὑνα*, a grape), the posterior lamina of the iris.

UVULA, the glandular substance which hangs down from the middle of the soft palate.

VALVES, (*valvæ*, folding doors), little membranes preventing the return of the fluids in the blood-vessels and absorbents.

VERTEBRÆ, (*verto*, to turn), the bones of the spine.

VOMER, (a plough-share), a bone of the nose.

X.

XIPHOID, (*ξίφος*, a sword), like a sword.

Z.

ZOOPHITES, (*ζωον*, animal, and *φύλον*, a plant), substances which partake of the nature of animals and plants.

ZYGOMA, (*ζυγος*, a yoke), the arch formed by the zygomatic processes of the temporal and cheek bones.

INDEX.

A.

	Vol. Pag.
ABDOMEN, of the, - - -	ii. 208
———, muscles on the anterior and lateral parts of the, -	i. 210
———, ——— within the cavity of the, -	229
———, blood-vessels of the containing parts of the, &c. and of the pelvis and inferior extremity, -	iii. 102
———, blood-vessels within the cavity of the, - - -	77, &c.
———, fascia of the, - - -	i. 210.218
———, lymphatics of the under part of the, &c. - - -	iii. 147
———, nerves within the cavity of the, -	240, &c.
Abducentes, or sixth pair of nerves, -	190
Abductor oculi, - - -	ii. 75
——— { indicis manus, - - -	i. 277
——— { minimi digiti manus, -	278
——— { pollicis manus, - - -	276
——— { or prior indicis, - - -	312
——— { ——— medii digiti } pedis, -	311
——— { ——— tertii digiti } - - -	309
——— { minimi digiti pedis, - - -	308
——— { pollicis pedis, - - -	143
ABSORBENTS, of the, - - -	iii. 135
Absorbent glands, - - -	143

	Vol. Pag.
Absorption, see use of the absorbents,	iii. 142
Accelerator urinæ, - - -	i. 223
Accessorii ad sacro-lumbalem, - - -	244
Accessory nerve to the eighth pair, - - -	iii. 204
Acervulus cerebri, - - -	ii. 37
Acusticus, nervus, - - -	iii. 192
Adductor { minimi digiti manus, - - -	i. 278
{ pollicis manus, - - -	276
{ vel posterior indicis pedis, - - -	312
{ ————— medii digiti pedis,	<i>ib.</i>
{ ————— tertii digiti pedis,	313
{ — prior minimi digiti pedis, - - -	312
{ pollicis pedis, - - -	309
————— femoris triceps, - - -	286
————— oculi, - - -	ii. 75
Adeps, - - -	14
Adipose arteries, - - -	iii. 94
After-birth, - - -	ii. 325
Alæ vespertilionis, - - -	300
Albuginea tunica, testis, - - -	277
—————, oculi, - - -	58
Almonds of the ear, - - -	146
Alveolar artery, - - -	iii. 27
Amnios, - - -	ii. 329
Amygdalæ, - - -	146
Anconeus, - - -	i. 265
Anastomoses of arteries, - - -	iii. 9
Anomalous maxillæ superioris, musculus, - - -	i. 187
Anterior auris, - - -	185
Antihelix, - - -	ii. 82
Antitragicus, - - -	82
Antitragus, - - -	<i>ib.</i>
Anus, muscles of the, - - -	i. 222
Aorta, general course of the, - - -	iii. 16
Aponeurosis of the superior extremity,	i. 262
————— inferior extremity, - - -	284
————— palmaris, - - -	266
————— plantaris, - - -	305
————— temporalis, - - -	192
Appendages of the skin, - - -	ii. 10
Appndices vermiformes cerebelli,	38

	Vol. Pag.
Appendix vermiformis intestini cæci, - - - - -	ii. 224
Aqua labyrinthi, - - - - -	101
Aquæductus cochleæ, - - - - -	<i>ib.</i>
————— COTUNNI, - - - - -	<i>ib.</i>
————— FALLOPII, - - - - -	99
————— SYLVII, - - - - -	36
————— vestibuli, - - - - -	101
Aqueous humour of the eye, - - - - -	65
Arachnoidea, tunica, - - - - -	23
Arbor vitæ, - - - - -	39
Arch of the aorta, - - - - -	iii. 16
——, crural, - - - - -	i. 214
Arches of the palate, - - - - -	ii. 146
Arcus plantaris arteriosus, - - - - -	iii. 127
—— arteriosus volaris profundus, - - - - -	62
————— superficialis, - - - - -	65
Arm-bone, - - - - -	i. 128
ARTERIES, of the, - - - - -	iii. 3
Articular nerve of the shoulder, - - - - -	220
Aryteno-epiglottideus, - - - - -	i. 209
Arytenoid cartilages, - - - - -	ii. 151
————— glands, - - - - -	154
Arytenoideus, { obliquus, - - - - -	i. 208
{ transversus, - - - - -	209
Astragalus, - - - - -	161
Atloido-occipitalis, - - - - -	249
Atloido-sub-mastoideus, - - - - -	250
Atloido-sub-occipitalis, - - - - -	240
Attollens aurem, - - - - -	184
Auditorius, nervus, - - - - -	iii. 192
Aurem retrahentes, - - - - -	i. 185
Auricles of the heart, - - - - -	ii. 174.173
Auricularis posterior arteria, - - - - -	iii. 24
Auris transversus, - - - - -	ii. 84
Axillary artery, - - - - -	iii. 53
————— vein, - - - - -	69
————— glands, - - - - -	166
————— plexus of nerves, - - - - -	219
Azygos uvulæ, - - - - -	i. 204
————— vena, - - - - -	iii. 76

B.

	Vol.	Pag.
BALL OF THE EYE, - - -	ii.	53
_____ , coats of the, -		54
_____ , humours of the, -		65
_____ , muscles of the, -		72
_____ , vessels of the, ii. 77, iii.		31
_____ , nerves of the, ii. 78, iii.		182
BAYNHAM'S membrane, see inflamed skin,	ii.	9
Basilar artery, - - -	iii.	39
Basilic vein, - - -		67
Bibitorius, - - -	ii.	75
Biceps flexor cubiti, - - -	i.	263
_____ cruris, - - -		296
Bifemoro-calcaneus, - - -		298
Bile, the secretion of the, - - -	ii.	252
Biventer cervicis, - - -	i.	246
_____ maxillæ inferioris, - - -		198
BLADDER OF URINE, - - -	ii.	269
_____ , blood-vessels of the, ii. 274, iii.		97
_____ , lymphatics of the,		151
BLOOD, the constituent parts of the, -	ii.	192
BLOOD-VESSELS in general, of the, -	iii.	3
BONES in general, of the, - - -	i.	3
Bones of the cranium, - - -		27
_____ face, - - -		64
_____ trunk, - - -		86
_____ pelvis, - - -		103
_____ thorax, - - -		113
_____ superior extremity, - - -		122
_____ inferior extremity, - - -		150
BONES, analysis of the, - - -		9
_____ , blood-vessels of the, - - -		7
_____ , cancelli of the, - - -		5
_____ , cavities of the, - - -		21
_____ , classes of the, - - -		20
_____ , colour of the, - - -		3
_____ , comparative view of the, - - -		8
_____ , composition of the, - - -		3
_____ , different kinds of connexion of,		23

	Vol.	Pag.
Bones, different kinds of motion of,	i.	24
———, lamellæ, or plates of the,	-	4
———, lymphatics of the,	-	9
———, nerves of the,	-	<i>ib.</i>
———, original formation of the,	.	17
———, prominences of the,	-	21
———, use of the,	-	10
Brachii os,	-	128
Brachial artery,	iii.	57
Brachialis internus,	i.	264
BRAIN, of the,	ii.	17
———, arteries of the,	ii. 44, iii.	34
———, veins of the,	iii.	46
———, nerves of the,	ii. 44, iii.	180
Breast-bone, or sternum,	i.	118
Bregma,	i. 42, ii.	333
Bronchi,	-	197
Bronchial arteries and veins,	ii. 201, iii.	72.75.76
——— glands,	ii.	200
Buccalis arteria,	iii.	27
Buccinator,	i.	190
Bucco-labialis,	-	<i>ib.</i>
Bulb of the urethra,	ii.	290
Bulbo-urethralis,	i.	223
BURSÆ MUCOSÆ, of the,	-	315
Bursæ mucosæ of the superior extremity,	-	320
——— of the inferior extremity,	-	324
——— of the head and neck,	-	319
——— upon the pelvis and upper part of the thigh,	-	324

C.

