An anatomical exposition of the structure of the human body / by James Benignus Winslow ... ; translated from the French original by G. Douglas.

Contributors

Winslow, Jacques-Bénigne, 1669-1760.
Douglas, G.

Publication/Creation

London : Printed for J. and F. Rivington, W. Clarke and Co., R. Horsfield, T. Caslon, T. Longman, G. Keith, J. Wilkie, T. Lowndes, Wilson and Nicoll, R. Ware, R. Baldwin, and E. Johnston, 1776.

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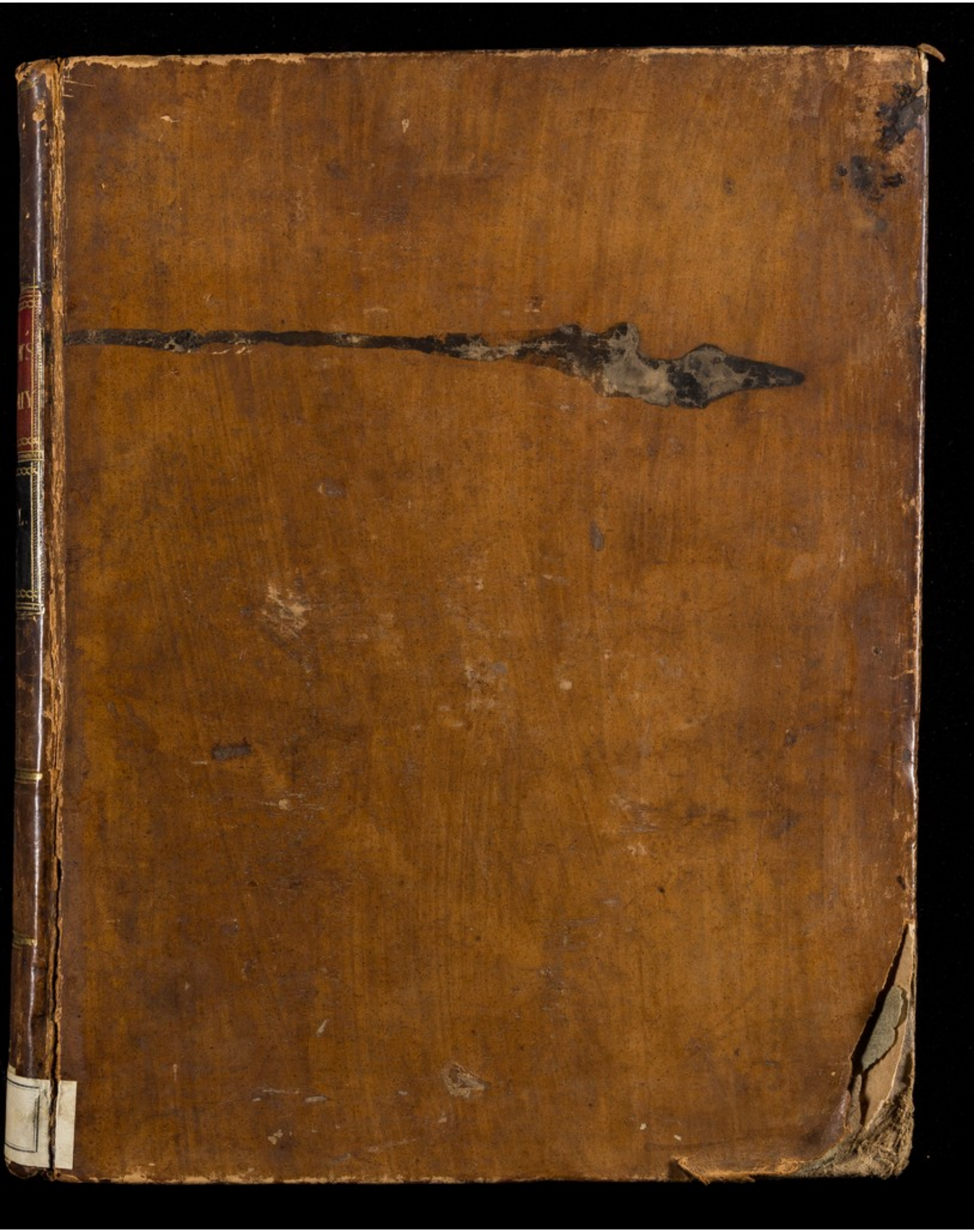

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ANATOMICAL EXPOSITION

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HUMAN BODY.

By JAMES BENIGNUS WINSLOW,

PROFESSOR OF PHYSICK, ANATOMY AND SURGERY, IN THE UNIVERSITY OF PARIS,

MEMBER OF THE ROYAL ACADEMY OF SCIENCES, AND OF THE ROYAL SOCIETY AT BERLIN, &c.

TRANSLATED FROM THE FRENCH ORIGINAL,

By G. DOUGLAS, M.D.

Illuſtrated with COPPER PLATES.

VOL. II.

The FIFTH EDITION, corrected.

1432.

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TO

Dr. BROXOLME.

SIR,

AN *Engliſh* Phyſician, eminent in all the Branches of his Profeſſion, is undoubtedly the moſt proper Perſon to recommend a laudable Attempt made by an obſcure Beginner, toward the Improvement of Phyſick in the *Engliſh* Dominions. I ſhall make no farther Apology for prefixing Your Name to this Phyſical Part of an *Engliſh* Edition of

the beſt Syſtem of Anatomy that has hitherto appeared. I have the Honour to be, with the greateſt Reſpect,

SIR,

Your Moſt Obedient,

Moſt Obliged Servant,

Bow Lane,
Nov. 1, 1732.

G. DOUGLAS.

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THE CONTENTS OF THE SECOND VOLUME.

SECT. IV. *The* ARTERIES.

	Numb.
Introduction	1
The Aorta in general	5
The general Division of the Aorta	8
The Distribution of the Branches of the Aorta in general	18
Arteriæ Coronariæ Cordis	41
The Arteriæ Carotides in general	45
Arteria Carotis Externa	50
Arteria Carotis Interna	71
Arteria Subclavia	80
Arteria Thymica	84
Arteria Pericardia	85
Arteria Mediastina	86
Arteria Trachealis	87
Arteria Mammaria Interna	88
Arteria Cervicalis	91
Arteria Vertebralis	95
Arteria Basilaris	100
Arteriæ Spinales	101
Arteria Auditoria Interna	102
Arteria Meningæa posterior	103
Arteria Intercostalis superior	104
Ductus Arteriosus in Ligamentum versus	108
Arteria Bronchialis	109
Arteriæ Oesophagææ	114
Arteriæ Intercostales inferiores	115
Arteriæ Axillares	121
Arteria Thoracica superior	123
Arteria Thoracica inferior	125
Arteria Scapularis	126
Arteria Humeralis	128
Arteria Brachialis	131
Arteria Cubitalis	144
Arteria Radialis	160
Arteria Diaphragmatica	172
Arteria Cœliaca	176
Arteria Ventriculi Coronaria	179
Arteria Hepatica	182
Arteria Splenica	190
Arteria Mesenterica superior	196
Arteria Mesenterica inferior	208
Arteriæ Renales	214
Arteriæ Capsulares	218
Arteriæ Spermaticæ	219
Arteriæ Lumbales	224
Arteriæ Sacræ	227
Arteriæ Iliacæ	228
Arteriæ Crurales	255

SECT. V. *The Veins.*

	Numb.
Introduction	1
The General Division of the Vena Cava	8
Vena Cava Superior	18
Vena Cava Inferior	33
Vena Azygos & Venæ Intercostales	39
Venæ Pectorales Internæ	55
Venæ Subclaviæ	66
Venæ Jugulares Externæ	70
Vena Jugularis Externa Anterior	72

	Numb.
Vena Jugularis Externa Posterior	90
Vena Jugularis Interna	102
Vena Vertebralis	110
Vena Axillaris	118
Vena Cephalica	122
Vena Basilica	132
Vena Cava Inferior	143
Venæ Iliacæ	166
Vena Hypogastrica	175
Vena Cruralis	185
Vena Saphena	190
The Continuation of the Vena Cruralis	203
Vena Saphena Minor	208
Vena Poplitea	211
Vena Tibialis Anterior	216
Vena Tibialis Posterior	221
Vena Peronæa	225
Vena Portæ	228
Vena Mesaraica Major	242
Vena Splenica	252
Vena Hæmorrhoidalis Interna	263

SECT. VI. *The Nerves.*

	Numb.
Introduction	1
The Nerves of the Medulla Oblongata	6
The Nerves of the Medulla Spinalis	7
Nervi Olfactorii	9
Nervi Optici	14
Nervi Motores Oculorum communes	ibid.
Nervi Trochleares	25
Nervi Trigemini	28
Nervus Ophthalmicus	34
Nervus Maxillaris Superior	44
Nervus Maxillaris Inferior	55
Nervi Motores Externi	73
Nervi Auditorii	78
Nervi Sympathetici Minimi	84
Nervi Sympathetici Medii	104
Nervi Accessorii Octavi Paris	143
Nervi Hypoglossi Externi	148
Nervi Suboccipitales	154
The Vertebral Nerves in general	165
The first Pair of Cervical Nerves	170
The second Pair of Cervical Nerves	176
The third Pair of Cervical Nerves	187
The last four Pair of Cervical Nerves in general	197
The Brachial Nerves in general	198
The fourth Pair of Cervical Nerves	212
The fifth Pair of Cervical Nerves	215
The last two Pair of Cervical Nerves	219
Nervus Musculo-Cutaneus	222
Nervus Medianus	226
Nervus Cubitalis	231
Nervus Cutaneus Internus	238
Nervus Radialis	242
Nervus Axillaris	253
Nervi Costales	255
Nervi Lumbares	265
The first Pair of Lumbar Nerves	268
The second Pair of Lumbar Nerves	279
The third Pair of Lumbar Nerves	285
The fourth Pair of Lumbar Nerves	289
Nervus Obturator	293
The fifth Pair of Lumbar Nerves	295
Nervi Sacri	297
Nervus Cruralis	308
Nervus Sciaticus	318
Nervi Sympathetici Maximi	357

SECT. VII. *The Parts of the Body in general, and the Integuments in particular.*

	Numb.
Introduction	1
The Explanation of the general Terms of Anatomy	6
The general Division of the Human Body	28
The Parts of the Head	33
The Parts of the Neck	66
The Parts of the Thorax	70
The Parts of the Abdomen	78
The Parts of the upper Extremities	93
The Parts of the lower Extremities	99
The Skin	110
The Cuticula	137
The Uses of the Skin	152

THE SECOND VOLUME.

	Numb.
The Membrana Adipoſa	172
The Nails	192
The Hairs	201
The ſuppoſed Integuments of the Ancients	209

SECT. VIII. *The Abdomen.*

	Numb.
Introduction	1
The External Conformation of the Abdomen	2
The Integuments of the Abdomen	13
The Cavity of the Abdomen	19
Peritonæum	22
Ventriculus	43
The Inteſtines in general	87
The ſmall Inteſtines	102
Inteſtinum Duodenum	104
Inteſtinum Jejunum	120
Inteſtinum Ilium	132
The great Inteſtines	136
Inteſtinum Cæcum	138
Inteſtinum Colon	147
Inteſtinum Rectum & Anus	170
The Muſcles of the Anus	179
Meſenterium & Meſocolon	196
Glandulæ Meſentericæ	208
Vaſa Lymphatica & Lactea	211
Receptaculum Chyli	222
The Blood-Veſſels and Nerves of the Inteſtines	225
Hepar	251
Vena Portæ Hepatica	276
Pori Bilarii & Ductus Hepaticus	278
Ductus Cholidochus	289
Veſicula Fellis	291
Remarks on the Veſſels, &c. of the Liver	306
Pancreas	320
The ſmall Pancreas	325
Lien	330
Omentum	352
The little Omentum	357
Appendices Epiploicæ	366
The Uſes of the Inteſtines	372
The Uſes of the Muſcles of the Anus	380
The Uſes of the Meſentery	381
The Uſes of the Lacteal Veſſels	386
The Uſes of the Liver	387
The Uſes of the Spleen, Omentum, &c.	388
Renes	302
Ureteres	418
Glandulæ Renales	432
Veſica Urinaria	449
Arachus	455
Urteriæ Umbilicales	456
The Parts of Generation in Males	466
The Spermatic Veſſels	470
Teſtes	483
Epididymis	490
Scrotum	494
Dartos	499
Vaſa Deferentia	505
The Coats of the Teſtes	514
Muſculus Cremaſter	519
Corpora Cavernoſa Penis	524
Urethra	531
Proſtatæ	535
Glans	538
Caruncula	544
Veſiculæ Seminales	546
The Lacunæ of the Urethra	554
Anti-Proſtatæ	556
The Orifice of the Urethra	557
Præputium	560
Ligamentum Penis Suſpenſorium	565
The Muſcles of all theſe Parts	568
The Parts of Generation in Females	590
Uterus	591
Ligamenta Lata	603
Ovaria	605
Tubæ Fallopianæ	608
Pubes	625
Sinus & Alæ	626
Lacunæ	629
Clitoris	632
Nymphæ	640
Urethra	642
The Canal of the Uterus	644
Circulus Membranoſus or Hymen	654
Carunculæ Myrtiformes	655
Plexus Retiformis	656
Obſervations concerning the Ligaments of the Bladder, &c. in both Sexes	659

THE CONTENTS OF

SECT. IX. *The Thorax.*

	Numb.
Introduction	1
The external Conformation of the Thorax	2
The Cavity of the Thorax	5
Mammæ	7
Ductus Lactiferi	13
Areola	14
Papillæ	17
Pleura & Mediastinum	25
Thymus	38
Cor	41
The Ventricles of the Heart	45
The Valves of the Heart	59
The Aorta in general	64
The Pulmonary Artery in general	65
The Auricles of the Heart	66
The Coronary Vessels	71
Pericardium	79
The Uses of the Heart	95
The Circulation of the Blood	80
Pulmones	95
Bronchia	101
Vesiculæ Bronchiales	105
Lobuli	106
The interlobular Substance	107
The vascular Texture	110
The Blood Vessels, Nerves and Ligaments of the Lungs	111
Trachia Arterea	128
The Bronchial Glands	144
The Uses of the Lungs	150
Oesophagus	158
Ductus Thoracicus	164

SECT. X. *The Head.*

	Numb.
THE Brain in general	3
Dura Mater	6
The Folds and Septa of the Dura Mater	12
The Elongations of the Dura Mater	21
The Vessels of the Dura Mater	25
The Sinuses of the Dura Mater	28
Pia Mater	49
Membrana Arachnoides	51
Cerebrum	53
Corpus Callosum	62
The medullary Arch and Centrum Ovale	64
Ventriculi Laterales	65
Septum Lucidum	68
Fornix	69
The Eminences of the Cerebrum	72
Corpora Striata	73
Thalami Nervorum Opticorum	75
Tubercula	79
Canalis Medius	80
Foramen commune posterius	81
Glandula Pinealis	82
Infundibulum	84
The third Ventricle	85
Plexus Choroides	87
Glandula Pituitaria	91
Cerebellum	92
The fourth Ventricle	96
Medulla Oblongata	102
Medulla Spinalis	119
The Nerves of both Medullæ from their Origin to their going out of the Cranium	130
The Nerves of the Medulla Oblongata	132
The Nerves of the Medulla Spinalis	148
The Blood-Vessels of the Brain and Medulla Spinalis	162
The Uses of the Brain and of its Appendages	181
M. Steno's *Dissertation on the Anatomy of the Brain*	195
Pericranium	196
The Eye	202
The Orbits	204
The Globe of the Eye	207
The Coats of the Eye	212
Tunica Sclerotica	ibid.
Tunica Choroides	217
Uvea, *Iris*, *Pupilla*, *Processus Ciliares*	220

Tunica

THE SECOND VOLUME.