Cæcum, intestinum,	ii.	223
———, absorbents of the,	iii.	156
Calamus scriptorius,	ii.	40
Calcis, os,	i.	163
Calco-sub-phalangeus communis,	-	305
——— pollicis,	-	308
Calco-sub-phalangeus minimi digiti,	-	309
Calco-super-phalangeus communis,	-	304

	Vol. Pag.
Circumvolutions of the brain, -	ii. 25
----- cerebellum, -	38
Circus arteriosus WILLISII, -	iii. 35.41
Clavicle, - - - - -	i. 122
Claviculi of bones, - - - - -	4
Clitoridis erector, - - - - -	226
Clitoris, - - - - -	ii. 310
Coats of the eye, - - - - -	54
Coccygeus, - - - - -	i. 228
Coccygis, os, - - - - -	100
Cochlea, - - - - -	ii. 95
Cœliac artery, - - - - -	iii. 79
----- ganglion, - - - - -	241
Colic arteries, - - - - -	85.87
----- veins, - - - - -	88.89
Collar-bone, - - - - -	i. 122
Colli { interspinales, - - - - -	252
{ intertransversales, - - - - -	<i>ib.</i>
----- longus, - - - - -	238
----- semispinalis, - - - - -	248
----- transversalis, - - - - -	249
Colon, - - - - -	ii. 223
-----, absorbents of the, - - - - -	iii. 156
Columnæ carneæ of the heart, - - - - -	ii. 178
----- valvulæ VIEUSSENII, - - - - -	40
Commissura cerebri { anterior, - - - - -	36
{ posterior, - - - - -	<i>ib.</i>
----- mollis of the optic thalami, - - - - -	30
Communicans arteria, - - - - -	iii. 40
----- faciei nervus, - - - - -	194
Complexus, - - - - -	i. 246
Compressor naris, - - - - -	186
----- { prostatae, - - - - -	226
{ urethrae, - - - - -	<i>ib.</i>
Concha of the ear, - - - - -	ii. 82
Conchæ inferiores of the nose, - - - - -	i. 75
Connexion of bones, different kinds of, - - - - -	23
Constrictor isthmi faucium, - - - - -	203
----- pharyngis { inferior, - - - - -	205
{ medius, - - - - -	<i>ib.</i>
{ superior, - - - - -	216

	Vol. Pag.
Costo-scapularis, - - - - -	i. 235
Coxæ, os, - - - - -	103
CRANIUM, bones of the, - - - - -	27
———, muscles of the integuments of the, - - - - -	181
———, nerves which pass through the base of the, - - - - -	iii. 180
Cremaster, - - - - -	i. 222
Crico-arytenoideus { lateralis, - - - - -	207
{ posticus, - - - - -	<i>ib.</i>
Cricoid cartilage, - - - - -	ii. 150
Crico-thyroideus, - - - - -	i. 197
Crura cerebri, - - - - -	ii. 41
——— cerebelli, - - - - -	<i>ib.</i>
——— anterior medullæ oblongatæ, - - - - -	<i>ib.</i>
Crural arch, - - - - -	i. 214
——— artery, - - - - -	iii. 113
——— foramen, - - - - -	i. 219
——— nerve, - - - - -	iii. 251
——— ring, - - - - -	i. 220
——— sheath, - - - - -	218
——— vein, - - - - -	iii. 131
Cruralis, - - - - -	i. 293
Crystalline lens, - - - - -	ii. 66
Cubito-carpeus, - - - - -	i. 267
——— phalangeus communis, - - - - -	270
——— super-metacarpeus, - - - - -	269
——— pollicis, - - - - -	275
——— radialis, - - - - -	273
——— super-phalangeus primus indicis, - - - - -	277
——— pollicis, - - - - -	275
——— secundus pollicis, - - - - -	276
Cuboides, os, - - - - -	166
Cucullaris, - - - - -	240
Cuneiforme, os, - - - - -	140
Cuneiformia, ossa, - - - - -	164
Curvator coccygis, - - - - -	229
Cutaneous nerve of the superior extremity, - - - - -	iii. 221
Cutaneus, - - - - -	i. 195
Cuticle, - - - - -	ii. 3
Cutis vera, - - - - -	6
Cystic artery, - - - - -	iii. 82

Vol. Pag.

Cystic duct, - - - - -	ii. 250
Cystis fellis, - - - - -	248

D

Dartos, - - - - -	276		
Deglutition, muscles of, see those of the tongue, palate, and throat.			
Deltoides, - - - - -	i. 259		
Depressor	{	anguli oris, - - - - -	188
		labii inferioris, - - - - -	<i>ib.</i>
		labii superioris alæque nasi, - - - - -	187
_____ oculi, - - - - -	ii. 74		
Diaphragm, - - - - -	i. 229		
_____, blood-vessels of the, - - - - -	iii. 77		
_____, nerves of the, - - - - -	217.230		
Didymi, - - - - -	ii. 275		
Digastricus, - - - - -	i. 198		
Digestion of the food in the stomach, - - - - -	ii. 219		
Digital cavities of the brain, - - - - -	29		
Diverging apparatus of fibres of the brain, - - - - -	44		
Dorsal vertebræ, - - - - -	i. 93		
_____ nerves, - - - - -	iii. 238		
Dorsalis linguæ arteria, - - - - -	21		
_____ scapulæ superior arteria, - - - - -	53		
_____ penis, nervus, - - - - -	247		
Dorsi interspinales, - - - - -	i. 252		
_____ intertransversales, - - - - -	<i>ib.</i>		
_____ latissimus, - - - - -	241		
_____ longissimus, - - - - -	245		
_____ semispinalis, - - - - -	247		
Dorso-cervicalis, - - - - -	243		
_____ costalis, - - - - -	<i>ib.</i>		
_____ scapularis, - - - - -	242		
_____ super-acromialis, - - - - -	240		
Drum of the ear, - - - - -	ii. 87		
Duct, cystic, - - - - -	250		
_____, hepatic, - - - - -	248		
_____, lacrymal, - - - - -	110		
_____, pancreatic, - - - - -	258		
_____, parotid, - - - - -	121		
_____, thoracic, - - - - -	ii. 206, iii. 160.163		
Ducts, biliary, - - - - -	ii. 248		

	Vol. Pag.
Ducts, lacrymal, - - - - -	ii. 52
—, lactiferous, - - - - -	163
—, sebaceous, - - - - -	13
Ductus communis choledochus, - - - - -	250
— incisivus, - - - - -	110
— venosus, - - - - -	339
Duodenum, - - - - -	221
DURA MATER, - - - - -	17
—, blood-vessels of the, ii. 21. iii. 26.46	
—, processes of the, - - - - -	ii. 19

E.