	Numb.
Tunica Retina	223
The Humours of the Eye	228
The Vitreous Humour	ibid.
The Cryſtalline Humour	232
The Aqueous Humour	233
Tunica Albuginea	240
The Muſcles of the Eye	241
The Uſes of the Muſcles of the Eye	249
Supercilia	255
Muſculi Frontales	257
Muſculi Occipitales	260
Muſculi Superciliares	265
Palpebræ	267
Tarſi	269
Ligamenta Tarſorum lata	271
Membrana Conjunctiva	272
Glandula Lacrymalis	275
Cilia	277
Glandulæ Ciliares	279
Puncta Lacrymalia	280
Caruncula Lacrymalis	283
The Muſcles of the Palpebræ	284
The Veſſels of the Eye	296
The Nerves of the Eye	302
The Uſes of the Eye	312
The Noſe	315
The Cartilages of the Noſe	322
The Muſcles of the Noſe	329
Membrana Pituitaria	334
The Sinuſes of the Noſe	339
Sacculus Lacrymalis	342
Ductus Inciſorii	350
The Veſſels and Nerves of the Noſe	357
The Uſes of the Noſe	360
The Ear	361
The external Ear	363
The internal Ear	384
Tuba Euſtachiana	386
Membrana Tympani	393
Cellulæ Maſtoidææ	397
The Ligaments of the Oſſicula Auditus	398
The Muſcles of the internal Ear	399
The Veſſels and Nerves of the Ear	408
The Mouth	416
Larynx	421
Cartilago Thyroides	423
Cartilago Cricoides	426
Cartilagines Arytenoides	429
Epiglottis	431
The Ligaments of the Larynx	432
Glottis	435

	Numb.
The Muſcles of the Larynx	440
Muſculi Sterno-Thyroidæi	441
Muſculi Thyro-Hyoidæi	447
Muſculi Crico-Thyroidæi	448
Muſculi Crico-Arytenoidæi	450
Muſculi Thyro-Arytenoidæi	452
Muſculi Arytenoidæi	453
Muſculi Thyro-Epiglottici	456
Muſculi Aryteno-Epiglottici	457
Muſculi Hyo-Epiglottici	458
The Uſes of the Larynx	459
Pharynx	468
The Muſcles of the Pharynx	473
Muſculi Cephalo-Pharyngæi	475
Muſculi Petro-Pharyngæi	476
Muſculi Spheno-Pharyngæi	ibid.
Muſculi Pterygo-Pharyngæi	ibid.
Muſculi Stylo-Pharyngæi	477
Muſculi Periſtaphyli-Pharyngæi	478
Muſculi Hypero-Pharyngæi	ibid.
Muſculi Gloſſo-Pharyngæi	ibid.
Muſculi Hyo-Pharyngæi	479
Muſculi Genio-Pharyngæi	480
Muſculi Syndeſmo-Pharyngæi	481
Muſculi Thyro-Pharyngæi	482
Muſculi Crico-Pharyngæi	483
Muſculus Oeſophagæus	484
Muſculus Thyro-Adenoidæus	ibid.
The Uſes of the Muſcles of the Pharynx	485
The Palate	486
Septum Palati	487
Uvula	489
The Muſcles of the Palate, &c.	492
Muſculi Gloſſo-Staphylini	495
Muſculi Pharyngo-Staphylini	496
Muſculi Thyro-Staphylini	497
Muſculi Spheno-Salpingo-Staphylini	498
Muſculi Pterygo-Staphylini	500
Muſculi Petro-Salpingo-Staphylini	501
Muſculi Staphylini	502
The Tongue	504
Papillæ of the Tongue	507
Muſculi Linguæ Interiores	513
Muſculi Linguæ Exteriores	515
Muſculi Mylo-Gloſſi	517
Muſculi Stylo-Gloſſi	518
Muſculi Hyo-Gloſſi	520
Muſculi Genio-Gloſſi	522
The Ligaments of the Tongue	530
The Uſes of the Tongue	539
The Cheeks and Lips	542

The

THE CONTENTS, &c.

	Numb.
The Gums	544
The Muſcles of the Lips	548
Muſculi Semi-Orbiculares	553
Muſculi Supra-Semi-Orbiculares	555
Muſculi Buccinatores	556
Ligamenta Inter-Maxillaria	557
Muſculi Zygomatici	559
Muſculi Canini	561
Muſculi Inciſorii Laterales	562
Muſculi Inciſorii Medii	565
Muſculi Triangulares	566
Muſculus Quadratus	567
Muſculi Inciſorii Inferiores	568
Muſculi Cutanei	570
The Salival Glands	575
Glandulæ Parotides	576
Glandulæ Maxillares	579
Glandulæ Sublinguales	581
Glandulæ Molares	583
Glandulæ Buccales, Labiales & Linguales	584
Amygdalæ	586
Glandula Thyroides	588
Glandulæ Lymphaticæ	591
The Glands in general	601

AN

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SECT. IV.

A Deſcription of the Arteries.

1. THE Heart throws the Blood into two great Arteries; one of which is named Aorta, the other, Arteria Pulmonalis. *Introduction.*

2. THE Aorta diſtributes the Blood to all the Parts of the Body, for the Nouriſhment of the Parts and for the Secretion of different Fluids.

3. THE Arteria Pulmonalis carries the venal Blood through all the capillary Veſſels of the Lungs.

4. BOTH theſe great or general Arteries are ſubdivided into ſeveral Branches, and to a great Number of Ramifications. In this Section, I ſhall deſcribe the Diſtributions of the Aorta, leaving the pulmonary Artery to the particular Hiſtory of the Lungs.

5. THE Baſis of the Heart being very much inclined to the right Side, and turned a little backward, the Aorta goes out from it in a direct Courſe nearly over-againſt the fourth Vertebra of the Back. Its Courſe, I ſay, is direct with reſpect to the Heart, but with reſpect to all the reſt of the *The Aorta in general.*

Body, it aſcends obliquely from the left to the right Hand, and from before, backward.

6. Soon after this, it bends obliquely from the right Hand to the left, and from before, backward, reaching as high as the ſecond Vertebra of the Back; from whence it runs down again in the ſame Direction, forming an oblique Arch. The Middle of this Arch is almoſt oppoſite to the right Side or Edge of the ſuperior Portion of the Sternum, between the cartilaginous Extremities or ſternal Articulations of the firſt two Ribs.

7. From thence the Aorta deſcends in a direct Courſe along the anterior Part of the Vertebræ, all the Way to the Os Sacrum, lying a little toward the left Hand; and there it terminates in two ſubordinate or collateral Trunks, called Arteriæ Iliacæ.

General Diviſion of the Aorta.

8. The Aorta is by Anatomiſts generally divided into the Aorta Aſcendens and Aorta Deſcendens, tho' both are but one and the ſame Trunk. It is termed Aſcendens, from where it leaves the Heart to the Extremity of the great Curvature or Arch. The remaining Part of this Trunk, from the Arch to the Os Sacrum or Bifurcation already mentioned, is named Deſcendens.

9. The Aorta Deſcendens is further divided into the ſuperior and inferior Portions; the firſt taking in all that lies above the Diaphragm; the other, all that lies between the Diaphragm and the Bifurcation.

10. The Aorta Aſcendens is chiefly diſtributed to Part of the Thorax, to the Head and upper Extremities. The ſuperior Portion of the Aorta Deſcendens furniſhes the reſt of the Thorax; the inferior Portion furniſhes the Abdomen and lower Extremities.

11. The great Trunk of the Aorta, through its whole Length, ſends off immediately ſeveral Branches which are afterwards differently ramified; and theſe arterial Branches may be looked upon as ſo many Trunks with reſpect to the other Ramifications; which again may be conſidered as ſmall Trunks, with regard to the Ramifications that they ſend off.

12. The Branches which go out immediately from the Trunk of the Aorta, may be termed original or capital Branches; and of theſe ſome are large and others very ſmall.

13. The large capital Branches of the Aorta are theſe: Two Arteriæ Subclaviæ, two Carotides, one Cæliaca, one Meſenterica Superior, two Renales, formerly termed Emulgents, one Meſenterica Inferior, and two Iliacæ.

14. The ſmall capital Branches are chiefly the Arteriæ Coronariæ Cordis, Bronchiales, Œſophagææ, Intercoſtales, Diaphragmaticæ Inferiores, Spermaticæ, Lumbares, and Sacræ.

15. These capital Branches or Arteries are for the moſt part diſpoſed in Pairs; there being none in odd Numbers but the Cæliaca, the two Meſentericæ, ſome of the Œſophagææ, the Bronchialis, and ſometimes the Sacræ.

16. The Ramifications of each capital Branch are in uneven Numbers with reſpect to their particular Trunks; but with reſpect to the Ramifications of the like capital Trunks on the other Side, they are diſpoſed in Pairs. Among the Branches there are in odd Numbers, none but the Arteria Sacra when it is ſingle, and the Œſophagææ; the Ramifications of which are ſometimes found in Pairs.

17. Be-

17. Before I enter upon the Detail of each of these particular Arteries, many of which have proper Names, it will be convenient to give a short View of the Disposition and Distribution of the principal arterial Branches, as a general Plan to which all the Particularities of each Distribution may afterwards be referred; for I have found by Experience, that the common Method of describing the Course of all the Ramifications of these Vessels, without having first given a general Idea of the principal Branches, is very troublesome to Beginners.

General Distribution of the Branches of the Aorta.

18. The Aorta gives Rise to two small Arteries, called Coronariæ Cordis, which go to the Heart and its Auricles; one of which is situated anteriorly, the other posteriorly, and sometimes they are three in Number.

19. From the upper Part of the Arch or Curvature, the Aorta sends out commonly three, sometimes four large capital Branches, their Origins being very near each other. When there are four, the two middle Branches are termed Arteriæ Carotides; the other two, Subclaviæ; and both are distinguished into right and left.

20. When there are but three Branches, which is oftenest the Case, the first is a short Trunk, common to the right Subclavian and Carotid, the second is the left Subclavian, and the third the left Carotid. Sometimes, tho' very rarely, these four Arteries unite in two Trunks.

21. The Origin of the left Subclavian terminates the Aorta Ascendens; but I have sometimes observed four Branches, the first three of which were those already mentioned, and the fourth a distinct Trunk of the left vertebral Artery.

22. It must be observed that these large Branches, which arise from the Curvature of the Aorta, are situated obliquely; the first, or that which is most on the right Hand, lying more forward than the rest, and the last, which is most on the left Hand, more backward. The first and second or middle Branches are generally in the Middle of the Arch, and the third lower down. Sometimes the first alone is in the Middle; all which Varieties depend on the Obliquity of the Arch.

23. The carotid Arteries run up directly to the Head, each of them being first divided into two, one external, the other internal. The external Artery goes chiefly to the outer Parts of the Head and Dura Mater or first Covering of the Brain. The internal enters the Cranium, through the bony Canal of the Os Petrosum; and is distributed through the Brain by a great Number of Ramifications.

24. The subclavian Arteries separate laterally and almost transversely, each toward that Side on which it lies, behind and under the Claviculæ, from whence they have their Name. The left seems to be shorter, and runs more obliquely than the right.

25. The Subclavian on each Side terminates at the upper Edge of the first Rib, between the lower Insertions of the first scalenous Muscle; and there, as it goes out of the Thorax, takes the Name of Arteria Axillaris.

26. During this Course of the subclavian Artery, taking in the common Trunk of the right Subclavian, several Arteries arise from it, *viz.* the Mam-

maria Interna, Mediaſtina, Pericardia, Diaphragmatica Minor ſive Superior, Thymica and Trachealis.

27. The Thymica and Trachealis on each Side are in ſome Subjects only Branches of one ſmall Trunk, which ſprings from the common Trunk of the right Subclavian and Carotid.

28. They are generally ſmall Arteries, which run ſometimes ſeparate, and ſometimes partly ſeparate and partly joined.

29. The Subclavian ſends off likewiſe the Mammaria Interna, Vertebrales, Cervicales, and ſometimes ſeveral of the upper Inter-coſtales.

30. The axillary Artery, which is only a Continuation of the Subclavian, from where it goes out of the Thorax, to the Axilla, detaches chiefly the Mammaria Externa or Thoracica Superior, Thoracica Inferior, Scapulares Externæ, Scapularis Interna, Humeralis or Muſcularis, *&c.* Afterwards it is continued, by different Ramifications and under different Names, over the whole Arm, all the Way to the Ends of the Fingers.

31. The ſuperior Portion of the Aorta Deſcendens gives off the Arteriæ Bronchiales, which ariſe ſometimes by a ſmall common Trunk, ſometimes ſeparate, and ſometimes do not come immediately from the Aorta. It next ſends off the Œſophagææ, which may be looked upon as Mediaſtinæ Poſteriores; and then the Inter-coſtales from its poſterior Part, which in ſome Subjects come all from this Portion of the Aorta, in others only the loweſt eight or nine.

32. The ſmall anterior Arteries here mentioned are generally at their Origins ſingle and in uneven Numbers, but they divide ſoon after, toward the right and left.

33. The inferior Portion of the deſcending Aorta, as it paſſes through the Diaphragm, gives off the Diaphragmaticæ Inferiores or Phrenicæ, which however do not always come immediately from the Aorta. Afterwards it ſends off ſeveral Branches anteriorly, poſteriorly and laterally.

34. The anterior Branches are the Cæliaca which ſupplies the Stomach, Liver, Spleen, Pancreas, *&c.* the Meſenterica Superior, which goes chiefly to the Meſentery, to the ſmall Inteſtines, and that Part of the great Inteſtines which lies on the right Side of the Abdomen; the Meſenterica Inferior, which goes to the great Inteſtines on the left Side, and produces the Hæmorrhoidalis Interna; and laſtly, the right and left Arteriæ Spermaticæ.

35. The poſterior Branches are the Arteriæ Lumbares, of which there are ſeveral Pairs, and the Sacræ, which do not always come from the Trunk of the Aorta.

36. The lateral Branches are the Capſulares and Adipoſæ, the Origin of which often varies; the Renales formerly termed Emulgentes, and the Iliacæ, which terminate the Aorta by the Bifurcation already mentioned.

37. The Iliac Artery on each Side is commonly divided into the external or anterior, and internal or poſterior.

38. The internal Iliaca is likewiſe named Arteria Hypogaſtrica; and its Ramifications are diſtributed to the Viſcera contained in the Pelvis, and to the neighbouring Parts, both internal and external.

39. The

39. The Iliaca Externa, which is the true Continuation of the Iliac Trunk, and alone deſerves that Name, goes on to the Inguen, and then out of the Abdomen, under the Ligamentum Fallopii; having firſt detached the Epigaſtrica, which goes to the Muſculi Abdominis Recti. Having quitted the Abdomen, it commences Arteria Cruralis, which runs down upon the Thigh, and is diſtributed by many Branches and Ramifications to all the lower Extremity.

40. I shall now go on to examine particularly all the capital or original Branches of the Aorta, from their Origin, to the Entry of them and of their Ramifications into all the Parts of the Body, and all the different Viſcera and Organs.

Arteriæ Cardiacæ ſive Coronariæ Cordis.

41. The cardiac or coronary Arteries of the Heart ariſe from the Aorta immediately on its leaving the Heart. They are two in Number, and according to the natural Situation of the Heart, one is rather ſuperior than anterior, the other rather inferior than poſterior.