EAR, of the, - - - - -	81
—, small bones of the, - - - - -	90
—, external, - - - - -	81
—, muscles common to the head and, - - - - -	i. 184
— proper to the, - - - - -	ii. 83
—, internal, - - - - -	87
—, muscles of the, - - - - -	92
Eighth pair of nerves, - - - - -	iii. 197
Ejaculator seminis, - - - - -	i. 223
Elbow, ligaments of the, - - - - -	346
Eminentiaë { olivares, - - - - -	ii. 34
{ mammillares, - - - - -	40
{ pyramidales, - - - - -	43
pyramidales tympani, - - - - -	88
Emulgent artery and vein, - - - - -	iii. 92.93
Epicondilo-cubitalis, - - - - -	i. 265
—radialis, - - - - -	272
—super-metacarpeus, - - - - -	268
—super-phalangeus communis, - - - - -	271
Epicraneus, - - - - -	181
Epidermis, - - - - -	ii. 3
Epididymis, - - - - -	278.282
Epigastric artery, - - - - -	iii. 111
Epiglottis, - - - - -	ii. 152
Epiphysis, - - - - -	i. 19
Epiploon, - - - - -	ii. 228
Epitrochlo-metacarpeus, - - - - -	i. 267

	Vol.	Pag.
EYE, coats of the, - - -	ii.	54
—, humours of the, - - -		65
—, vessels of the, - - -	ii. 77, iii.	31.43
—, nerves of the, - - -	ii. 78. iii.	182
Eye-ball, muscles of the, - - -	ii.	72
Eye-lids, muscles of the, - - -	i.	181

F.

FACE, bones of the, - - -		64
—, muscles of the, - - -		186
—, lymphatics of the, - - -	iii.	167
—, blood-vessels of the, - - -		21.41
—, nerves of the, - - -		194
Facial artery, - - -		21
— line, DR CAMPER'S, - - -	i.	64
— nerves, - - -	iii.	194
False water, - - -	ii.	331
Falx, or septum cerebri, - - -		19
— minor, or septum cerebelli, - - -		20
Fascia lata femoris, - - -	i.	284
Fasciæ of the abdomen, - - -	210.218	
Fat, - - -	ii.	14
Fauces, see isthmus faucium, - - -		146
Femoral, or crural artery, - - -	iii.	113
— vein, - - -		131
—, large, or crural nerve, - - -		251
Femoris, os, - - -	i.	150
Femoro-calcaneus parvus, - - -		300
—-poplito-tibialis, - - -		296
Fenestra ovalis, - - -	ii.	89.95
—-rotunda, - - -		<i>ib.</i>
Fibula, - - -	i.	157
Fibular artery, - - -	iii.	124
— vein, - - -		131
Fibular nerve, - - -		257
Fifth pair of nerves, or par trigeminum, - - -		184
First pair of nerves, or olfactory, - - -		180
Flexor accessorius digitorum pedis, - - -	i.	306
— biceps cruris, - - -		296

	Vol. Pag.
Fossa SYLVII, - - -	ii. 25
Fourth pair of nerves, or pathetic, -	iii. 183
Frænum epiglottidis, - - -	ii. 152
----- labiorum, - - -	114
----- pudendi, - - -	310
----- linguæ, - - -	117
----- preputii, - - -	288
Frontal sinuses, - - -	i. 37. ii. 108
Frontalis, - - -	i. 181
Frontis, os, - - -	34
Fronto-superciliaris, - - -	182
G.	
GALENI vena, - - -	ii. 31
Gall-bladder, - - -	248
Ganglia, - - -	iii. 177
Ganglion semilunare magnum, - - -	241
Gastric arteries, - - -	80, &c.
----- veins, - - -	88.90
----- juice, - - -	ii. 217
Gastrocnemius { externus, - - -	i. 298
{ internus, - - -	299
Gemellus, - - -	298
Gemini, - - -	290
GENERATION and URINE, ORGANS of, - - -	ii. 261.297
-----, blood-vessels of the	
organs of, - - -	iii. 92
-----, lymphatics of the or-	
gans of, - - -	149
-----, muscles of the organs of, - - -	i. 222.226
----- and urine, nerves of the organs	
of, - - -	iii. 245
Genio-hyo-glossus, - - -	i. 199
Genio-hyoideus, - - -	ib.
Gland, lacrymal, - - -	ii. 51
-----, parotid, - - -	120
-----, pineal, - - -	37
-----, pituitary, - - -	35
-----, prostate, - - -	ii. 286
-----, anti-prostate, - - -	294

	Vol.	Pag.
Gland, sublingual,	ii.	122
——, submaxillary,		<i>ib.</i>
——, thymus,		334
——, thyroid,		156
Glands, accessory, of HALLER,		121
——, arytenoid,		154
——, axillary,	iii.	166
——, bronchial,	ii.	200
——, conglobate or lymphatic,	iii.	143
——, iliac,		150
——, inguinal,		149
——, lumbar,		150
——, mesenteric,		154
——, miliary,	ii.	13
—— of COWPER,		294
—— of the joints,	i.	330
——, popliteal,	iii.	146
——, renal,	ii.	267
——, salivary,		120
——, sebaceous, of the skin,		13
——, ———, of the eye-lids,		50
——, tracheal,		200
Glandulæ anti-prostatæ,		294
—— ceruminosæ,		85
—— ciliares,		50
—— concatenatæ,	iii.	169
—— MEIBOMIANÆ,	ii.	50
—— odoriferæ,		291.311
—— PACCHIONI,		18
—— PEYERI et BRUNNERI,		233
Glans penis,		291
—— clitoridis,		310
Globuli arteriarum termini,		264
Glossary,	iii.	327
Glosso-palatinus,	i.	203
—— pharyngeus, nervus,	iii.	197
Glottis,	ii.	153
——, ligaments of the,		<i>ib.</i>
——, muscles of the,		207
Gluteal artery,	iii.	106
—— nerves,		254

	Vol.	Pag.
Gluteus	{	maximus, - - - - - i. 288
		medius, - - - - - <i>ib.</i>
		minimus, - - - - - 289
Gracilis, - - - - -		292
GRAVID UTERUS, of the, - - - - -	ii.	314
Great hippocampus, - - - - -		33
Great sympathetic nerve, - - - - -	iii.	201
Gubernaculum testis, - - - - -	ii.	341
Gula, or gullet, - - - - -		204
Gums, - - - - -		114
Gustatorius nervus, - - - - -	iii.	189
Gutturalis arteria	{	superior, - - - - - 20
		inferior, - - - - - 52
Gyri of the cochlea, - - - - -	ii.	95

H.

Hæmorrhoidalis arteria	{	interna, - - - - - iii. 87
		media, - - - - - 109
		externa, - - - - - 99
_____ vena, - - - - -		88.101
Hairs, - - - - -		ii. 11
Ham-muscle, or popliteus, - - - - -	i.	296
HAND, bones of the, - - - - -		138
_____, blood-vessels of the, - - - - -	iii.	61. &c.
_____, ligaments of the, - - - - -	i.	349
_____, lymphatics of the, - - - - -	iii.	165
_____, muscles of the, - - - - -	i.	265
_____, nerves of the, - - - - -	iii.	222. &c.
HEAD, bones of the, - - - - -	i.	34
_____, blood-vessels of the, - - - - -	iii.	19.41
_____, ligaments of the, - - - - -	i.	332
_____, lymphatics on the, - - - - -	iii.	167
_____, muscles on the, - - - - -	i.	181
_____, nerves of the, - - - - -	iii.	179
HEART, of the, - - - - -	ii.	171
Helicis	{	major, - - - - - 83
		minor, - - - - - <i>ib.</i>
Helix, - - - - -	ii.	81
Hepatic artery, - - - - -	iii.	80
_____ veins, - - - - -		91

	Vol.	Pag.
Hepatic nerves, - - -	iii.	242
HIGHMORIANUM corpus, - - -	ii.	279
Hippocampus major, - - -		33
----- minor, - - -		30
Humeral artery, - - -	iii.	57
----- veins, - - -		68
Humeri, os, - - -	i.	128
Humero-cubitalis, - - -		264
-----super-metacarpeus, - - -		268
-----radialis, - - -		272
Humilis musculus, - - -	ii.	74
Humours of the eye, - - -		65
Hymen, - - -		312
Hyo-glossus, - - -	i.	200
Hyoides, os, - - -		84
Hyo-pharyngeus, - - -		205
-----thyroideus, - - -		197
Hypogastric artery, - - -	iii.	104
----- vein, - - -		133
----- lymphatics, - - -		152
----- nerves, - - -		244

I.

Jaw-bone, lower, - - -	i.	77
-----, ligaments of the, - - -		332
-----, muscles of the, - - -		192
-----, muscles between the, and os hyoides, - - -		198
Jejunum, - - -	ii.	222
-----, lacteals of the, - - -	iii.	154
Ileo-lumbaris arteria, - - -		105
Iliac arteries and veins, - - -	104.	132
----- glands, - - -		150
Iliacus internus, - - -	i.	233
Ilio-abdominalis, - - -		216
-----aponeuroso-femoris, - - -		291
-----costalis, - - -		231
-----lumbar artery, - - -	iii.	102
-----pretibialis, - - -	i.	292
-----rotuleus, - - -		293

	Vol. Pag.
Ilio-trochantineus, - - - - -	i. 233
— trochanterius magnus, - - - - -	288
— parvus, - - - - -	289
Ilium, intestinum, - - - - -	ii. 222
—, os, - - - - -	i. 103
IMPREGNATION, changes produced in the uterine system by, - - - - -	ii. 319
Incus, - - - - -	90
Indicator, - - - - -	i. 277
Indignabundus, - - - - -	ii. 75
INFERIOR EXTREMITY, aponeurosis of the, - - - - -	i. 284
—, bones of the, - - - - -	150
—, blood-vessels of the, - - - - -	iii. 102
—, ligaments of the, - - - - -	i. 354
—, lymphatics of the, - - - - -	iii. 146
—, muscles of the, - - - - -	i. 284
—, nerves of the, - - - - -	iii. 248
Infra-orbital artery, - - - - -	27
Infra-spinatus, - - - - -	i. 258
Infundibulum of the brain, - - - - -	ii. 35
— of the cochlea, - - - - -	96
— of the kidneys, - - - - -	266
Inguinal glands, - - - - -	iii. 174.150
Innominata arteria, - - - - -	51
Innominatum, os, - - - - -	i. 103
Inspiration, - - - - -	ii. 202
Integuments, common, of the, - - - - -	3
Intercostal arteries and veins, - - - - -	iii. 74.76
— nerves, - - - - -	238
Intercostales { externi, - - - - -	i. 236
{ interni, - - - - -	<i>ib.</i>
Internus mallei, - - - - -	ii. 90
Interossei { manus, - - - - -	i. 279
{ pedis, - - - - -	311
Interosseæ arteriæ, - - - - -	iii. 63
Interosseus auricularis, - - - - -	i. 280
Interspinales et intertransversales { colli, - - - - -	252
{ dorsi, - - - - -	<i>ib.</i>
{ lumborum, - - - - -	252.253
Intervertebral substances, - - - - -	87.335
INTESTINES, - - - - -	ii. 220
—, small, - - - - -	221

	Vol. Pag.
INTESTINES, great, - - - - -	ii. 223
———, absorbents of the, - - - - -	iii. 153
———, blood-vessels of the, - - - - -	83
Iris, - - - - -	ii. 56
Ischiatic artery, - - - - -	iii. 109
——— nerve, - - - - -	255
Ischio-cavernosus, - - - - -	i. 223
———coccygeus, - - - - -	229
———femoralis, - - - - -	286
———femoro-peronealis, - - - - -	296
———perinealis, - - - - -	224
———poplito-tibialis, - - - - -	295
———pretibialis, - - - - -	<i>ib.</i>
———sub-clitorideus, - - - - -	226
———sub-penialis, - - - - -	223
———sub-trochanterius, - - - - -	291
———trochanterius, - - - - -	290
Ischium, os, - - - - -	106
Isthmus hepatis, - - - - -	ii. 242
———faucium, - - - - -	146
———VIEUSSENII, - - - - -	176
Iter a palato ad aurem, - - - - -	88
Iter ad tertium ventriculum, - - - - -	34
———quartum ventriculum, - - - - -	36
Jugalia, ossa, - - - - -	i. 67
Jugular vein, { external, - - - - -	iii. 42
{ internal, - - - - -	49

K.

KIDNEYS, - - - - -	ii. 261
———, blood-vessels of the, - - - - -	ii. 263, iii. 92.93
———, lymphatics of the, - - - - -	159
———, nerves of the, - - - - -	245
Knee-joint, ligaments of the, - - - - -	i. 356
Knee-pan, - - - - -	159

L.

Labia pudendi, - - - - -	ii. 309
--------------------------	---------

	Vol.	Pag.
Ligaments of the bones of the pelvis, - -	i.	339
----- of the superior extremity, -		343
----- of the inferior extremity, -		354
----- of the liver, - -	ii.	243
Ligamentum denticulatum, - -	iii.	209
----- suspensorium penis, -	ii.	289
Linguale, os, - - -	i.	84
Lingualis, - - -		200
Lingual artery, - - -	iii.	21
----- vein, - - -		50
----- nerve, - - -		200
Lips, - - -	ii.	113
Liquor amnii, - - -		330
----- pericardii, - - -		170
LIVER, - - -		240
-----, blood-vessels of the, - -	ii. 245, iii.	81.90
-----, ligaments of the, - -	ii.	243
-----, lymphatics of the, - -	iii.	156
-----, nerves of the, - - -		242
Lobes of the brain, - - -	ii.	24
----- of the liver, - - -		241
----- of the lungs, - - -		195
Locus niger crurum cerebri, - -		41
Longus colli, - - -	i.	238
Longissimus dorsi, - - -		245
Lumbar arteries, - - -	iii.	102
----- glands, - - -		150
----- plexus of nerves, - - -		249
----- vertebræ, - - -	i.	94
Lumbo-abdominalis, - - -		217
-----costalis, - - -		242
-----humeralis, - - -		241
Lumbricales manus, - - -		271
----- pedis, - - -		307
Lunare, os, - - -		139
LUNGS, - - -	ii.	193
-----, blood-vessels of the, - -	ii. 201, iii.	72.75
-----, lymphatics of the, - - -		161
-----, nerves of the, - - -		232
Lymph, - - -		138