42. They go out near the two Sides of the pulmonary Artery, which having firſt ſurrounded, they afterward run upon the Baſis of the Heart in Form of a Kind of Crown or Garland, from whence they are called Coronariæ; and then purſue the ſuperficial Traces of the Union of the two Ventricles, from the Baſis of the Heart to the Apex.

43. They ſend communicating Branches to each other, which are afterward loſt in the Subſtance of the Heart, as ſhall be ſhewn more particularly in deſcribing that Organ.

44. We ſometimes meet with a third coronary Artery, which ariſes from the Aorta more backward, and is ſpent on the poſterior or lower Side of the Heart.

The Arteriæ Carotides in general.

45. The carotid Arteries are commonly demonſtrated after the Subclavian; but I chooſe to deſcribe them firſt, that I may afterwards be able to purſue the Arteries of the Thorax ariſing partly from the Subclaviæ and partly from the Aorta Deſcendens, without Interruption.

46. These Arteries are two in Number, one called the right Carotid, the other the left. They ariſe near each other, from the Curvature or Arch of the Aorta; the left immediately, the right moſt commonly from the Trunk of the Subclavia on the ſame Side, as has been already obſerved.

47. They run upon each Side of the Trachea Arteria, between it and the internal jugular Vein, as high as the Larynx, without any Ramification. During this Courſe, therefore, they may be named carotid Trunks, or general, common and original Carotids. Each of theſe Trunks is afterwards ramified in the following Manner.

48. The Trunk having reached as high as the Larynx, is divided into two large Branches or particular Carotids, one named external, the other internal, becauſe the firſt goes chiefly to the external Parts of the Head, the ſecond enters the Cranium and is diſtributed to the Brain.

49. The external Carotid is anterior, the internal, poſterior; and the external is even ſituated more inward and nearer the Larynx than the other; but

but the common Names may ſtill be retained, as being taken not from their Situation, but from their Diſtribution.

Arteria Carotis Externa.

50. The external Carotid is the ſmalleſt, and yet appears by its Direction to be a Continuation of the common Trunk. It runs inſenſibly outward, between the external Angle of the lower Jaw, and the parotid Gland, which it ſupplies as it paſſes. Afterwards it aſcends on the Foreſide of the Ear, and ends in the Temples.

51. In this Courſe it ſends off ſeveral Branches, which may well enough be divided into anterior or internal, and poſterior or external; and the principal Branches of each Kind are theſe.

52. The firſt anterior or internal Branch goes out from the very Origin of the Carotid on the Inſide; and having preſently afterward taken a little Turn, and ſent off Branches to the jugular Glands near it, to the Fat and Skin; it runs tranſverſely, and is diſtributed to the Glandulæ Thyroidææ, and to the Muſcles and other Parts of the Larynx; for which Reaſon I name it Laryngæa or Gutturalis Superior. It likewiſe ſends ſome Branches to the Pharynx and Muſcles of the Os Hyoides.

53. The ſecond anterior Branch paſſes over the neareſt Cornu of the Os Hyoides, to the Muſcles of that Bone and of the Tongue; and to the Glandulæ Sublinguales; afterwards paſſing before the Cornu of the Os Hyoides, it loſes itſelf in the Tongue, from whence it has been called Arteria Sublingualis; and it is the ſame Artery which others have named Ranina.

54. The third Branch or Arteria Maxillaris Inferior goes to the maxillary Gland, to the Styloide and Maſtoide Muſcles, to the parotid and ſublingual Glands, to the Muſcles of the Pharynx, and to the ſmall Flexors of the Head.

55. The fourth Branch, which I name Arteria Maxillaris Externa, paſſes anteriorly on the Maſſeter Muſcle, and Middle of the lower Jaw near the Chin, from whence it has a Denomination in ſome Languages, which cannot be expreſſed in *Engliſh*. Afterwards it runs under the Muſculus Triangularis Labiorum, which it ſupplies as well as the Buccinator and the Quadratus Menti.

56. It ſends off a particular Branch, very much contorted, which divides at the angular Commiſſure of the Lips, and running in the ſame Manner along the ſuperior and inferior Portions of the Muſculus Orbicularis, it communicates on both Sides with its Fellow, and thereby forms a Kind of Arteria Coronaria Labiorum.

57. Afterwards it aſcends towards the Nares, and is diſtributed to the Muſcles, Cartilages and other Parts of the Noſe, ſending down ſome Twigs, which communicate with the coronary Artery of the Lips. Laſtly, it reaches the great Angle of the Eye, and is ramified and loſt on the Muſculus Orbicularis Palpebrarum, Superciliaris and Frontalis. Through all this Courſe, it is named Arteria Angularis.

58. The fifth Branch ariſes over-againſt the Condyle of the lower Jaw, and as it is very conſiderable, I call it Maxillaris Interna. It paſſes behind the

the Condyle, and having given off a Twig among the Muſculi Pterygoidæi, it is divided into three principal Branches.

59. The firſt Branch goes through the inferior orbitary or ſpheno-maxillary Fiſſure, to the Orbit, after having ſupplied the Muſculi Periſtaphylini, and the glandulous Membrane of the poſterior Nares, through the Foramen Spheno-Palatinum. I name this Branch Spheno-Maxillaris.

60. It is diſtributed inferiorly and laterally to the Parts contained in the Orbit, and detaches a ſmall ſubaltern Branch through the Extremity of the ſuperior orbitary or ſphenoidal Fiſſure, which enters the Cranium, and is ſpent upon the Dura Mater, communicating there with the other Artery of the Dura Mater, which enters by the Foramen Spinale of the ſphenoidal Bone.

61. It ſends off likewiſe another ſubaltern Branch, which paſſes through the poſterior Opening of the orbitary Canal, and having furniſhed the maxillary Sinus and the Teeth, goes out by the inferior orbitary Hole, and on the Cheek communicates with the angulary Artery.

62. The ſecond of the three Branches runs through the Canal of the lower Jaw, and being diſtributed to the Alveoli and Teeth, goes out at the Hole near the Chin, and loſes itſelf in the neighbouring Muſcles, communicating with the Rami of the Arteria Maxillaris Externa.

63. The third Branch of the Maxillaris Interna runs up between the internal and external Carotids, paſſes through the Foramen Spinale of the ſphenoidal Bone, and is diſtributed to the Dura Mater by ſeveral Ramifications, which run forward, upward and backward; the uppermoſt communicating with thoſe on the other Side, above the longitudinal Sinus of the Dura Mater.

64. This Artery of the Dura Mater, which may be termed Spheno-Spinalis, to diſtinguiſh it from thoſe that go to the ſame Part by another Courſe, ariſes ſometimes from the Trunk of the external Carotid, behind the Origin of the Laryngæa or Gutturalis Superior, and ſometimes from the firſt Ramus of the Maxillaris Interna, juſt before it enters the ſpheno-maxillary Fiſſure.

65. The ſixth anterior or internal Branch, which is very ſmall, is ſpent on the Muſculus Maſſeter.

66. The firſt external or poſterior Branch is named Arteria Occipitalis. It paſſes obliquely before the internal jugular Vein, and having Twigs to the Muſculus Stylo-Hyoidæus, Stylo-Gloſſus and Digaſtricus, it runs between the ſtyloide and maſtoide Apophyſes, along the maſtoide Groove, and goes to the Muſcles and Integuments which cover the Os Occipitis, turning ſeveral Times in an undulating Manner as it aſcends backward.

67. It communicates by a deſcending Branch with the vertebral and cervical Arteries, as has been already ſaid; near the Top of the Head, it communicates likewiſe with the poſterior Branches of the temporal Artery, and it ſends a Branch to the Foramen Maſtoidæum.

68. The ſecond external Branch ſpreads itſelf on the outward Ear, by a great many ſmall Twigs on each Side, ſeveral of which run inward, and furniſh the Cartilages, Meatus Auditorius, Skin of the Tympanum and internal Ear.

69. The

69. The Trunk of the external Carotid aſcends afterwards above the Zygoma, paſſing between the Angle of the lower Jaw and parotid Gland, and forms the temporal Artery, which divides into an anterior, middle and poſterior Branch.

70. The anterior Branch of the temporal Artery goes to the Muſculus Frontalis, communicates with the Arteria Angularis, and ſometimes gives off a very ſmall Artery, which pierces the internal Apophyſis of the Os Malæ, all the Way to the Orbit. The middle Branch goes partly to the Muſculus Frontalis, partly to the Occipitalis. The poſterior Branch goes to the Occiput, and communicates with the Arteria Occipitalis. All theſe Branches likewiſe furniſh the Integuments.

Arteria Carotis Interna.

71. The internal carotid Artery, leaving the general Trunk, is at firſt a little incurvated, appearing as if either it were the only Branch of that Trunk, or a Branch of the Trunk of the external Carotid. Sometimes the Curvature is turned a little outward, and then more or leſs inward, paſſing behind the neighbouring external Carotid.

72. It is ſituated a little more backward than the Carotis Externa, and generally runs up without any Ramification, as high as the lower Orifice of the great Canal of the Apophyſis Petroſa of the Os Temporis. It enters this Orifice directly from below upward, and afterward makes an Angle according to the Direction of the Canal, the reſt of which it paſſes horizontally, being covered by a Production of the Dura Mater.

73. At the End of this Canal it is again incurvated from below upward, and enters the Cranium through a Notch of the ſphenoidal Bone. Then it bends from behind, forward, and makes a third Angle on the Side of the Sella Sphenoidalis; and again a fourth, under the Clinoide Apophyſis of that Sella.

74. As it leaves the bony Canal to enter the Cranium, it ſends off a Branch through the ſphenoidal Fiſſure to the Orbit and Eye; and ſoon afterward, another, through the Foramen Opticum, by which it communicates with the external Carotid.

75. Afterwards the internal Carotid runs under the Baſis of the Brain to the Side of the Infundibulum, where it is at a ſmall Diſtance from the internal Carotid of the other Side, and there it commonly divides into two principal Branches, one anterior, and one poſterior.

76. The anterior Branch runs forward under the Brain, firſt ſeparating from that on the other Side, then coming nearer again, it unites with it by an Anaſtomoſis or Communication in the Interſtice between the olfactory Nerves. Afterwards having ſent off ſome ſmall Arteries, which accompany theſe Nerves, it leaves its Fellow, and divides into two or three Branches.

77. The firſt of theſe Branches goes to the anterior Lobe of the Brain; the ſecond, which is ſometimes double, is inverted on the Corpus Calloſum, to which it gives ſome Ramifications, as alſo to the Falx of the Dura Mater, and middle Lobe of the Brain. The third, which in ſome Subjects is a diſtinct Branch, in others only a Diviſion of the ſecond, goes to the poſterior

Lobe

Lobe of the Brain. This might be looked upon as a third principal Branch lying between the other two.

78. The posterior Branch communicates first of all with the vertebral Artery of the same Side, and then divides into several Rami which run between the superficial Circumvolutions of the Brain; and are ramified in many different Directions on and between these Circumvolutions, all the Way to the Bottom of the Sulci.

79. All these Ramifications are covered by the Pia Mater, in the Duplicature of which they are distributed, and form capillary reticular Textures in great Numbers; and afterwards they are lost in the inner Substance of the Brain. The anterior and middle Branches produce the same Kind of Ramifications, and the anterior, in particular, sends a Twig to the Corpus Callosum.

80. The subclavian Arteries are named from their Situation near the Claviculæ, in the transverse Direction of which they run. They are two in Number, one right, the other left; and they arise from the Arch of the Aorta, on each Side of the left Carotid, which commonly lies in the Middle between them; but when both Carotids go out separately, they both lie between the Subclaviæ. These Arteries terminate, or rather change their Name, above the Middle of the two first Ribs, between the anterior Insertions of the Musculi Scaleni. *Arteria Subclavia.*

81. The right Subclavian is larger at the Beginning than the left, when it produces the right Carotid; its Origin is likewise more anterior and higher, because of the Obliquity of the Arch of the Aorta; for which Reason also, the left is shorter than the right, and runs more obliquely. Both of them are distributed much in the same Manner; and therefore the Description of one may likewise be applied to the other.

82. The right Subclavian, the longest of the two, gives off, first of all, small Arteries to the Mediastinum, Thymus, Pericardium, Aspera Arteria, *&c.* which are named Mediastinæ, Thymicæ, Pericardiæ, and Tracheales. These small Arteries sometimes go out from the Subclavian itself, either separately, or by small common Trunks; sometimes they are Branches of the Mammaria Interna, especially the Mediastina.

83. Afterward this right Subclavian, at about a Finger's Breadth from its Origin, often produces the common Carotid of the same Side; and at a small Finger's Breadth from the Carotid, it gives off commonly three considerable Branches, *viz.* the Mammaria Interna, Cervicalis, and Vertebralis, and sometimes an intercostal Artery which goes to the first Ribs, called Intercostalis Superior.

84. The Arteria Thymica communicates with the Mammaria Interna, and sometimes arises from the anterior middle Part of the common Trunk of the Subclavian and Carotid. The Thymus receives likewise some Rami from the Mammaria Interna, and Intercostalis Superior. The same Observation may be applied to the Mediastina and Pericardia. *Arteria Thymica.*

Arteria Pericardia. 85. The Pericardia ariſes much in the ſame Manner with the Thymica, and runs down upon the Pericardium all the Way to the Diaphragm, to which it ſends ſome ſmall Ramifications.

Arteria Mediaſtina. 86. The Mediaſtina ariſes ſometimes immediately after the Thymica, and is diſtributed principally to the Mediaſtinum.

Arteria Trachealis. 87. The Trachealis, which may likewiſe be named Gutturalis Inferior, runs up from the Subclavia, in a winding Courſe, along the Aſpera Arteria, to the Glandulæ Thyroidææ, and Larynx, detaching ſmall Arteries to both Sides, one of which runs to the upper Part of the Scapula.

Arteria Mammaria Interna. 88. The internal mammary Artery comes from the anterior and lower Side of the Subclavia, near the Middle of the Clavicula, and runs down for about one Finger's Breadth, behind the Cartilages of the true Ribs, an Inch diſtant from the Sternum.

89. In its Paſſage it ſends Rami to the Thymus, Mediaſtinum, Pericardium, Pleura, and intercoſtal Muſcles. It likewiſe detaches other Branches, through theſe Muſcles, and between the Cartilages of the Ribs, to the Pectoralis Major, and other neighbouring muſcular Portions, to the Mammæ, Membrana Adipoſa and Skin.

90. Several of theſe Rami communicate, by Anaſtomoſes, with the Mammaria Externa, and other Arteries of the Thorax, eſpecially in the Subſtance of the Pectoralis Major, and likewiſe with the Intercoſtals. Afterwards it goes out of the Thorax on one Side of the Appendix Enſiformis, and is loſt in the Muſculus Abdominis Rectus, a little below its upper Part; communicating at this Place, by ſeveral ſmall Ramifications, with the Arteria Epigaſtrica; and in its Courſe, it gives Branches to the Peritonæum, and to the anterior Parts of the oblique and tranſverſe Muſcles of the Abdomen.

Arteria Cervicalis. 91. The cervical Artery ariſes from the upper Side of the Subclavian, and is preſently afterward divided into two, which come out ſometimes ſeparately, ſometimes by a ſmall common Trunk. The largeſt of theſe two Arteries is anterior, the other poſterior.

92. The anterior Cervicalis, running behind the Carotid of the ſame Side, is diſtributed to the Muſculus Coraco-Hyoidæus, Maſtoidæus, Cutaneus, Sterno-Hyoidæus, and Sterno-Thyroidæus, to the jugular Glands, the Aſpera Arteria, the Muſcles of the Pharynx, Bronchia, Œſophagus, and to the anterior Muſcles, which move the Neck and Head. This Artery has been obſerved to ſend out the Intercoſtalis Superior.