	Vol. Pag.
LYMPHATICS, - - - - -	iii. 137
Lyra fornicis, - - - - -	ii. 33
M.	
Magna pollicis arteria, - - - - -	iii. 62
Magnum, vel capitatum, os, - - - - -	i. 142
Malarum, ossa, - - - - -	67
Mallei internus, - - - - -	ii. 92
Malleolus { externus, - - - - -	i. 158
{ internus, - - - - -	156
Malleus, - - - - -	ii. 90
MAMMÆ, - - - - -	160
Mammary arteries, - - - - -	iii. 54.71
————— veins, - - - - -	69.75
————— nerves, - - - - -	219
Manducation, organs of, see teeth and jaws, with the muscles that move the lower jaw.	
MARROW, - - - - -	i. 12
Marsupialis, - - - - -	290
Massa carnea JACOBI SYLVII, - - - - -	306
Masseter, - - - - -	193
Masseteric arteries, - - - - -	iii. 26
Mastoid process, - - - - -	i. 48, ii. 89
Mastoides lateralis, - - - - -	246
Mastoido-auricularis, - - - - -	185
Mastoido-mentalis, - - - - -	198
Mater, { dura, - - - - -	ii. 17
{ pia, - - - - -	23
MATRIX, - - - - -	298
Maxilla inferior, - - - - -	i. 77
Maxillaria superiora ossa, - - - - -	69
Maxillary artery, external, - - - - -	iii. 21
—————, internal, - - - - -	25
Maxillary vein, - - - - -	41.50
————— nerves, - - - - -	188
Maxillo-hyoideus, - - - - -	i. 199
Maxillo-labialis inferior, - - - - -	188
Meatus auditorius externus, - - - - -	ii. 84
————— internus, - - - - -	i. 52, ii. 98
Meatus of the nose, - - - - -	105

	Vol.	Pag
Meconium, - - - - -	ii.	338
Median veins, - - - - -	iii.	67
----- nerve, - - - - -		225
MEDIASTINUM, - - - - -	ii.	167
Medulla oblongata, - - - - -		42
----- spinalis, - - - - -	iii.	206
Medullary substance of the brain, - - - - -	ii.	26
<i>Meibomian</i> glands, - - - - -		50
MEMBRANA CELLULARIS, - - - - -		13
----- decidua, - - - - -		316
----- medullaris, - - - - -	i.	12
----- pupillaris, - - - - -	ii.	56.334
----- Ruyschiana, - - - - -		60
----- Schneideriana, - - - - -		108
----- tympani, - - - - -		86
----- secundarii, - - - - -		90.97
Membranula coronæ ciliaris, - - - - -		71
Meningeal artery, - - - - -	iii.	26
Menstrual discharge, analysis of the, - - - - -	ii.	308
Mento-labialis, - - - - -	i.	188
Mentula muliebris, - - - - -	ii.	310
Mesenteric blood-vessels, - - - - -	iii.	83.86
----- glands, - - - - -		154
----- nerves, - - - - -		243
MESENTERY, - - - - -	ii.	226
Meso-colon, - - - - -		227
-----rectum, - - - - -		228
Metacarpus, - - - - -	i.	143
Metacarpeus, - - - - -		278
Metacarpo-phalangei laterales, - - - - -		279
-----phalangeus pollicis, - - - - -		276
Metatarsus, - - - - -		167
Metatarsal artery, - - - - -	iii.	123
Metatarso-phalangei laterales, - - - - -	i.	311
-----sub-phalangeus pollicis, - - - - -		309
----- transversalis pollicis, - - - - -		210
Miliary glands, - - - - -	ii.	13
Milk, - - - - -		164
Modiolus, - - - - -		96
Monticuli of the cerebellum, - - - - -		38
Motion of bones, different kinds of, - - - - -	i.	24

	Vol. Pag.
Motion, organs of, - - -	i. 177
Motores oculorum, or third pair of nerves,	iii. 183
MOUTH, of the, - - -	ii. 113
——, muscles of the, - - -	i. 186
Multifidus spinæ, - - -	248
MUSCLES in general, of the, - - -	177
Musculo-cutaneous nerve of the superior extre-	
mity, - - - - -	iii. 222
Mylo-hyoideus, - - - - -	i. 199

N.

Naboth, ovula of, - - -	ii. 300
NAILS, - - - - -	10
Naris compressor, - - - - -	i. 186
Nasalis labii superioris, - - - - -	191
Nasi alæ { depressor, - - - - -	187
{ levator, - - - - -	186
——, ossa, - - - - -	65
Naso-palpebralis, - - - - -	183
Nates cerebri, - - - - -	ii. 37
Naviculare, os, - - - - -	i. 164
NECK, blood-vessels of the, - - - - -	iii. 18.50
——, lymphatics of the, - - - - -	167
——, muscles on the fore and lateral part of the, i.	195
——, nerves of the, - - - - -	iii. 214
——, vertebræ of the, - - - - -	i. 87
NERVES, of the, - - - - -	iii. 173
——, cerebral, - - - - -	180
——, spinal, - - - - -	206
Nervous fluid, - - - - -	179
Ninth pair of nerves, - - - - -	200
Nipple, - - - - -	ii. 161
Noni descendens, nervus, - - - - -	iii. 201
NOSE, of the, - - - - -	ii. 105
——, bones of the, - - - - -	i. 65, ii. 105
——, blood-vessels of the, - - - - -	111
——, lymphatics of the, - - - - -	iii. 168
——, muscles of the, - - - - -	i. 186
——, nerves of the, - - - - -	ii. 111

	Vol.	Pag.
Nutrition, organs of, see arteries,	-	iii. 10
Nymphæ,	-	ii. 311

O.

Obliquus ascendens internus,	-	i. 216
----- capitis	{ inferior,	- - - 250
	{ superior,	- - - <i>ib.</i>
----- descendens externus abdominis,	-	212
----- oculi	{ inferior,	ii. 76
	{ superior,	- - - 75
Obturator artery,	- - -	iii. 107
----- externus,	- - -	i. 287
----- internus,	- - -	290
Obturator nerve,	- - -	iii. 251
Occipital artery,	- - -	24
----- vein,	- - -	42.50
----- nerve,	- - -	216
Occipitis, os,	- - -	i. 42
Occipito-frontalis,	- - -	181
Olfactory, or first pair of nerves,	- - -	iii. 180
OMENTUM,	- - -	ii. 228
----- minus,	- - -	229
Omo-hyoides,	- - -	i. 197
Ophthalmic or ocular artery,	- - -	iii. 31
----- vein,	- - -	46
----- nerves,	- - -	186
Opponens pollicis,	- - -	i. 274
Optic, or second pair of nerves,	ii. 62. iii.	182
Orbiculare, os, of the hand,	- - -	i. 140
-----, of the ear,	- - -	ii. 90
Orbicularis oculi,	- - -	i. 183
----- oris,	- - -	190
----- palpebrarum,	- - -	183
Orbito-palpebralis,	- - -	184
Orbits,	- - -	ii. 47
Organs of the senses,	- - -	ii. 3
Organs of urine and generation in a male,	- - -	261
----- in a female,	- - -	297
-----, blood-vessels of	- - -	
the,	iii.	92

	Vol.	Pag.
Organs of urine and generation, lymphatics of the,	ii.	149
—————, nerves of the,		245
Oris anguli, { depressor,	i.	188
{ levator,		187
Os tincæ,	ii.	300
Ova,		302
Ovaria,		301
Oxoido-atloideus,	i.	250
————-occipitalis,		249

P.