93. The poſterior Cervicalis ariſes ſometimes a little after the Vertebralis, and ſometimes from that Artery. It paſſes under the tranſverſe Apophyſis of the laſt Vertebra of the Neck; and ſometimes through a particular Hole in that Apophyſis; and from thence runs up backward in a winding Courſe, on the vertebral Muſcles of the Neck, and then returns in the ſame Manner.

94. It communicates with a deſcending Branch of the occipital Artery, and with another of the vertebral Artery above the ſecond Vertebra. It is diſtributed

distributed to the Musculi Scaleni, Angularis Scapulæ, and Trapezius, and to the jugular Glands and Integuments.

95. The vertebral Artery goes out from the posterior and upper Side of the Subclavian, almost opposite to the Mammaria Interna and Cervicalis. It runs up through all the Holes in the transverse Apophyses of the Vertebræ of the Neck, and, in its Passage, sends off little Twigs through the lateral Notches of these Vertebræ, to the Medulla Spinalis and its Coverings. It also gives Arteries to the vertebral Muscles, and to other Muscles near them. *Arteria Vertebralis.*

96. As it passes through the transverse Hole of the second Vertebra, it is generally incurvated, to accommodate itself to the particular Obliquity of this Foramen, mentioned in the Description of the Sceleton N° 479. And between this Hole and that in the first Vertebra, it takes another larger Turn in a contrary Direction to the former. Having passed the transverse Hole of the first Vertebra, it is considerably incurvated a third Time, from before backwards, as it goes through the superior and posterior Notch in this Vertebra.

97. At this third Curvature, it sends off a small Branch, which is ramified on the outer and posterior Parts of the Occiput, and communicates with the cervical and occipital Arteries. Having afterwards reached the great Foramen of the Os Occipitis, it enters the Cranium and pierces the Dura Mater; and on these Accounts it may be named Arteria Occipitalis Posterior, to distinguish it from the other which is lateral.

98. As soon as it enters the Cranium, it sends several small Ramifications to the Backpart of the Medulla Oblongata, and to the Corpora Olivaria and Pyramidalia, which are likewise spread on the Backsides of the fourth Ventricle of the Brain, and form the Plexus Choroides of the Cerebellum.

99. Afterwards it advances on the Apophysis Basilaris of the Os Occipitis, inclining by small Degrees toward the vertebral Artery of the other Side, all the Way to the Extremity of that Apophysis, where they both join in one common Trunk, which may be named Arteria Basilaris.

100. The Arteria Basilaris runs forward under the great transverse Protuberance of the Medulla Oblongata, to which it gives Ramifications, as well as to the neighbouring Parts of the Medulla. Sometimes this Artery divides again near the Extremity of the Apophysis Basilaris into two lateral Branches, which communicate with the posterior Branches of the two internal Carotides, and are lost in the posterior Lobe of the Brain. *Arteria Basilaris.*

101. The spinal Arteries are two in Number, one anterior and one posterior; both produced by both Vertebrales, each of which, as soon as it enters the Cranium, sends out a small Branch, by the Union of which the Posterior Spinalis is formed. Afterwards the Vertebrales advancing on the Apophysis Basilaris or Production of the Occipital Bone, detach backward two other small Branches, which likewise meet, and by their Union form the Spinalis Anterior. These spinal Arteries run down on the fore and Backsides of the Medulla Spinalis, and by small transverse Ramifications communicate with those which the intercostal and lumbar Arteries send to the same Part. *Arteriæ Spinales.*

Arteria Auditoria Interna.

102. The internal auditory Artery goes off from each Side of the Arteria Basilaris, to the Organ of Hearing, accompanying the auditory Nerve, having first furnished several small Twigs to the Membrana Arachnoides.

Arteria Meningæa Posterior.

103. The Posterior Meningæa arises from the same Trunk with the Auditoria Interna, and goes to the Backpart of the Dura Mater, on the Occipital and Temporal Bones, and likewise supplies the neighbouring Lobes of the Brain.

Arteria Intercostalis Superior.

104. When the superior intercostal Artery does not go out from the Trunk of the Aorta Descendens, it commonly arises from the lower Side of the Subclavian, and runs down on the Inside of the two, three or four uppermost true Ribs, near their Heads, and sends off under each Rib, a Branch, which runs along the lower Edge, and supplies the intercostal Muscles and neighbouring Parts of the Pleura.

105. These Branches or particular intercostal Arteries communicate with each other at different Distances by small Rami, which run upward and downward from one to the other, on the intercostal Muscles.

106. They likewise give Branches to the Musculi Sterno-Hyoidæi, Subclavius, Vertebrales, and Bodies of the Vertebræ; and also to the Pectoralis Major and Minor, piercing the intercostal Muscles; and lastly, they send Branches through the Notches of the first four Vertebræ to the Medulla Spinalis and its Coverings.

107. Sometimes the superior common intercostal Artery comes from the Cervicalis, and not immediately from the Subclavia. Sometimes it arises from the Aorta Descendens, either by small separate Arteries or by a common Trunk, which divides as it runs obliquely up upon the Ribs. Lastly, it sometimes arises from the nearest Bronchialis, or from several Bronchiales together.

Ductus Arteriosus in Ligamentum versus.

108. The Ductus Arteriosus, which is found only in the Fœtus and in very young Children, arises from the Aorta Descendens, immediately below the left subclavian Artery. In Adults, this Duct is shrunk up and closed, and appears only like a short Ligament, adhering by one End to the Aorta, and by the other to the pulmonary Artery, so that in Reality it deserves no other Name than that of Ligamentum Arteriosum.

Arteria Bronchialis.

109. The bronchial Arteries go sometimes from the Foreside of the superior descending Aorta, sometimes from the first Intercostal, and sometimes from the Arteria Œsophagæa. Sometimes they arise separately from each Side, to go to each Lung, and sometimes by a small common Trunk, which afterwards separates towards the right and left Hand, at the Bifurcation of the Aspera Arteria, and accompany the Ramifications of the Bronchia.

110. The bronchial Artery on the left Side often comes from the Aorta, while the other arises from the superior Intercostal on the same Side, which Variety is owing to the Situation of the Aorta. Sometimes there is another bronchial Artery which goes out from the Aorta posteriorly, near the superior Intercostal, above the Bronchialis Anterior.

111. In

111. In the Year 1719, I obſerved a very plain Communication of the Branches of the left pulmonary Vein, with the Rami of an Arteria Œſophagæa, which came from the firſt left Intercoſtal, together with a bronchial Artery of the ſame Side.

112. The Bronchialis gives a ſmall Branch to the neighbouring Auricle of the Heart, which communicates with the Arteria Coronaria.

113. In the Year 1719 or 1720, I diſcovered a Communication between the left bronchial Artery and the Vena Azygos; and in the Month of *Auguſt* 1721, I ſaw a Branch of this bronchial Artery joined by an Anaſtomoſis to the Body of the Azygos.

114. The Œſophagææ are generally two or three in Number, ſometimes but one. They ariſe anteriorly from the Aorta Deſcendens, and are diſtributed to the Œſophagæus, *&c.* Sometimes the uppermoſt Œſophagæa produces a bronchial Artery. *Arteriæ Oeſophagææ.*

115. The inferior Intercoſtals are commonly ſeven or eight on each Side, and ſometimes ten, when the ſuperior Intercoſtals ariſe likewiſe from the Aorta Deſcendens; in which Caſe theſe run obliquely upward, as has been already ſaid. *Arteriæ Intercoſtales Inferiores.*

116. They ariſe along the Backſide of the deſcending Aorta in Pairs, all the Way to the Diaphragm, and run tranſverſely toward each Side, on the Bodies of the Vertebræ. Thoſe on the right Side paſs behind the Vena Azygos; and afterwards they all run to the intercoſtal Muſcles, along the lower Edge of the Ribs, all the Way to the Sternum or near it.

117. They ſend Branches to the Pleura, to the vertebral Muſcles, to thoſe Muſcles which lie on the Outſides of the Ribs, and to the upper Portions of the Muſcles of the Abdomen; and they communicate with the Arteriæ Epigaſtricæ and Lumbares.

118. Sometimes, inſtead of going out from the Aorta in Pairs, they ariſe by ſmall common Trunks, which afterwards divide, and ſend an Artery to each neighbouring Rib.

119. Before they take their Courſe along the Ribs, each of them detaches one Branch between the tranſverſe Apophyſes on both Sides, to the vertebral Muſcles, and another which enters the great Canal of the Spina Dorſi. Each of theſe latter Branches divides at leaſt into two ſmall Arteries, one of which runs tranſverſely on the anterior Side of the Canal, the other on the poſterior Side. Both of them communicate with the like Arteries from the other Side of the Spine, in ſuch a Manner, as to form a Kind of arterial Rings, which likewiſe communicate with each other by other ſmall Ramifications. The ſame is to be obſerved in the Arteriæ Lumbares.

120. Afterwards each intercoſtal Artery, having reached the Middle of the Rib or little more, divides into two principal Branches, one internal, the other external. Soon after this Diviſion, the Arteries that run upon the falſe Ribs, ſeparate a little from them, being gradually bent downward one after another, and are ſpread upon the abdominal Muſcles. They are likewiſe diſtributed to other neighbouring Muſcles, and particularly

to

to thoſe of the Diaphragm, almoſt in the ſame Manner with the Arteriæ Phrenicæ. They alſo communicate with the Lumbares, and ſometimes with Branches of the Hypogaſtricæ.

Arteriæ Axillares.

121. The ſubclavian Artery having left the Thorax immediately above the firſt Rib, in the Interſtice left between the Portions of the Scalenus, there receives the Name of Axillaris, becauſe it paſſes under the Axilla.

122. In this Courſe it gives off from its Inſide, a ſmall Branch to the Inſide of the firſt Rib; and afterwards, four or five principal Branches, *viz.* The Thoracica Superior or Mammaria Externa, Thoracica Inferior, Muſcularis or Scapularis Externa, Scapularis Interna, and Humeralis.

Arteria Thoracica Superior.

123. The ſuperior Thoracica, or external mammary Artery, runs down in a winding Courſe on the lateral Parts of the Thorax, and croſſes the Ribs. It gives Branches to the two pectoral Muſcles, to the Mamma, Muſculus Subclavius, Serratus Major, Latiſſimus Dorſi, and to the upper Portions of the Coraco-Brachialis and Biceps.

124. These Branches are ſometimes ſeparate for ſome Space; and one of them in particular runs down between the Deltoides and Pectoralis Major, together with the Vena Cephalica to which it adheres very cloſely, the Extremity of it piercing the Coat of that Vein, as if there were an Anaſtomoſis between them. Another ſometimes runs between the Muſculus Brachiæus and Anconæus Internus, which communicates with a Branch of the radial Artery.

Arteria Thoracica Inferior.

125. The inferior Thoracic Artery runs along the inferior Coſta of the Scapula, to the Muſculus Subſcapularis, Teres Major and Minor, Infra-Spinatus, Latiſſimus Dorſi, Serratus Major, and the neighbouring intercoſtal Muſcles, communicating with the Arteriæ Scapulares.

Arteriæ Scapulares.

126. The external ſcapulary Artery paſſes through the Notch in the ſuperior Coſta of the Scapula, to the Muſculus Supra-Spinatus and Infra-Spinatus, Teres Major and Minor, and to the Articulation of the Scapula, with the Os Humeri.

127. The internal Scapularis ariſes from the axillary Artery near the Axilla, and runs backward, to be diſtributed to the Subſcapularis, giving Branches to the Serratus Major, to the axillary Glands, and to the Teres Major, upon which it is ramified in different Manners. It likewiſe ſends Rami to the Infra-Spinatus and upper Portion of the Anconæi.

Arteria Humeralis.

128. The humeral Artery ariſes from the lower and Foreſide of the Axillaris, and runs backward between the Head of the Os Humeri and Teres Major, ſurrounding the Articulation, till it reaches the poſterior Part of the Deltoides to which it is diſtributed.

129. During this Courſe, it gives ſeveral Branches to the ſuperior Portions of the Anconæi, to the capſular Ligament of the Joint of the Shoulder, and to the Os Humeri itſelf, through ſeveral Holes immediately below the great Tuberoſity of the Head of that Bone. It likewiſe communicates with the ſcapulary Artery.

130. Opposite to the Origin of this humeral Artery, the Axillaris ſends off another ſmall Branch, which runs in a contrary Direction between the

the Head of the Os Humeri and the common upper Part of the Biceps and Coraco-Brachialis; and having given Branches to the Vagina and Channel of the Biceps, and to the Periosteum, afterwards joins the principal Humeralis.

131. The axillary Artery having given off these Branches, passes immediately behind the Tendon of the Pectoralis Major, where it changes its former Name for that of Arteria Brachialis. It runs down on the Inside of the Arm over the Musculus Coraco-Brachialis, and Anconæus Internus, and along the inner Edge of the Biceps behind the Vena Basilica, giving small Branches on both Sides to the neighbouring Muscles, to the Periosteum, and to the Bone. *Arteria Brachialis.*

132. Between the Axilla and Middle of the Arm, it is covered only by the Skin and Fat; but afterwards it is hid under the Biceps, and runs obliquely forward as it descends; being at some Distance from the internal Condyle, but it does not reach the Middle of the Fold of the Arm.

133. Between the Axilla and this Place, it sends off many Branches to the Infra-Spinatus, Teres Major and Minor, Subscapularis, Latissimus Dorsi, Serratus Major, and other neighbouring Muscles, to the common Integuments and even to the Nerves. Below the Fold of the Arm, it divides into two principal Branches, one called Arteria Cubitalis, the other Radialis.

134. From its upper and inner Part it sends off a particular Branch, which runs obliquely downward and backward over the Anconæi, and then turns forward again near the external Condyle, where it communicates with a Branch of the Arteria Radialis.

135. Immediately below the Insertion of the Teres Major, it gives off another Branch, which runs from within outwards, and from behind forward, round the Os Humeri; and descends obliquely forward between the Musculus Brachiæus, and Anconæus Externus, to both which it is distributed in its Passage. Having afterwards reached the external Condyle, it unites with the Branch last mentioned, and likewise communicates with a Branch of the Arteries of the Fore-Arm, so that there is here a triple Anastomosis.

136. About the Breadth of a Finger below this second Branch, the brachial Artery sends off a third, which runs down toward the internal Condyle, and communicates with other Branches of the Arteries of the Fore-Arm, as we shall see hereafter.

137. About the Middle of the Arm, or a little lower, much about the Place where the brachial Artery begins to be covered by the Biceps; it sends off a Branch, which is distributed to the Periosteum, and penetrates the Bone, between the Musculus Brachiæus and Anconæus Internus.

138. About an Inch lower, it gives off another Branch, which having furnished Ramifications to the Anconæus Internus, runs over the inner Condyle, and likewise communicates with Branches of the Arteries of the Fore-Arm.

139. Having got below the Middle of the Arm, the brachial Artery detaches an other Branch which runs behind the inner Condyle in Company with a considerable Nerve; and having passed over the Muscles inserted in this

Condyle, it communicates with that Branch of the cubital Artery, which encompaſſes the Fold of the Arm.

140. A little lower, it ſometimes ſends out another Branch, which paſſes on the Foreſide of the inner Condyle, and then communicates with a Branch which runs up from the cubital Artery. Theſe three communicating Branches are termed collateral Arteries.

141. THE common Trunk of the brachial Artery having reached the Fold of the Arm, runs together with a Vein and a Nerve immediately under the Aponeuroſis of the Biceps, and paſſes under the Vena Mediana, detaching Branches on each Side to the neighbouring Muſcles.