Palate,	ii.	115
————, arches of the,		146
Palati, { circumflexus,	i.	202
{ levator,		203
————, ossa,		77
Palatina descendens arteria,	iii.	27
———— inferior, vel ascendens arteria,		22
Palato-maxillary nerve,		188
———— pharyngeus,	i.	204
———— uvularis,		<i>ib.</i>
Palmaris arcus arteriosus profundus,	iii.	62
———— arteria profunda,		<i>ib.</i>
———— arcus arteriosus superficialis,		65
———— nervus,		228
———— musculus { longus,	i.	266
{ brevis,		<i>ib.</i>
Palmaro-cutaneus,		<i>ib.</i>
Palmo-phalangei,		271
Palpebræ,	ii.	48
Palpebræ superioris levator,	i.	184
Palpebrarum orbicularis,		183
PANCREAS,	ii.	257
Panniculus carnosus,		16
Pap of the throat,		161
Papilla, or nipple,		<i>ib.</i>
———— of the kidneys,		263
Papillaris musculi,		180
Papillæ of the skin,		8

	Vol. Pag.
Papillæ of the tongue, - - -	ii. 117
Par trigeminum, or fifth pair of nerves,	iii. 183
Parietalia, ossa, - - -	i. 39
Parotid gland, - - - -	ii. 120
Pars vaga of the eighth pair of nerves,	iii. 197.231.240
Patella, - - - -	i. 159
Pathetic, or fourth pair of nerves, - -	iii. 183
Patientiæ musculus, - - - -	i. 247
Pectinalis, - - - -	285
Pectinis, os, - - - -	107
Pectoralis, { major, - - - -	233
{ minor, - - - -	234
Pedes hippocampi, - - - -	ii. 33
Pedis, interossei, - - - -	i. 311
Pedunculi { cerebri, - - - -	ii. 41
{ cerebelli, - - - -	ib.
{ medullæ oblongatæ, - - - -	43
PELVIS, blood-vessels of the, - - -	iii. 102
———, bones of the, - - - -	i. 103
———, ligaments of the bones of the, -	354
———, lymphatics of the, - - -	iii. 149
———, muscles on the, - - - -	i. 284
———, nerves of the, - - - -	iii. 248
PENIS, - - - -	ii. 288
———, blood-vessels of the, - - -	ii. 294, iii. 100
———, muscles of the, - - - -	i. 223
———, ligamentum suspensorium of the, -	ii. 289
———, lymphatics of the, - - -	ii. 296, iii. 149
———, nerves of the, - - - -	ii. 295, iii. 247
Perforans, - - - -	i. 270
Perforans Casserii nervus, - - -	iii. 222
Perforantes arteriæ femoris, - - -	116
Perforatus, - - - -	i. 270
PERICARDIUM, - - - -	ii. 169
Perichondrium, - - - -	i. 15
Perinei transversus, - - - -	224.227
Perineo-clitorideus, - - - -	227
Perineum, - - - -	ii. 309
Periosteum, { externum, - - - -	i. 11
{ internum, - - - -	12
Peristaltic and anti-peristaltic motion,	ii. 232

	Vol. Pag.
Peritoneum, - - - - -	ii. 210
Peroneal artery, - - - - -	iii. 124
— nerve, - - - - -	257
Perone, os, - - - - -	i. 157
Peroneo-metatarsus { magnus, - - - - -	302
{ minor, - - - - -	304
— sub-phalangeus pollicis, - - - - -	308
— sub-tarsus, - - - - -	302
— super-phalangeus communis, - - - - -	303
— super-phalangeus pollicis, - - - - -	307
Peroneus { brevis, - - - - -	302
{ longus, - - - - -	<i>ib.</i>
— tertius, - - - - -	304
Perspiration, organs of, see common integuments, ii.	3
Petro-palatinus, - - - - -	i. 203
Pharyngeal artery, inferior, - - - - -	iii. 23
— nerve, - - - - -	198
Pharyngo-palatinus, - - - - -	i. 204
PHARYNX, - - - - -	ii. 147
—, muscles on the back part of the, - - - - -	i. 205
Phrenic arteries and veins, - - - - -	iii. 77
— nerve, - - - - -	230
Pia mater, - - - - -	ii. 23
Pigmentum nigrum, - - - - -	60
Pineal gland, - - - - -	37
Pinguedo, - - - - -	14
Pisiforme, os, - - - - -	i. 140
Placenta, - - - - -	ii. 327
Plantar arteries, - - - - -	iii. 127
Plantaris, - - - - -	i. 300
Planto-sub-phalangeus, - - - - -	307
Plates of the bones, - - - - -	3
Platysma myoides, - - - - -	195
PLEURA, - - - - -	ii. 166
Plexus reteformis, - - - - -	306
Pomum Adami, - - - - -	149
Pons hepatis, - - - - -	242
Pons { TARINI, - - - - -	ii. 41
{ VAROLII, - - - - -	<i>ib.</i>
Popliteal artery, - - - - -	iii. 119
— glands, - - - - -	146

	Vol. Pag.
Pterygoideus { externus, - - -	i. 194
{ internus, - - -	193
Pterygo-maxillaris { major, - - -	<i>ib.</i>
{ minor, - - -	194
Pterygo-palatinus, - - -	202
Pubio-femoralis, - - -	286
———sternalis, - - -	221
———sub-umbilicalis, - - -	222
Pubis, os, - - -	107
Pudendum, - - -	ii. 309
Pudic artery, - - -	iii. 99
——— vein, - - -	101
——— nerves, - - -	247
Pulmonary artery and veins, - - -	15
——— nerves, - - -	233
Puncta lacrymalia, - - -	ii. 52
Pupil of the eye, - - -	56
Pylorus, - - -	214
Pyramidalis, - - -	i. 222
Pyriformis, - - -	289

Q.

Quadratus femoris, - - -	291
——— genæ, - - -	188
——— lumborum, - - -	231

R.

Radial artery, - - -	iii. 60
——— nerve, - - -	225
Radialis externus { brevior, - - -	i. 268
{ longior, - - -	<i>ib.</i>
——— internus, - - -	267
Radio-phalangeus pollicis, - - -	273
Radius, - - -	135
Ramus anastomoticus magnus of the humeral artery, - - -	iii. 59
Ranina, arteria, - - -	21
———, vena, - - -	50

		Vol.	Pag.
Receptaculum chyli,	-	ii. 205,	iii. 160
Rectum,	-		ii. 225
——, lymphatics of the,	-		iii. 156
Rectus abdominis,	-		i. 221
—— capitis anterior	{ major,	-	239
	{ minor,	-	<i>ib.</i>
—— lateralis,	-		240
—— posticus	{ major,	-	249
	{ minor,	-	<i>ib.</i>
—— femoris,	-		293
—— internus,	-		292
Recurrent nerve of the eighth pair,	-	iii.	231
—— radial artery,	-		61
—— ulnar artery,	-		63
Regions of the abdomen,	-	ii.	208
Renal artery and vein,	-	ii. 263,	iii. 92.93
—— glands,	-		ii. 267
—— nerves,	-		iii. 245
Respiration,	-	ii.	202
Reticular substance of the bones,	-	i.	5
—— of the integuments, &c.	-	ii.	13
Retina,	-		62
Rete mirabile, vel rete vasculosum MALPIGHI,			201
Rete mucosum of the skin,	-		5
Retractor anguli oris,	-	i.	190
Retrahentes aurem,	-		185
Rhomboideus,	-		242
Ribs,	-		113
——, ligaments of the,	-		336
Ring, abdominal,	-	215.	220
——, crural,	-		214
Rotula,	-		159
S.			
Sacculus vestibuli,	-	ii.	97
Sacra media, arteria,	-	iii.	103
Sacræ laterales, arteriæ,	-		<i>ib.</i>
Sacral nerves,	-	iii.	253
Sacro-coccygeus,	-	i.	229
—— costalis,	-		244