142. ABOUT a large Finger's Breadth beyond the Fold of the Arm, this Artery divides into two principal Branches, one interior or poſterior, named Cubitalis; the other outer or anterior, named Radialis, as has been already ſaid.

143. FROM this Bifurcation, the brachial Artery ſends Branches on each Side, to the Supinator Longus, Pronator Teres, Fat and Skin. It ſometimes tho' very rarely happens, that this Artery is divided from its Origin into two large Branches, which run down on the Arm, and afterwards on the Fore-Arm, where they have the Names of Cubitalis and Radialis.

Arteria Cubitalis.

144. THE cubital Artery ſinks in between the Ulna, and the upper Parts of the Pronator Teres, Perforatus, Ulnaris Gracilis, and Radialis Internus; then leaving the Bone, it runs down between the Perforatus and Ulnaris Internus, all the Way to the Carpus and great tranſverſe Ligament. In this Courſe it winds and turns ſeveral Ways and ſends out ſeveral Branches.

145. THE firſt is a ſmall Artery which runs inward to the inner Condyle, and then turns upward like a Kind of Recurrent, to communicate by ſeveral Branches with the collateral Arteries of the Arm already mentioned, and particularly with the third. A little lower down, another ſmall Branch goes off, which having run upward a little Way, and almoſt ſurrounding the Articulation, communicates with the ſecond collateral Artery of the Arm, between the Olecranum and inner Condyle.

146. AFTERWARDS the cubital Artery, having in its Courſe between the Heads of the Ulna and Radius reached the interoſſeous Ligament, ſends off two principal Branches, one internal, the other external, which I call the interoſſeous Arteries of the Fore-Arm.

147. THE external Artery pierces the Ligament about three Fingers Breadth below the Articulation; and preſently afterward gives off a Branch, which runs up like a Recurrent toward the external Condyle of the Os Humeri under the Ulnaris Externus, and Anconæus Minimus, to which it is diſtributed, as alſo to the Supinator Brevis; and it communicates with the collateral Arteries of the Arm on the ſame Side.

148. AFTERWARD this external interoſſeous Artery runs down on the Outſide of the Ligament, and is diſtributed to the Ulnaris Externus, Extenſor Digitorum Communis, and to the Extenſores Pollicis, Indicis and Minimi Digiti; communicating with ſome Branches of the internal interoſſeous Artery.

149. HAVING reached the lower Extremity of the Ulna, it unites with a Branch of the internal interoſſeous Artery, which at this Place runs from within outward; and is diſtributed together with it on the convex Side of the Carpus and Back of the Hand; communicating with the Arteria Radialis and with a Branch of the Cubitalis, which will be mentioned hereafter.

150. BY theſe Communications, this Artery forms a ſort of irregular Arch, from whence Branches are detached to the external interoſſeous Muſcles, and to the external lateral Parts of the Fingers.

151. THE internal interoſſeous Artery runs down very cloſe to the Ligament, till it reaches below the Pronator Teres, between which and the Pronator Quadratus, it perforates the Ligament, and goes to the convex Side of the Carpus and Back of the Hand, where it communicates with the external interoſſeous Artery, with the Radialis and internal Branches of the Cubitalis.

152. FROM the Origin of the two Interoſſeæ, the cubital Artery runs down between the Perforatus, Perforans, and Ulnaris Internus, along the Ulna, ſending Branches to the neighbouring Parts. Below the internal Interoſſea, it ſometimes ſends off a Branch which runs down between the Flexor Pollicis, Radialis Internus and Perforatus, to which it is diſtributed all the Way to the Carpus, where it runs under the internal annular Ligament and communicates on the Hand with Branches of the Arteria Radialis.

153. AFTERWARD the cubital Artery paſſes over the internal tranſverſe Ligament of the Carpus, by the Side of the Os Piſiforme, and having furniſhed the Skin, Palmaris Brevis and Metacarpius, it ſlips under the Aponeuroſis Palmaris, giving off one Branch to the Hypothenar Minimi Digiti, and another which runs towards the Thumb between the Tendons of the Flexors of the Fingers, and the Baſes of the metacarpal Bones.

154. IT likewiſe ſends off a Branch, which running between the third and fourth Bones of the Metacarpus, reaches to the Back of the Hand, where it communicates with the external interoſſeous Artery. Afterwards having ſupplied the interoſſeous Muſcles, it communicates with the Radialis; and they both form an arterial Arch in the Hollow of the Hand in the following Manner.

155. THE Cubitalis having got about two Fingers Breadth beyond the internal annular Ligament of the Carpus, forms an Arch, the convex Side of which is turned to the Fingers, and commonly ſends off three or four Branches. The firſt goes to the inner and Backpart of the little Finger; and is ſometimes a Continuation or Production of that Branch which goes to the Hypothenar.

156. THE other three Branches run in the Interſtices of the four metacarpal Bones, near the Heads of which, each of them is divided into two Branches, which paſs along the two internal lateral Parts of each Finger, from the Foreſide of the Little Finger to the poſterior Side of the Index incluſively; and at the Ends of the Fingers, theſe digital Arteries communicate and unite with each other.

157. SOME-

157. Sometimes the Arch of the cubital Artery terminates by a particular Branch in the Middle Finger, and in that Caſe it communicates with the radial Artery, which makes up what the other wants.

158. This Arch ſends likewiſe from its concave Side, toward the ſecond Phalanx of the Thumb, a Branch for the lateral internal Part thereof, and then ends near the Head of the firſt metacarpal Bone, by a Communication with the Radialis, having firſt given a Branch to the Foreſide of the Index, and another to the Side of the Thumb next the former. Theſe communicate at the Ends of the Fingers with the neighbouring Branches, as in the other Fingers.

159. This Arch ſends likewiſe ſmall Twigs to the interoſſeous Muſcles, to the Lumbricales, Palmaris, and to other neighbouring Parts; and laſtly, to the Integuments.

Arteria Radialis.

160. The radial Artery begins by detaching a ſmall Branch, which runs upward like a Recurrent, toward the Fold of the Arm, and turns backward round the external Condyle, communicating with the neighbouring Branches from the Trunk of the brachial Artery, eſpecially with the firſt collateral Branch on that Side.

161. It runs down along the Inſide of the Radius, between the Supinator Longus, Pronator Teres and the Integuments, giving Branches to theſe Muſcles, and likewiſe to the Perforatus, Perforans and Supinator Brevis. From thence it runs in a winding Courſe toward the Extremity of the Radius, ſupplying the Flexors of the Thumb and Pronator Quadratus.

162. Having reached the Extremity of the Radius, it runs nearer the Skin, eſpecially toward the anterior Edge of the Bone, being the Artery which we there feel when we examine the Pulſe.

163. At the End of the Radius, it gives off a Branch to the Thenar; and after having communicated with the Arch of the cubital Artery in the Palm of the Hand, and ſent off ſome cutaneous Branches at that Place, it detaches one along the whole internal lateral Part of the Thumb.

164. Afterwards it runs between the firſt Phalanx and Tendons of the Thumb, to the Interſtice between the Baſis of this firſt Phalanx and of the firſt metacarpal Bone, where it turns toward the Hollow of the Hand.

165. At this Turning, it ſends off a Branch to the external lateral Part of the Thumb, which, having reached the End thereof, communicates by a ſmall Arch with the Branch which goes to the internal lateral Part.

166. It likewiſe ſends Branches outward, which run more or leſs tranſverſely between the firſt two Bones of the Metacarpus and the two Tendons of the Radialis Externus; and it communicates with an oppoſite Branch of the Cubitalis, together with which it furniſhes the external interoſſeous Muſcles and Integuments of the Back of the Hand and convex Side of the Carpus.

167. Laſtly, the radial Artery terminates, in its Paſſage over the ſemi-interoſſeous Muſcle of the Index, near the Baſis of the firſt metacarpal Bone, and as it runs under the Tendons of the Flexor Muſcles of the Fingers, where it is joined to the Arch of the Cubitalis.

168. It

168. It ſends off another Branch which runs along the Forepart of the firſt Bone of the Metacarpus, to the convex Side of the Index, where it is loſt in the Integuments.

169. It gives likewiſe a Branch to the internal lateral Part of the Index, which, at the End of that Finger, joins an oppoſite Branch which comes from the Arch of the Cubitalis. It alſo ſends off a ſmall Branch croſs the internal interoſſeous Muſcles, where it forms a Kind of ſmall irregular Arch, which communicates with the great Arch by ſeveral ſmall arterial Rami.

170. When the Arch of the Cubitalis ends at the Middle Finger, the Radialis runs along the inner or concave Part of the firſt metacarpal Bone, at the Head of which it terminates by two Branches.

171. One of theſe Branches runs along the inner and anterior lateral Part of the Index; the other paſſes between the Flexor Tendons of this Finger and the metacarpal Bone, and having communicated with the cubital Branch of the Middle Finger, it advances on the poſterior lateral Part of the Index all the Way to the End of that Finger, where it unites again with the firſt Branch.

172. The left Diaphragmatic Artery goes out commonly from the Aorta Deſcendens, as it paſſes between the Crura of the ſmall Muſcle of the Diaphragm. The right Diaphragmatic comes ſometimes from the neareſt Lumbar Artery, but moſt commonly from the Cæliaca. Sometimes both theſe Arteries ariſe by a ſmall common Trunk immediately from the Aorta. They likewiſe have the Name of Arteriæ Phrenicæ. *Arteria Diaphragmatica.*

173. They appear almoſt always in ſeveral Ramifications on the concave or lower Side of the Diaphragm, and ſeldom on the upper or convex Side. They give ſmall Branches to the Glandulæ Renales or Capſulæ Atrabilariæ, which ſometimes communicate with the other Arteries that go to the ſame Part.

174. They ſend likewiſe ſmall Branches to the Fat which lies upon the Kidneys, called the Membrana Adipoſa, from whence they have the Name of Arteriæ Adipoſæ; and they ſometimes come immediately from the Trunk of the Aorta on one Side of the Meſenterica Superior.

175. Beſides theſe capital Diaphragmatic Arteries, there are others of a ſubordinate Claſs, which come from the Intercoſtales, Mammariæ Internæ, Mediaſtinæ, Pericardiæ and Cæliaca, as is obſerved in the Deſcription of each of theſe Arteries.

176. The Cæliac Artery ariſes anteriorly and a little to the left Hand, from the Aorta Deſcendens, immediately after its Paſſage through the ſmall Muſcle of the Diaphragm, nearly oppoſite to the Cartilage between the laſt Vertebra of the Back and firſt of the Loins. The Trunk of this Artery is very ſhort; and near its Origin, it ſends off from the right Side two ſmall Diaphragmaticæ, though ſometimes there is only one which goes to the right Hand, and is afterwards diſtributed both Ways; communicating with the other Arteries of the ſame Name which come from the Intercoſtales and Mammariæ. The left Branch ſends Rami to the ſuperior Orifice of the Stomach and to the Glandula Renalis on the ſame Side; the right furniſhes the Pylorus, and the Renal Gland on the Right Side. *Arteria Cæliaca.*

177. Immediately after this, the Cæliaca gives off a conſiderable Branch, named Arteria Ventriculi Coronaria, and Gaſtrica, or Gaſtrica Superior; and then it preſently divides into two large Branches, one toward the right Hand, named Arteria Hepatica; the other to the left, called Splenica, which is larger than the former.

178. Sometimes this Artery is divided into theſe three Branches at the ſame Place, very near its Origin; the Trunk going out from the Aorta almoſt in a ſtraight Line, and the Branches from the Trunk almoſt at right Angles, like Radii from an Axis, whence this Trunk has been called Axis Arteriæ Cæliacæ.

Arteria Ventriculi Coronaria.

179. The coronary Artery of the Stomach goes firſt to the left Side of that Organ, a little beyond the ſuperior Orifice; round which Orifice it throws Branches, and alſo to every Part of the Stomach near it; and theſe Branches communicate with thoſe which run along the Bottom of the Stomach to the Pylorus.

180. Afterwards it runs on the right Side of the ſuperior Orifice, along the ſmall Curvature of the Stomach, almoſt to the Pylorus, where it communicates with the Arteria Pylorica; and turning towards the ſmall Lobe of the Liver, it gives off ſome Branches to it.

181. Then it advances under the Ductus Venoſus, to the left Lobe of the Liver, in which it loſes itſelf near the Beginning of the juſt-mentioned Duct, having firſt given off ſome ſmall Branches to the neighbouring Parts of the Diaphragm and Omentum.

Arteria Hepatica.

182. As ſoon as the Hepatic Artery leaves the Cæliaca, it runs to the upper and inner Part of the Pylorus, in Company with the Vena Portæ, ſending off two Branches, a ſmall one called Arteria Pylorica, and a large one named Gaſtrica Dextra, or Gaſtrica Major.

183. The Pylorica is ramified on the Pylorus, from whence it has its Name; and having diſtributed Branches to the neighbouring Parts of the Stomach, which communicate with thoſe of the right Gaſtrica, it terminates on the Pylorus, by an Anaſtomoſis with the coronary Artery of the Stomach.

184. The right Gaſtric Artery having paſſed behind and beyond the Pylorus, ſends out a conſiderable Branch named Arteria Duodenalis, or Inteſtinalis, which ſometimes comes from the Trunk of the Hepatica, as we ſhall ſee hereafter. Afterwards this Gaſtric Artery runs along the right Side of the great Curvature of the Stomach, to the neighbouring Parts of which, on both Sides, it diſtributes Branches.

185. These Branches communicate with thoſe of the Arteria Pylorica, and of the Coronaria Ventriculi, and with the right Gaſtro-Epiploicæ, which furniſh the neareſt Parts of the Omentum, and communicate with the Meſenterica Superior. After this, the right Gaſtric Artery ends in the left, which is a Branch of the Splenica.

186. The Duodenal or inteſtinal Artery runs along the Duodenum on the Side next the Pancreas; to both which it furniſhes Branches, and alſo to the

the neighbouring Part of the Stomach. Sometimes this Artery goes out from the Meſenterica Superior, and ſometimes it is double.

187. The Hepatic Artery having ſent out the Pylorica and right Gaſtrica, advances behind the Ductus Hepaticus, toward the Veſicula Fellis, to which it gives two principal Branches called Arteriæ Cyſticæ; and an other named Bilaria, which is loſt in the great Lobe of the Liver.

188. Afterwards, this Artery enters the Fiſſure of the Liver, and joins the Vena Portæ, with which it runs within a membranous Vagina called Capſula Gliſſoni, and accompanies it through the whole Subſtance of the Liver by numerous Ramifications, which may be termed Arteriæ Hepaticæ Propriæ.

189. Before it enters the Liver, it gives ſmall Branches to the external Membrane of this Viſcus, and to the Capſula Gliſſoni. The Gaſtric and proper Hepatic Arteries come ſometimes from the Meſenterica Superior, when the ordinary Ramifications are wanting.

190. Immediately after the Origin of the Splenic Artery from the Cæliaca, it runs toward the left Hand, under the Stomach and Pancreas, to the Spleen. It adheres cloſely to the poſterior Part of the lower Side of the Pancreas, to which it gives ſeveral Branches named Arteriæ Pancreaticæ. *Arteria Splenica.*

191. Near the Extremity of the Pancreas, under the left Portion of the Stomach, the Splenic Artery gives off a principal Branch called Gaſtrica Siniſtra or Minor, which runs from left to right along the left Portion of the great Curvature of the Stomach, giving Branches to both Sides of this Portion, which communicate with thoſe of the Coronaria Ventriculi.

192. This Gaſtric Artery ſends likewiſe another Branch, at leaſt to the Extremity of the Pancreas, which communicates with the other Pancreatic Arteries. It alſo ſupplies the Omentum with Branches, termed Gaſtro-Epiploicæ Siniſtræ; and then it communicates with the right Gaſtrica, and from this Union the Gaſtro-Epiploicæ Mediæ are produced.

193. From this Detail we learn that the Arteria Coronaria Ventriculi Pylorica, Inteſtinalis, both Gaſtricæ, Gaſtro-Epiploicæ, and conſequently the Hepatica, Splenica and Meſenterica, communicate all together.

194. Afterwards, the Splenic Artery advances towards the Spleen, in a Courſe more or leſs contorted; but before it arrives at that Viſcus, it gives two or three Branches to the large Extremity of the Stomach, commonly called Vaſa Brevia; and one to the Omentum, named Epiploica.

195. At the Spleen, this Artery divides into four or five Branches, which enter that Viſcus, after having given ſome ſmall Twigs to the neighbouring Parts of the Stomach and Omentum.

196. The ſuperior Meſenteric Artery ariſes anteriorly from the lower Portion of the deſcending Aorta, a very little Way below the Cæliaca, going out a little towards the right Hand, but bending immediately afterwards to the left. *Arteria Meſenterica Superior.*

197. Near its Origin, it gives off a ſmall Branch, which dividing into two, goes to the lower Side of the Head of the Pancreas, and neighbouring

Part of the Duodenum, communicating with the Inteſtinalis by ſmall Arches, and Areolæ or Maſhes.

198. Afterwards it paſſes over the Duodenum, between this Inteſtine and the Meſeraic Vein, between the two Laminæ of the Meſentery; and then bending in an oblique Direction from left to right, and from above downward, by very ſmall Degrees, it advances toward the Extremity of the Ileum. By this Incurvation, it forms a Kind of long Arch, from the convex Side of which a great many Branches go out.

199. These Branches are ſixteen or eighteen in Number, or thereabouts, and almoſt all of them are beſtowed on the ſmall Inteſtines, from the lower third Part of the Duodenum to the Cæcum and Colon. The firſt Branches are very ſhort, and from thence they increaſe gradually in Length all the Way to the Middle of the Arch; the reſt diminiſhing again by ſmall Degrees.

200. As they approach the Inteſtines, all theſe Branches communicate firſt by reciprocal Arches; then by Areolæ and Maſhes of all Kinds of Figures, from which is detached an infinite Number of ſmall Ramifications, which ſurround the inteſtinal Canal, like an annular Piece of Net-work.

201. These Arches and Maſhes increaſe in Number proportionably to the Length of the Branches; and their Size diminiſhes gradually as they approach the Inteſtines.

202. The firſt Branches from the convex Side of the Meſenteric Arch, which are very ſhort, ſupply the Pancreas and Meſocolon, and communicate with the Duodenal Artery. The laſt Branches go to the Appendicula Vermiformis, and ſend a Portion of an Arch to the Beginning of the Colon.

203. The conſiderable Branches from the concave Side of the Meſenteric Arch, are ſeldom above two or three in Number; but before they ariſe, a ſmall Ramus goes out to the Duodenum, and gives ſome very ſmall Arteries to the Pancreas.

204. The firſt conſiderable Branch from the concave Side of the Arch goes into the Meſocolon towards the right Portion of the Colon, being firſt divided into two Rami; the firſt of which runs along the whole ſuperior Part of the Colon, where it forms the famous Communication with the Meſenterica Inferior; and might be named Arteria Colica Superior. The other Ramus of this Branch runs down on the right Portion of the Colon.

205. The ſecond principal Branch having run for ſome Space thro' the Meſentery, divides into three Rami; the firſt of which goes to the lower Part of the right Portion of the Colon, where it communicates with the ſecond Ramus of the firſt Branch; the ſecond goes to the Beginning of the Colon, where it communicates with the firſt, and to the Inteſtinum Cæcum.

206. The third Ramus of this ſecond Branch, having communicated with the ſecond, gives ſmall Twigs to the Cæcum, Appendicula Vermiformis, and Extremity of the Ileum. Afterwards it communicates with the Extremity of the Arch, or curve Trunk of the ſuperior Meſenteric.

207. All theſe Communications are by Arches and Maſhes, as in thoſe Branches that come from the convex Side of the Arch; and it is to be obſerved in general, that all the Branches of the Meſenterica Superior are diſpoſed according to the Folds of the Meſentery and Circumvolutions of the Inteſtines; giving off Branches, through their whole Courſe, to the Laminæ of the Meſentery, its cellular Subſtance, and to the meſenteric Glands.

208. The lower Meſenteric Artery goes out anteriorly from the Aorta Deſcendens Inferior, about a Finger's Breadth or more above the Bifurcation and below the Spermatic Arteries; and having run about the Length of an Inch, or ſomething more, it is divided into three or four Branches, which gradually ſeparate from each other. *Arteria Meſenterica Inferior.*

209. The firſt or ſuperior Branch, about an Inch from its Origin, divides into two Rami; the firſt of which runs along the left Portion of the Colon, and Forms the Communication of the two meſenteric Arteries, already mentioned. It may be named Arteria Colica Siniſtra. The ſecond Ramus having communicated with the firſt, runs down upon the ſame Portion of the Colon.

210. The middle Branch having run the ſame Length with the firſt, divides into two Rami; one of which paſſes upward on the Extremity of the Colon, communicating by Arches with the ſecond Ramus of the ſuperior Branch; the other runs down on the Extremity of the ſame Inteſtine.

211. When there is another middle Branch, it goes to the firſt Part of the double Curvature of the Colon, by a like Diſtribution and Communication from above downward.

212. The lower Branch goes to the ſecond Portion of the Colon, or to both, when the ſecond middle Branch is wanting, and ſends up a Ramus, which communicates with the foregoing.

213. It ſends another conſiderable Branch downward, called Arteria Hæmorrhoidalis Interna, which runs down behind the Inteſtinum Rectum, to which it is diſtributed by ſeveral Ramifications, and it communicates with the Arteriæ Hypogaſtricæ.

214. The Renal Arteries, called commonly Emulgents, are ordinarily two in Number, and go out laterally from the inferior deſcending Aorta, immediately under the Meſenterica Superior, one to the right Hand, the other to the left. The right is ſituated more backward, and is longer than the left, becauſe of the Vena Cava, which lies on the right Side between the Aorta and the Kidney. *Arteriæ Renales.*

215. They run commonly without Diviſion, and almoſt horizontally to the Kidneys, into the Depreſſions of which they enter by ſeveral Branches, which form Arches in the inner Subſtance of theſe Viſcera.

216. From theſe Arches, numerous ſmall Rami go out toward the Circumference or outer Surface of the Kidneys. Sometimes there is more than one Artery on each Side; ſometimes this Augmentation is only on one Side, and theſe ſupernumerary Arteries come ſometimes immediately from the Aorta, and enter at the upper or lower Part of the Kidneys.

217. Ordi-

217. Ordinarily, the right Renal Artery paſſes behind the Vena Cava and Renal Vein on the other Side; and the left Artery, firſt behind and then before the Vein. Sometimes they ſend Branches to the Glandulæ Renales, Membrana Adipoſa of the Kidneys, and even to the Diaphragm.

Arteriæ Capſulares.

218. The Arteries of the Renal Glands, which may be termed Arteriæ Capſulares, ariſe ſometimes from the Aorta above the Arteria Renalis, and give out the Arteriæ Adipoſæ, which go to the Fat of the Kidneys. Sometimes they come from the Trunk of the Cæliaca. The right Capſular Artery comes moſt commonly from the Arteria Renalis of the ſame Side, near its Origin; the left, from the Aorta above the Renalis.

Arteriæ Spermaticæ.

219. The Spermatic Arteries are commonly two in Number, ſometimes more. They are very ſmall, and go out anteriorly from the Aorta Deſcendens Inferior, near each other, about a Finger's Breadth below the Arteriæ Renales, more or leſs, between the two Meſentericæ, or between the Renales and Meſentericæ Inferiores. Sometimes one is higher, or placed more laterally than the other.

220. They ſend off to the common Membrane of the Kidneys, ſmall Branches named Arteriæ Adipoſæ; and afterwards they run down upon the Pſoas Muſcles, on the Foreſide the Ureters, between the two Laminæ of the Peritonæum.

221. They give ſeveral conſiderable Branches to the Peritonæum, chiefly to thoſe Parts of it which are next the Meſentery, and they communicate both with the Meſentericæ and Adipoſæ. They likewiſe ſend ſmall Arteries to the Ureters.

222. Afterwards, they paſs in Men through the tendinous Openings of the abdominal Muſcles in the Vagina of the Peritonæum, and are diſtributed to the Teſticles and Epididymes, where they communicate with a Branch of the Iliaca Externa.

223. In Women they do not go out of the Abdomen, but are diſtributed to the Ovaria and Uterus, and communicate with Branches of the Hypogaſtrica, at the jagged Extremities of the Tubæ Fallopianæ.

Arteriæ Lumbares.

224. The Lumbar Arteries go out poſteriorly from the inferior deſcending Aorta, in five or ſix Pairs, or more, much in the ſame Manner with the Intercoſtals.

225. They may be divided into ſuperior and inferior. The ſuperior ſend ſmall Branches to the neighbouring Parts of the Diaphragm and intercoſtal Muſcles, and ſupply the Place of ſemi-intercoſtal Arteries. Sometimes thoſe Pairs go out by a ſmall common Trunk, and not ſeparately.

226. They are diſtributed on each Side to the Pſoas Muſcles, to the Quadrati Lumborum, and to the oblique and tranſverſe Muſcles of the Abdomen; and by perforating the oblique Muſcles, they become external Hypogaſtric Arteries. They go likewiſe to the vertebral Muſcles, and to the Bodies of the Vertebræ, and enter the ſpinal Canal through the lateral Notches, to go to the Membranes, &c. forming Rings much in the ſame Manner with the Intercoſtals; and they likewiſe give ſmall Twigs to the Nerves.

227. The

227. The Arteriæ Sacræ go out commonly from the back Part of the inferior descending Aorta, at the Bifurcation. Sometimes they arise higher, from the Lumbares, and sometimes lower, from the Iliacæ. They are two, three or four in Number, and sometimes but one. They are ramified on the Os Sacrum, and on the neighbouring Parts of the Peritonæum, Intestinum Rectum, Fat, &c. and enter the Canal of that Bone through the anterior Holes, being there distributed toward each Side. They likewise send small Arteries to the large Fasciculi of Nerves, which go out through the Holes of the Os Sacrum, and they penetrate the inner Substance of that Bone. *Arteriæ Sacræ.*

228. The inferior descending Aorta ends at the last Vertebra of the Loins, and sometimes higher, in two large lateral Branches, one on the right Hand, the other on the left, called Arteriæ Iliacæ, each of which is a common Trunk to two other Arteries of the same Name. This Bifurcation lies on the anterior and left Side of that of the Vena Cava. *Arteriæ Iliacæ.*

229. The primitive Iliac Arteries divaricate gradually as they descend, advancing obliquely toward the anterior and lower Part of the Ossa Ilium, without any considerable Ramification, for about the Breadth of three Fingers, except a few very small Arteries that go to the Os Sacrum, some of which enter by the upper Holes, and are distributed like the Arteriæ Sacræ, while others emerge again through the posterior Holes, and go to the neighbouring Muscles, &c. They likewise give small Arteries to the Peritonæum, to the Coats of the Veins, and to the Fat and Ureters, behind which the Iliac Trunks pass.

230. The right Iliac Trunk passes first on the Foreside of the Origin of the left Iliac Vein, and runs down on the Foreside of the right Vein, almost to the Place where it goes out of the Abdomen, its Course being there directed more inwardly. The left Trunk goes down likewise before the left Vein, but lies a little toward the Inside as it leaves the Abdomen.

231. About three Fingers Breadth from their Origin, each Iliac Trunk is divided into two secondary Arteries, one external, the other internal. The external Artery has no particular Name; the internal is termed Hypogastrica, which often appears to be no more than a Branch of the other in Adults; but in young Children, and especially in the Fœtus, the Hypogastric Artery looks like the Trunk, and the other like a Branch.

232. The external Iliaca on each Side runs down on the Iliac Muscle to the Ligamentum Fallopii, under which it goes out of the Abdomen. In this Course it gives off only a few small Arteries to the Peritonæum, and other Parts near it, but as it passes out of the Abdomen under the Ligament, it detaches two considerable Branches, one internal, the other external.

233. The internal Branch is named Arteria Epigastrica, and goes out anteriorly from the external Iliaca. From thence it runs obliquely upward on the Tendon of the transverse Muscle, toward the posterior Part of the Rectus, which it reaches about two or three Fingers Breadth above the Os Pubis.

234. Afterwards the Epigastric Artery runs up along the posterior or inner Side of this Muscle, sending Ramifications to the Tendons of the neigh-

bouring Muſcles, &c. and then loſes itſelf by a true Anaſtomoſis of ſeveral Ramifications, with the Mammaria Interna. It likewiſe communicates with the inferior Intercoſtals which are ſpread on the Abdomen.

235. It ſometimes gives out two particular Branches, one of which, accompanied by a Nerve, goes through the Foramen Ovale of the Pelvis, to the Triceps Muſcles, &c. the other runs down to the Teſticles along with the ſpermatic Artery, and there communicates with it.

236. The external Branch of the outer Iliaca goes off laterally from the Outſide of that Artery under the Ligamentum Fallopii, and from thence to the internal Labium of the Os Ilium, where it divides into two, and is ramified on the oblique and tranſverſe Muſcles of the Abdomen, communicating with the Arteria Lumbaris.

237. Besides theſe two Branches, the external Iliaca gives off a ſmall Ramus internally, under the Ligament, which runs to the Vagina of the ſpermatic Rope; and ſometimes another ſmall Twig goes from the Outſide to the Os Ilium.

238. The internal Iliaca or Hypogaſtrica, having run a little more than a Finger's Breadth inward and backward, bends by ſmall Degrees obliquely forward, and toward the Outſide; and afterwards contracting in its Dimenſions, it ends in the umbilical Artery, which ought to be looked upon as a true Continuation of the Trunk of the Hypogaſtrica.

239. This Arteria Umbilicalis aſcends on the Side of the Bladder, and having detached ſmall Rami to that Viſcus, and to the neighbouring Parts of the Peritonæum, &c. it contracts, and in Adults is quite cloſed up above the Middle of the Bladder. It likewiſe gives Branches to the Uterus, and to the neighbouring Parts in both Sexes. Afterwards it aſcends in Form of a Ligament to the Umbilicus, where it joins the umbilical Artery on the other Side; its Name being taken from its Uſe in the Fœtus.

240. From the convex Side of the Curvature of the Hypogaſtric Artery, four or five principal Branches commonly go out very near each other. Sometimes they all ariſe ſeparately, ſometimes by ſmall common Trunks, and what is the firſt Branch in ſome Subjects, is only a Ramus of another principal Branch in others; ſo much does the Number, Diſpoſition, Origin, and Diſtribution of theſe Branches vary in different Subjects. For this Reaſon I think it proper to diſtinguiſh them by the following proper Names: Iliaca Minor, Glutæa, Sciatica, Pudica Communis ſive Pudica Hypogaſtrica, and Obturatrix.

241. The Iliaca Minor, the moſt poſterior of theſe Branches, and which is often no more than a Ramus of the Glutæa, paſſes between the laſt two Lumbar Nerves, and divides into two Rami, one of which enters the Canal of the Os Sacrum, through the loweſt large anterior Holes; the other paſſes behind the Muſculus Pſoas, to which it gives Twigs, and behind the Crural Nerve, being afterwards diſtributed to the Iliac Muſcle, and to the middle Part of the Inſide of the Os Ilium, penetrating into the Subſtance of the Bone, ſometimes by one Hole, ſometimes by more.