	Vol. Pag.
Sacro-femoralis, - - - - -	i. 288
——lumbalis, - - - - -	244
——spinalis, - - - - -	245
——trochanterius, - - - - -	289
Sacrum, os, - - - - -	96
Saliva, - - - - -	ii. 124
Salivary glands, - - - - -	120
Salpingo-pharyngeus, - - - - -	i. 204
Saphenæ, venæ, - - - - -	iii. 129
Saphenus, nervus, - - - - -	251
Sartorius, - - - - -	i. 292
Scala { tympani, - - - - -	ii. 97
{ vestibuli, - - - - -	<i>ib.</i>
Scalenus { anticus, - - - - -	i. 251
{ medius, - - - - -	<i>ib.</i>
{ posticus, - - - - -	<i>ib.</i>
Scaphoides, os, - - - - -	139
Scapula, - - - - -	124
——, ligaments of the, - - - - -	344
Scapulæ levator, - - - - -	247
Scapular arteries, - - - - -	iii. 53.55
——- nerve, - - - - -	220
Scapulo-humeralis, - - - - -	i. 259
——-humero-olecraneus, - - - - -	264
——-radialis, - - - - -	263
Sciatic artery, - - - - -	iii. 109
—— nerve, - - - - -	255
Sclerotic coat, - - - - -	ii. 57
Scrotum, - - - - -	276
Sebaceous ducts, follicles, or glands, - - - - -	ii. 13
Second, or optic pair of nerves, - - - - -	iii. 182
Secretion, - - - - -	275
Secundines, - - - - -	ii. 325
Semen, - - - - -	286
Semicircular canals of the ear, - - - - -	97
Semilunar ganglion, - - - - -	iii. 241
Semi-membranosus, - - - - -	i. 295
Seminal vessels, - - - - -	ii. 279.281
Seminis ejaculator, - - - - -	i. 223
Semispinalis { colli, - - - - -	248
{ dorsi, - - - - -	247

	Vol. Pag.
Semitendinosus, - - - - -	i. 295
Sensation, organs of, see nerves, - - -	iii. 179
SENSES, ORGANS of the, - - - - -	ii. 3
Septum or falx cerebri, - - - - -	19
—— cerebelli, - - - - -	20
—— lucidum, - - - - -	29
—— penis, - - - - -	290
—— scroti, - - - - -	276
Serratus magnus, - - - - -	i. 235
—— minor anticus, - - - - -	234
—— posticus inferior, - - - - -	242
—— superior, - - - - -	243
Sesamoidea, ossa, - - - - -	171
Seventh pair of nerves, - - - - -	iii. 191
Shoulder, ligaments of the, - - - - -	i. 344
Shoulder blade, - - - - -	122
Sinus of the septum lucidum, - - - - -	ii. 32
—— venosus of the heart, - - - - -	175.183
—— venosi of the spinal marrow, - - -	iii. 213
Sinuses of the dura mater, - - - - -	ii. 21, iii. 407
—— of VALSALVA, - - - - -	ii. 182.187
Sixth pair of nerves, or abducentes, - -	iii. 190
Skarf-skin, - - - - -	ii. 3
SKELETON, different kinds and division of the,	i. 25
——, principal differences between the	
male and female, - - - - -	172
SKIN, - - - - -	ii. 3
SKULL, - - - - -	i. 27
Soleus, - - - - -	299
Sound, - - - - -	ii. 104
Speech, - - - - -	156
Spermatic artery and vein, - - - - -	ii. 280.281.306.307
———— cord, - - - - -	iii. 94, &c.
———— nerves, - - - - -	ii. 279
———— nerves, - - - - -	iii. 246
Sphenoid sinuses, - - - - -	i. 62, ii. 109
Sphenoidal cornua, - - - - -	i. 76
Sphenoides, os, - - - - -	57
Sphincter ani, - - - - -	i. 224.227
—— labiorum, - - - - -	190
—— pylori, - - - - -	216
—— vaginæ, - - - - -	227

	Vol. Pag.
Sphincter vesicæ, - - -	i. 272
SPINAL MARROW, of the, - - -	iii. 206
——— nerves, origin of the, - - -	209
Spinalis dorsii, - - -	i. 245
SPINE, - - -	86
Spiral nerve, - - -	iii. 222
Splanchnicus, nervus, - - -	237.241
SPLEEN, - - -	ii. 253
———, lymphatics of the, - - -	iii. 158
Splenic artery, - - -	82
——— vein, - - -	88
——— nerves, - - -	243
Splenius, - - -	i. 243
Spongiosa, ossa, - - -	75
Spongiosum corpus urethræ, - - -	ii. 290
Stapedius, - - -	94
Stapes, - - -	90
STENO'S salivary duct, - - -	121
——— nasalo-palatine duct, - - -	110
Sterno-cleido-mastoideus, - - -	i. 195
——— costalis, - - -	237
——— humeralis, - - -	233
——— hyoides, - - -	196
——— pubialis, - - -	221
——— thyroideus, - - -	196
Sternum, - - -	118
STOMACH, - - -	ii. 212
———, absorbents of the, - - -	iii. 152
———, blood-vessels of the, - - -	ii. 218. iii. 79, &c.
———, nerves of the, - - -	iii. 240.242
Stylo-glossus, - - -	i. 200
——— hyoides, - - -	201
——— pharyngeus, - - -	202
Sub-acromio-humeralis, - - -	259
Subclavian artery, - - -	iii. 50
———, vein, - - -	69
Subclavius, - - -	i. 234
Sublingual gland, - - -	ii. 122
——— artery, - - -	iii. 21
Submaxillary gland, - - -	ii. 122
Submental artery, - - -	iii. 22
Sub-occipital nerve, - - -	125

	Vol.	Pag.	
Tarso-sub-phalangeus	{	i.	minimi digiti, - - - - - 310
			pollicis, - - - - - 308
Tarsus, bones of the,	-	-	161
——, ligaments of the,	-	-	362
—— of the eye-lids,	-	ii.	49
Taste,	-	-	119
Tears,	-	-	51
TEETH,	-	i. 82, ii.	124
Tela cellulosa,	-	-	13
—— choroidea,	-	-	33
Temporal artery,	-	iii.	28
Temporalis,	-	i.	192
Temporo-auricularis,	-	-	184
——maxillaris,	-	-	192
Temporum, ossa,	-	-	47
Tensor palati,	-	-	202
—— tympani,	-	ii.	92
—— vaginæ femoris,	-	i.	291
Tentorium cerebelli,	-	ii.	20
Teres	{	i.	major, - - - - - 259
			minor, - - - - - 258
Testis musculus,	-	-	222
TESTES,	-	ii.	275
—— cerebri,	-	-	39
——, blood-vessels of the,	-	iii.	94
——, lymphatics of the,	-	-	149
——, nerves of the,	-	-	246
Thalami nervorum opticorum,	-	ii.	30
Thigh-bone,	-	i.	150
Third pair of nerves, or motores oculorum,	-	iii.	183
THORACIC DUCT,	-	ii. 206, iii.	160
Thoracicæ externæ arteria,	-	-	54
Thoraco-facialis,	-	i.	195
THORAX, of the,	-	i. 113, ii.	159
——, blood-vessels within the,	-	iii.	71
——, bones of the,	-	i.	113
——, muscles situated upon the anterior and lateral parts of the,	-	-	233
——, nerves within the,	-	iii.	230
THROAT, of the,	-	ii.	146
Thymus gland,	-	-	334