242. The Arteria Glutæa is commonly very conſiderable, and ſometimes the largeſt of all the Hypogaſtric Branches. Near its Beginning it ſometimes ſends out the Iliaca Minor, and ſometimes the ſmall Ramus that goes from that Artery to the Os Sacrum, and other Parts fixed to that Bone; afterwards this Artery goes out of the Pelvis, in Company with the Sciatic Nerve, through the upper Part of the great Sinus of the Os Innominatum, below the Muſculus Pyriformis, and is diſtributed, in a radiated Manner, to the Glutæus Maximus and Medius.

243. In its Paſſage it gives ſome Branches to the Os Sacrum, Os Coccygis, Muſculus Pyriformis, the Muſcles of the Anus, and to the neighbouring Parts of the Inteſtinum Rectum, forming a particular Hæmorrhoidalis Interna. It likewiſe ſends Twigs to the Bladder and Parts near it, and detaches a pretty long Branch, which runs down with the Sciatic Nerve.

244. The Arteria Sciatica gives firſt of all ſome Branches to the Muſculus Pyriformis, the Quadrigemini, the Os Sacrum, *&c.* and even to the inner Side of the Os Iſchium. It likewiſe detaches a Branch which runs under the Muſculus Quadratus, to the Articulation of the Os Femoris.

245. It paſſes obliquely over the Sciatic Nerve, and as they both go through the great poſterior Sinus of the Os Ilium, it detaches ſmall Arteries, which are diſtributed to the inner Subſtance of that Nerve; afterwards it runs up in a radiated Manner on the Outſide of the Os Ilium, and is diſtributed to the inner Subſtance of that Bone, and to the Muſculi Glutæi, eſpecially to the Medius and Minimus.

246. The Pudica Communis, called commonly Pudica Interna, ariſes ſometimes by a Trunk common to it and to the Glutæa, and gives out two principal Branches; the firſt of which paſſes through the great Sinus of the Os Ilium, in Company with the Glutæa and Sciatica, and then divides into two Rami.

247. The firſt Ramus goes behind the Spine of the Iſchium, between the two Ligaments which lie between that Bone and the Os Sacrum, and runs on the Inſide of the Tuberculum Iſchii, all the Way to the Origin of the Corpus Cavernoſum Penis. There it divides into ſeveral Arteries, one of which goes to the Sphincter Ani, under the Name of Hæmorrhoidalis Externa.

248. The reſt are diſtributed to the neighbouring Integuments, to the Bulb of the Urethra, and to the Corpus Cavernoſum Penis; but the laſt of theſe Arteries, or rather the Extremity of this firſt Ramus, runs from behind forward, over the Neck of the Os Femoris, and communicates with a Branch of the Arteria Cruralis.

249. The ſecond principal Ramus, called commonly Arteria Pudica Externa, runs between the Bladder and Inteſtinum Rectum, and is diſtributed in Men to the Veſiculæ Seminales, Neck of the Bladder, Proſtate Gland, and neighbouring Parts of the Rectum.

250. Afterwards it runs under the Os Pubis, on the Side of a conſiderable Vein, which lies directly under the Symphyſis, and it runs along the Penis between this Vein and a Nerve, being diſtributed in its Paſſage

to the Corpus Cavernoſum, and communicating with the Pudica Minor which comes from the Cruralis.

251. This ſecond Branch of the Pudica Major goes off ſometimes ſeparately from the Hypogaſtrica, eſpecially in Women, being diſtributed to the lateral Parts of the Uterus, where it communicates with the ſpermatic Artery, near the jagged Extremity of the Tuba Fallopiana, and to the neighbouring Parts of the Vagina, *&c.*

252. The Arteria Obturatrix perforates the Obturator Muſcles from whence it has its Name, and goes out of the Pelvis at the upper Part of the Ligament of the Foramen Ovale, having firſt ſent a ſmall Branch over the Symphyſis of the Os Ilium and Os Pubis, to the Inguinal Glands and Integuments.

253. As it paſſes by the Muſcles it divides, and is diſtributed to the Pectineus and Triceps. It likewiſe ſends out another Branch, which communicates with that Branch of the Sciatica that goes to the Articulation of the Os Femoris, and gives ſmall Arteries to the Holes in the Neck of that Bone.

254. Afterwards the Hypogaſtric Artery ends in the Umbilicalis, as has been already ſaid.

Arteriæ Crurales.

255. The Iliac Artery goes out of the Abdomen between the Ligamentum Fallopii and Tendon of the Pſoas, at the Union of the Os Ilium and Os Pubis, and there it takes the Name of Arteria Cruralis.

256. It ſends off firſt of all three ſmall Branches, one of which, called Pudica Externa, goes over the Crural Vein to the Skin and Ligament of the Penis, and to the Inguinal Glands, communicating with the Pudica Interna. The ſecond goes to the Muſculus Pectineus; and the third to the upper Part of the Sartorius. All theſe Branches furniſh likewiſe the neighbouring anterior Integuments.

257. Afterwards the Crural Artery runs down on the Head of the Os Femoris, and by taking a particular Turn, gets on the Inſide of the Crural Vein, about three Fingers Breadth from where it goes out of the Abdomen. From its Origin to this Place, it is covered only by the Skin and Fat, and lies on the Pectineus and Triceps Primus.

258. In changing its Situation, it ſends out three conſiderable Branches, one external, one middle, and one internal. They all go out more or leſs poſteriorly, ſometimes by a ſhort common Trunk, ſometimes by two, *&c.*

259. The external Branch runs on the upper Side of the Thigh to the Crureus, Vaſtus Externus, Rectus Anterior, Muſculus Faſciæ Latæ, and Glutæus Medius; ſending up a Ramus to the Apex of the great Trochanter, which communicates with the firſt principal Ramus of the Pudica Major and Sciatica, as has been already ſaid.

260. The middle Branch runs down on the Inſide of the Thigh, between the Triceps Muſcles, to which it gives ſeveral Rami, one whereof perforates the ſecond Muſcle, and is diſtributed to the Glutæus Maximus, Semi-Nervoſus, Semi-Membranoſus, Biceps, and to the neighbouring Integuments.

261. The

261. The internal Branch runs backward on the Quadrigemini towards the great Trochanter; and having detached a Ramus which goes into the Joint of the Os Femoris, it runs downward and gives Rami to all the Muſcles that lie on the Backſide of that Bone, one of which enters the Bone itſelf on one Side of the Linea Aſpera.

262. Having ſent off all theſe three Branches, the Arteria Cruralis runs down between the Sartorius, Vaſtus Internus and Triceps, giving Branches to all the Parts near it. It is covered by the Sartorius all the Way to the lower Part of the Thigh, where it is inflected backward over the Triceps Tertius a little above the internal Condyle of the Os Femoris. Afterwards continuing its Courſe through the Hollow of the Ham, it is called Arteria Poplitea, being accompanied by the Vein of the ſame Name.

263. The Poplitea, while in the Ham, is covered only by the Integument, ſending off Branches toward each Side, which run up upon the Condyles, and communicate with the lower Ramifications of the Arteria Cruralis.

264. It ſends Rami to the Joint of the Knee, one of which at leaſt paſſes between the crucial Ligaments. As it runs down it ſends Branches to the Gaſtrocnemii and Popliteus; and having reached the Backſide of the Head of the Tibia, it gives off two Branches, one to each Side.

265. The firſt or internal Branch ſurrounds the Forepart of the Head of the Tibia, paſſing between the Bone and internal lateral Ligament; and beſides ſeveral other Ramifications, ſends up a ſmall Branch which communicates with the Arteries that lie round the Condyles of the Os Femoris.

266. The ſecond or external Branch runs over the Head of the Fibula, and between the Head of the Tibia and external lateral Ligament of the Knee, ſurrounding the Articulation all the Way to the Ligaments of the Patella, and communicating with the Branches which lie round the Condyles of the Os Femoris, together with a Branch of the firſt or internal Ramus.

267. Immediately after the Origin of theſe two Rami, and before the Poplitea ends, it ſends a ſmall Artery down on the Backſide of the interoſſeous Ligament, very near the Tibia, into which it enters by a particular Hole a little above the middle Portion of the Bone.

268. As the Poplitea ends, it divides into two principal Branches, one of which runs between the Heads of the Tibia and Fibula, paſſing from behind forwards on the interoſſeous Ligament, where it takes the Name of Arteria Tibialis Anterior. The ſecond Branch divides into two others, one internal and largeſt, called Arteria Tibialis Poſterior, the other poſterior and ſmalleſt, named Arteria Peronæa Poſterior.

269. The Tibialis Anterior having paſſed between the Heads of the Tibia and Fibula, ſends ſmall Branches upward and laterally. The ſuperior Branches communicate with thoſe Rami of the Popliteus which lie round the Articulation; and the lateral Branches go to the neighbouring Parts. Afterwards this Tibial Artery runs down on the Foreſide of the interoſſeous Ligament, toward the Outſide of the Tibia, between the Muſculus Tibialis Anticus and Extenſor Pollicis.

270. Ha-

270. Having run laterally on the Tibia for about two Thirds of the Length of that Bone, it paſſes on the Foreſide under the common annular Ligament, and Extenſor Pollicis, to the Articulation of the Foot; giving off ſeveral Rami both to the right and left Hand, which communicate laterally with the Tibialis Poſterior and Peronæa Poſterior, ſo that theſe two Bones are in a Manner ſurrounded by Arteries.

271. At the Joint of the Foot, it ſends out Branches which run between the Aſtragalus and Os Calcis, being diſtributed to the Articulation and to the Bones of the Tarſus. The Communications are here very numerous on all Sides.

272. Having paſſed the Fold of the Foot, it ſends off toward both Sides, other Rami, which communicate with the Poſterior Tibialis and Peronæa; all theſe Branches making a Kind of Circles round the Tarſus.

273. Afterwards the anterior tibial Artery advances on the convex Side of the Foot, as far as the Interſtice between the firſt and ſecond metatarſal Bones; between the Heads of which, it ſends a large Branch, which perforates the ſuperior interoſſeous Muſcles, and joining the Tibialis Poſterior, forms an Arch on the Side of the Foot.

274. It likewiſe ſends two or three conſiderable Branches over the other metatarſal Bones, which go to the reſt of the interoſſeous Muſcles, Integuments, *&c.* and communicate with each other.

275. Lastly, this Artery terminates by two principal Branches, one of which goes to the Thenar and Inſide of the Great Toe; the other is ſpent upon the Outſide of the Great Toe, and the Inſide of the ſecond Toe.

276. The Tibialis Poſterior, called likewiſe Suralis, runs down between the Solei, Tibialis Poſticus, Flexor Digitorum Communis, and Flexor Pollicis; giving Branches to theſe Muſcles, to the Tibia, and to the Marrow of that Bone, through a particular Canal in its poſterior and upper Part.

277. Afterwards it runs behind the inner Ankle, communicating with the Tibialis Anterior, and ſurrounded by the neighbouring Veins; and paſſes to the Sole of the Foot between the concave Side of the Os Calcis and Thenar Muſcle, where it divides into two Branches, one large or external, the other ſmall or internal.

278. The great Branch, or Arteria Plantaris Externa, paſſes on the concave Side of the Os Calcis obliquely under the Sole of the Foot, to the Baſis of the fifth metatarſal Bone, and from thence runs in a Kind of Arch toward the Great Toe, communicating there with the Tibialis Anterior, which perforates the interoſſeous Muſcles in the Manner already ſaid.

279. The convex Side of this Arch ſupplies both Sides of the laſt three Toes, and the Outſide of the ſecond Toe, forming ſmall communicating Arches at the End, and ſometimes at the Middle of each Toe, as in the Hand. The concave Side of the Arch furniſhes the neighbouring Parts.

280. The ſmall Branch, or Arteria Plantaris Interna, having reached beyond the Middle of the Sole of the Foot, is divided into two; one of which goes to the Great Toe, communicating with the Ramus of the Tibialis Anterior;

terior ; the other is distributed to the first Phalanges of the other Toes, communicating with the Ramifications from the Arch already mentioned.

281. The Arteria Peronæa runs down on the Backside of the Fibula, between the Soleus and Flexor Pollicis, to which and to the neighbouring Parts it gives Rami in its Passage.

282. Having reached to the lower third Part of the Fibula, it sends off a considerable Branch, which runs in between the Tibia and that Bone, passing between their Extremities from behind forward, below the interosseous Ligament, and is distributed to the Integuments of the Tarsus.

283. Lastly, the Peronæa containing its Course downward, on the Backside of the Fibula, as far as the Os Calcis, forms an Arch with the Tibialis Posterior, between the Astragalus and the Tendo Achillis.

284. From thence it runs outward, and a little above the outer Ankle communicates with the Tibialis Anterior by an Arch, which sends several small Ramifications to the neighbouring Parts.

285. In this Description of the Arteries, I have said nothing of the cutaneous Anastomoses, which are exceedingly beautiful in the Fœtus ; nor of the frequent and considerable Communications of small Arteries upon the Periosteum, which form a delicate Kind of Net-work, or Rete Mirabile.

SECT,

SECT. V.

A Deſcription of the Veins.

Introduction. 1. THE Blood diſtributed to all Parts of the Body by two Kinds of Arteries, the Aorta, and Arteria Pulmonaris, returns by three Kind of Veins, called by Anatomiſts Vena Cava, Vena Portæ, and Vena Pulmonaris.

2. THE Vena Cava carries back to the right Auricle of the Heart, the Blood conveyed by the Aorta to all the Parts of the Body, except what goes by the Arteriæ Coronariæ Cordis. It receives all this Blood from the Arterial Ramifications in Part directly, and in Part indirectly.

3. THE Vena Portæ receives the Blood carried to the floating Viſcera of the Abdomen by the Arteria Cæliaca, and the two Meſentericæ, and conveys it to the Vena Hepatica, and from thence to the Vena Cava.

4. THE Vena Pulmonaris conveys to the Pulmonary Sinus, or left Auricle of the Heart, the Blood carried to the Lungs by the Arteria Pulmonaris.

5. To theſe three Veins two others might be added, *viz.* thoſe which belong particularly to the Heart and to its Auricles, and the Sinuſes of the Dura Mater.

6. IN deſcribing the general Courſe of the Veins, we may either begin by their Extremities in all the Parts of the Body, and end by the Trunks carried all the Way to the Heart, according to the Courſe of the Blood; or we may begin by the great Trunks, and end by the Ramifications and capillary Extremities, according to their ſeveral Diviſions and Subdiviſions.

7. THIS laſt Method is moſt convenient, and makes it a very eaſy Matter to purſue the firſt, whenever we think it proper to do it; and for theſe Reaſons, I have choſen to follow it in this Deſcription.

General Diviſion of the Vena Cava. 8. WE commonly talk of the Vena Cava in general, as if it were but one Vein at its Origin, or had but one common Trunk; whereas it goes out from the right Auricle of the Heart by two large ſeparate Trunks, in a Direction almoſt perpendicularly oppoſite to each other, one running upward called Vena Cava Superior, the other downward called Vena Cava Inferior.

9. IT may however be ſaid, that theſe two Veins have a Sort of Continuity, or a ſmall Portion of a common Trunk, fixed to the Edges of the right Auricle; as if three Quarters of the Circumference of a large ſtraight Tube were cut off, and the Edges of a ſmall Bladder applied to the Edges of the Opening thus made in the Tube.

10. THE right Auricle may alſo be looked upon as a muſcular Trunk common to theſe two large Veins, and may be called the Sinus of the Vena Cava; but in this Reſpect, the Name of Sinus Pulmonaris agrees ſtill better to the left Auricle.