	Vol. Pag.
Thyro-arytenoideus, - - - - -	i. 208
———epiglottideus, - - - - -	209
———hyoideus, - - - - -	197
Thyroid cartilage, - - - - -	ii. 149
———gland, - - - - -	156
Thyroidea arteria, { inferior, - - - - -	iii. 52
{ superior, - - - - -	20
Tibia, - - - - -	i. 154
Tibial arteries, - - - - -	iii. 121.124.125
———veins, - - - - -	129
———nerve, - - - - -	259
Tibialis { anticus, - - - - -	i. 300
{ posticus, - - - - -	301
Tibio-calcaneus, - - - - -	299
———phalangeus communis, - - - - -	306
———sub-tarseus, - - - - -	301
———super-tarseus, - - - - -	300
Tomentum cerebri, - - - - -	ii. 25
TONGUE, of the, - - - - -	116
———, artery of the, - - - - -	iii. 21
———, lymphatics of the, - - - - -	168
———, muscles of the, - - - - -	i. 199
———, nerves of the, - - - - -	ii. 119
Tonsils, - - - - -	146
Torcular HEROPHILI, - - - - -	ii. 22, iii. 47
Touch, see cutis, - - - - -	ii. 9
Trachea, - - - - -	197
Trachelo-mastoideus, - - - - -	i. 246
———occipitalis, - - - - -	239
———scapularis, - - - - -	247
———occipitalis, - - - - -	246
———sub-occipitalis major, - - - - -	239
———sub-occipitalis minor, - - - - -	ib.
Tractus optici, - - - - -	ii. 31
Tragicus, - - - - -	83
Tragus, - - - - -	82
Transversalis abdominis, - - - - -	i. 217
———colli, - - - - -	249
———pedis, - - - - -	310
———urethræ, - - - - -	224

	Vol. Pag.
Transverso-spinalis { colli, - - -	i. 248
{ dorsii, - - -	247
{ lumborum, - - -	248
Transversus auris, - - -	ii. 84
————— perinei, - - -	i. 224.227
Trapezium, os, - - -	141
Trapezius, - - -	240
Trapezoides, os, - - -	140
Triangularia, ossa, - - -	76
Triangularis oris, - - -	188
————— sterni, - - -	237
Triceps adductor femoris, - - -	286
————— extensor cubiti, - - -	264
Tricuspid valve, - - -	ii. 179
Tri-femoro-rotuleus, - - -	i. 293.294
Trigone of LIEUTAUD, - - -	ii. 274
Triquetra, ossa, - - -	i. 33
Trochlearis, - - -	ii. 75
Trumpeter muscle, see Buccinator, - - -	i. 190
TRUNK, bones of the, - - -	86
—————, muscles situated on the posterior part of the, - - -	240
Tuber annulare, - - -	ii. 41
Tubercula quadrigemina, - - -	33
Tuberculum LOWERI, - - -	176
Tube, EUSTACHIAN, - - -	88
—————, FALLOPIAN, - - -	303
Tunica adnata, - - -	54
————— albuginea oculi, - - -	58
————— albuginea testis, - - -	277
————— arachnoidea, - - -	23
————— aranea, - - -	68.70
————— carnosa, - - -	16
————— cellulosa RUYSCHIANA, - - -	215
————— choroides, - - -	59
————— hyaloidea, - - -	70
————— filamentosa, - - -	316
————— RUYSCHIANA, - - -	60
————— sclerotica, - - -	57
————— vaginalis testis, - - -	277
————— vitrea, - - -	70

	Vol.	Pag.
Turbinata inferiora, ossa,	-	i. 55.75
Tympani chorda,	ii. 102,	iii. 195
—— laxator,	-	ii. 93
—— membrana,	-	86
—— tensor,	-	92
Tympanum,	-	87

V.

Vagina,	-	304
Vaginæ sphincter,	-	i. 227
Vaginal artery,	-	iii. 98
Valve of EUSTACHIUS,	-	ii. 336
Valve of the absorbents,	-	iii. 141
—— of the veins,	-	13
—— of the heart and arteries, vol. ii.—	<i>See</i> Heart.	
Valvula colli,	-	236
—— semilunaris oculi,	-	53
Valvulæ conniventes,	-	232
Vas aberrans,	-	283
—— deferens,	-	<i>ib.</i>
Vasa brevia,	-	iii. 83
—— efferentia testis,	-	ii. 282
—— efferentia of the absorbents,	-	iii. 145
—— inferentia of the absorbents,	-	144
—— lactea,	-	153
—— vasorum,	-	6
Vastus	{	
externus,	-	i. 294
internus,	-	<i>ib.</i>
VEINS, of the,	-	iii. 10
Velum VIEUSSENII,	-	ii. 40
Vena azygos,	-	iii. 76
VENA CAVA, general course of the,	-	17
——, superior,	-	17.71
——, inferior,	-	17
Vena magna ipsius penis,	ii. 295,	iii. 101
—— portæ,	-	90
Ventricles of the brain,	-	ii. 29
—— of the heart,	-	172
—— of the larynx,	-	154
Vermiform appendix of the cæcum,	-	224

	Vol. Pag.
Vermiform appendages of the cerebellum,	ii. 38
Vertebræ, true,	i. 87
————, false,	96
————, ligaments of the,	333
Vertebral artery,	iii. 37
Verumontanum,	ii. 285
Vesica urinaria,	269
Vesicalis ima, arteria,	iii. 108
Vesicula fellis,	ii. 248
———— umbilicalis, vel alba,	317
Vesiculæ seminales,	284
Vestibule of the labyrinth,	94
———— of the pudendum,	312
Vis a tergo,	190
VISCERA, of the,	3
Vision,	78
Vitreous humour,	70
Ulna,	i. 133
Ulnar artery,	iii. 62
—— nerve,	226
Ulnaris { externus,	i. 269
{ internus,	267
Umbilical cord,	ii. 325
—— artery,	iii. 97
Unciforme, os,	i. 142
Unguis, ossa,	66
Vocal ligaments,	ii. 153
Voice,	155
Volar arches,	iii. 62.65
Vomer,	i. 76
Vorticose veins,	iii. 44
Urachus,	ii. 340
Ureters,	266
Urethra,	292.297
Urethræ transversalis,	i. 224
Urinæ accelerator,	223
Urine, analysis of,	ii. 275
Uterine artery,	iii. 97
UTERUS, of the,	ii. 298
——, appendages of the,	300
——, gravid, of the,	314

I N D E X.

395

		Vol. Pag.
Uvula, - - - - -		ii. 116
——, vesicæ, - - - - -		292
Uvulæ azygos, - - - - -		i. 204
Vulva cerebri, - - - - -		ii. 34
WHARTONI ductus, - - - - -		122
WIRTSUNGI ductus, - - - - -		258
WORMIANA ossa, - - - - -		i. 33

Z.

Zona cochleæ, - - - - -		ii. 96
Zonula ciliaris, - - - - -		71
Zygomatikus major, - - - - -		i. 189
—— minor, - - - - -		188
Zygomato-labialis major, - - - - -		<i>ib.</i>
—— minor, - - - - -		<i>ib.</i>
Zygomato-maxillaris, - - - - -		193
—— auricularis, - - - - -		185

END OF VOLUME THIRD.

EDINBURGH :
 Printed by JOHN PILLANS,
 James's Court.