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11. The Vena Cava Superior is distributed chiefly to the Thorax, Head, and upper Extremities, and but very little to the Parts below the Diaphragm.

12. The Vena Cava Inferior is distributed chiefly to the Abdomen and lower Extremities, and but very little to the Parts above the Diaphragm.

13. The Ancients called the Superior Vena Cava, Ascendens, and the Inferior, Descendens, having Regard only to the great Tubes, and to their Division into Trunks and Branches. Several Moderns have retained these Names, but in a contrary Signification, to accommodate them to the Motion of the Blood, which descends by the Cava Superior, and ascends by the Cava Inferior.

14. But to shun the Mistakes that may happen in Reports made of Wounds or other Diseases, and of what is observed in opening dead Bodies, and in other Cases of these Kinds, it is best to retain the Distinction of Vena Cava Superior and Inferior.

15. The Trunk of each of these two Veins sends off, much in the same Manner with the Arteries, a certain Number of principal or capital Branches, which are afterwards ramified in different Manners. Each Trunk terminates afterwards by a Bifurcation or a Division into two subordinate Trunks, each of which gives off other principal Branches, ending in a great Number of small Trunks, Rami and Ramifications.

16. They have likewise this common to them with the Arteries, that the greatest Part of the capital Branches are in Pairs, as well as the subordinate Trunks. The Ramifications of each subaltern Trunk taken by itself, are in uneven Numbers, but they make even Numbers with those of the other like Trunk. The Vena Azygos, and some other small Veins, of which hereafter, are Exceptions from this Rule.

17. Before I go on to the particular Description of each of these Veins, many of which have proper Names, I shall give a general Idea of their Distribution, and an Enumeration of their principal Ramifications, in the same Manner as I did in the Description of the Arteries, and for the same Reason. But I shall say nothing of the Venæ Coronariæ Cordis, because they are not immediately joined to any other Vein, as we shall see in describing the Parts of the Thorax. I begin by the Vena Cava Superior.

18. The Superior Vena Cava runs up from the right Auricle of the Heart, almost in a direct Course, for about two Fingers Breadth, lying within the Pericardium, in the right Side of the Trunk of the Aorta, but a little more anteriorly. *Vena Cava Superior.*

19. As it goes out of the Pericardium, it is inclined a little to the left Hand, and then runs up about an Inch, that is, as high as the Cartilage of the first true Rib, and a little higher than the Curvature of the Aorta. At this Place it terminates by a Bifurcation or Division into two large Branches or subordinate Trunks, one of which runs toward the left Hand, the other toward the right.

20. These two Branches are named Subclaviæ, as lying behind, and in some Measure under the Claviculæ, both in the same Manner. They

are of unequal Lengths, becauſe the Trunk of the Vena Cava does not lie in the Middle of the Thorax, but toward the right Side, where the left Subclavian ariſes as well as the right, and is conſequently longeſt.

21. The Trunk of the Superior Cava, from where it leaves the Pericardium to the Bifurcation, ſends out anteriorly ſeveral ſmall Branches, which ſometimes ariſe ſeparately, and ſometimes by ſmall common Trunks. Theſe Branches are the Vena Mediaſtina, Pericardia, Diaphragmatica Superior, Thymica, Mammaria Interna, and Trachealis, the laſt of which go out ſometimes behind the Bifurcation.

22. All theſe ſmall Branches from the Trunk of the Cava Superior, are termed Dextræ; and their Fellows on the other Side, called Siniſtræ, do not ariſe from the Trunk, becauſe of its lateral Situation, but from the left Subclavia.

23. Posteriorly, a little above the Pericardium, the Trunk of the Superior Cava ſends out a capital Branch, called Vena Azygos, or Vena Sine Pari, which runs down on the right Side of the Bodies of the Vertebræ Dorſi, almoſt to the Diaphragm, giving off the greateſt Part of the Venæ Intercoſtales, and Lumbares Superiores.

24. The two Subclaviæ run laterally or toward each Side, and terminate as they go out of the Thorax, between the firſt Rib and Clavicula, immediately before the anterior Inſertion of the Muſculus Scalenus.

25. The right Subclavian, which is the ſhorteſt of the two, commonly ſends out four capital Branches, the Jugularis Externa, Jugularis Interna, Vertebralis and Axillaris, which laſt is rather a Continuation than a Branch of the Subclavia.

26. The left Subclavian, being longer than the right, for the Reaſon already given, gives off firſt of all the ſmall Veins on the left Side, anſwering thoſe on the right Side that come from the Trunk of the Superior Cava, *viz.* the Mediaſtina, Pericardia, Diaphragmatica Superior, Thymica, Mammaria Interna and Trachealis.

27. Next to theſe ſmall Veins, called Siniſtræ, it detaches another ſmall Branch, called Intercoſtalis Superior Siniſtra, and then four large Branches, like thoſe from the right Subclavian, *viz.* the Jugularis Externa, Jugularis Interna, Vertebralis and Axillaris, which are all termed Siniſtræ.

28. The external Jugular Veins are diſtributed chiefly to the outer Parts of the Throat, Neck and Head; and ſend a ſmall Vein to the Arm, named Cephalica, which aſſiſts in forming a large one of the ſame Name.

29. The internal Jugular Veins go to the internal Parts of the Neck and Head, communicating with the Sinuſes of the Dura Mater, and in ſeveral Places with the external Jugular Veins.

30. The vertebral Veins paſs through the Holes in the tranſverſe Apophyſes of the Vertebræ of the Neck, ſending Branches to the Neck and Occiput. They form the Sinus Venales of theſe Vertebræ, and communicate with the Sinuſes of the Dura Mater.

31. The Axillary Veins are Continuations of the Subclaviæ, from where theſe leave the Thorax, to the Axillæ. They produce the Mammariæ Internæ,

ternæ, Thoracicæ, Scapulares or Humerales, and a Branch to each Arm, which, together with that from the external Jugularis, form the Vena Cephalica.

32. AFTERWARDS the axillary Vein terminates in the principal Vein of the Arm, called Basilica, which, together with the Cephalica, is distributed by numerous Ramifications to all the Parts of the Arm, Fore-Arm, and Hand.

Vena Cavæ Inferior.

33. THE Portion of the inferior Vena Cava contained in the Pericardium, is very small, being scarcely the twelfth Part of an Inch on the Forepart, and not above a Quarter of an Inch on the Backpart. From thence it immediately perforates the Diaphragm, to which it gives the Venæ Diaphragmaticæ Inferiores or Phrenicæ.

34. IT passes next behind the Liver, through the great Sinus of that Viscus to which it furnishes several Branches, termed Venæ Hepaticæ.

35. IN this Course it inclines a little toward the Spina Dorsi and Aorta Inferior, the Trunk and Ramifications of which it afterwards accompanies in the Abdomen, all the Way to the Os Sacrum; the Arteria Cæliaca and the two Mesentericæ only excepted.

36. THUS the Inferior Cava sends out on each Side, in the same Manner with the Aorta, the Venæ Adiposæ, Renales, Spermaticæ, Lumbares, and Sacræ. Having reached to the Os Sacrum, it loses the Name of Cava, and terminating by a Bifurcation, like that of the descending Aorta, it forms the two Venæ Iliacæ.

37. THESE Iliac Veins having given off the Hypogastricæ, with all their Ramifications, to the Viscera of the Pelvis, and to some other external and internal neighbouring Parts, go out of the Abdomen, under the Ligamentum Fallopii, and there take the Name of Venæ Crurales.

38. EACH Crural Vein sends off numerous Ramifications to all the lower Extremity; besides the Vena Saphena, which goes out near the Origin of the Cruralis, and running along this whole Extremity, detaches many Ramifications, all the Way to the Foot, as we shall see more particularly hereafter.

Vena Azygos, and Venæ Intercostales.

39. THE Vena Azygos, or Sine Pari, is very considerable, and arises posteriorly from the Superior Cava, a little above the Pericardium.

40. IT is immediately afterwards bent backward over the Origin of the right Lung, forming an Arch, which surrounds the great pulmonary Vessels on that Side, as the Arch of the Aorta does those of the left Side, with this Difference only, that the Curvature of the Azygos is almost directly backward, whereas that of the Aorta is oblique.

41. FROM thence it runs down on the right Side of the Vertebræ Dorsi on one Side of the Aorta, and before the Intercostal Arteries, and getting behind the Diaphragm, it terminates by a very sensible Anastomosis, sometimes with the Vena Renalis, sometimes with a neighbouring Lumbar Vein, sometimes immediately with the Trunk of the Cava Inferior, and sometimes otherwise.

42. I have seen this Vein extremely large, resembling the Trunk of the Inferior Cava, from the Diaphragm to the Origin of the Renales; the

true Cava being through all this Space very narrow, or of the Size of an ordinary Azygos.

43. The Vena Azygos ſends out firſt of all two or three ſmall Veins from the Top of the Arch, one of which goes to the Aſpera Arteria; the others partly to the Aſpera Arteria, and partly to the Bronchia, by the Name of Venæ Bronchiales, accompanying the Ramifications of the Bronchial Artery.

44. Afterwards the Azygos detaches from the Extremity of the Arch, a ſmall Trunk common to two or three ſmall Veins, called Intercoſtales Superiores Dextræ, which bring back the Blood from the firſt three Series of intercoſtal Muſcles, and from the neighbouring Part of the Pleura.

45. These intercoſtal Veins ſend Branches through the intercoſtal Muſcles to the Serratus Superior Poſticus, Serratus Major, *&c.* and afterwards they run along the Interſtices between the Ribs, communicating with the Venæ Mammariæ.

46. They likewiſe ſend ſmall Branches backward to the vertebral Muſcles, and Canal of the Spine, where they communicate with the Venal Circles or Sinuſes, which bring back the Blood from the Medulla Spinalis.

47. As the Azygos runs down, it ſends off the inferior intercoſtal Veins on the right Side, one going to each Series of intercoſtal Muſcles. Theſe Veins run along the lower Edges of the Ribs, and perforate the Muſcles, by Branches which go to the poſterior and external Part of the Thorax.

48. They communicate with the Venæ Thoracicæ, and moſt commonly with the Mammaria Interna; and laſtly, more or leſs with each other, by perpendicular Branches, near the poſterior Extremities of the Ribs.

49. The Azygos ſends off likewiſe the left intercoſtal Veins, but ſeldom the whole Number; for the ſuperior Veins come often from the left Subclavian, as we ſhall ſee in the Hiſtory of that Vein. The inferior intercoſtal Veins, to the Number of ſix or ſeven, ſometimes more, ſometimes fewer, come often from the Trunk of the Azygos, and running between the Aorta and Vertebræ, to the Subſtance of which they give ſmall capillary Twigs, they ſend off almoſt the ſame Ramifications with the Veins on the right Side, and likewiſe ſome to the Œſophagus.

50. Sometimes theſe intercoſtal Veins come from a ſmall common Trunk, which goes out from that of the Azygos, and paſſing between the Aorta and Vertebræ, is bent downward along the left Side of the Vertebræ, in which Courſe it detaches the Intercoſtals laterally. This ſmall Trunk is in ſome Subjects bifurcated upward and downward, as it ſends off the Intercoſtals; and in others there are two ſmall common Trunks.

51. Lastly, there is ſometimes an intire Azygos on the left Side, which proceeding from the Arch of the ordinary Azygos, is afterwards diſtributed in the ſame Manner as the other on the right Side; but this Diſpoſition likewiſe varies very much.

52. The Azygos having reached below the laſt Rib, ſends off a large Branch, which bending outward, perforates the Muſcles of the Abdomen, is ramified between their different Planes, and communicates with the like Ramifications of the laſt, or laſt two intercoſtal Veins. 53. Some-

53. Sometimes it ſends off the Vena Diaphragmatica Inferior, and likewiſe gives downward to the firſt, or firſt two tranſverſe Apophyſes of the Vertebræ Lumbares, a Branch which forms the firſt Venæ Lumbares Dextræ.

54. These Communications between the laſt Intercoſtal, and firſt Lumbar Veins are very irregular, being ſometimes by a Series of oppoſite Angles; ſometimes by Areolæ, ſometimes by a reticular Texture, *&c.* Sometimes the Extremity of the Vena Azygos communicates either mediately or immediately with the Vena Adipoſa, and even with the Vena Spermatica.

Venæ Pectorales Internæ.

55. The Pectorales Internæ are ſmall Veins diſpoſed in Pairs toward the right and left Hand, behind the Sternum and Parts near it, including the Diaphragmaticæ Superiores, or Pericardio-Diaphragmaticæ, Mediaſtinæ, Mammariæ Internæ, Thymicæ, Pericardiæ, and Gutturales or Tracheales.

56. All theſe ſmall Veins are divided into right and left; and theſe are both diſtributed much in the ſame Manner; but they differ in their Origins, becauſe of the Inequality in the Bifurcation of the Cava Superior.

57. The right Vena Mediaſtina goes out anteriorly from the Trunk of the ſuperior Cava, a little above the Origin of the Azygos; the left comes from the Subclavia.

58. The right ſuperior Diaphragmatica or Pericardio-Diaphragmatica comes anteriorly from the Root of the Bifurcation near the Mediaſtina; and is diſtributed by ſeveral Branches to the upper, fore, and back Parts of the Pericardium, communicating with thoſe of the left Diaphragmatica, and accompanying the Nerve of the ſame Name. The left ſuperior Diaphragmatica comes from the left Subclavian a little below the Origin of the Mammaria.

59. The right internal Mammaria ariſes anteriorly from the Vena Cava, a little below the Angle of the Bifurcation. It runs along the neareſt internal or poſterior Edge of the Sternum, and on the cartilaginous Extremities of the right Ribs, together with the Artery of the ſame Name. Having reached near the Diaphragm, it ſends it a Branch which runs toward the tendinous Plane, and communicates with the common Diaphragmatic Veins.

60. Afterwards this mammary Vein gives ſmall Branches to the Mediaſtinum, and others between the Ribs to the Integuments; of which thoſe that paſs between and under the Cartilages of the laſt true Ribs, run down on the inner or poſterior Side of the Muſculi Recti Abdominis, being ramified among their fleſhy Fibres, and communicating really with the Epigaſtric Veins by ſeveral ſmall Twigs.

61. The left internal Mammaria ariſes anteriorly from the left Subclavian, oppoſite to the Cartilage or anterior Extremity of the firſt true Rib.

62. The right Vena Thymica, when it ariſes ſeparately, goes out from the Bifurcation; and when it is wanting, the Thymus from whence it takes its Name, is furniſhed by the Gutturalis or ſome other neighbouring Vein. This Vein often reaches no lower than the inferior Part of the Thymus; and the left Vein of the ſame Name comes from the left Subclavian, almoſt oppoſite to the Sternum.

63. The right Pericardia ſeems to go out rather from the Origin of the right Subclavian, than from the Trunk of the ſuperior Cava; but in this there

there are many Varieties. It goes to the upper Side of the Pericardium, and other neighbouring Parts. The left Pericardia comes ſometimes from the left Subclavian, before the Mammaria, and ſometimes from the Mammaria or Diaphragmatica Superior on the ſame Side.

64. The right Gutturalis or Trachealis goes out from the upper Part of the Bifurcation, above the Mammaria of the ſame Side, ſometimes more backward, and ſometimes from the Subclavia. It is diſtributed to the Glandulæ Thyroidææ, Trachea Arteria, Muſculi Sterno-Hyoidæi, Thymus and Glandulæ Bronchiales. It communicates by lateral Branches, more or leſs contorted, with the internal Jugular Vein, and ſometimes, by another Branch, with a ſmall Vein which the internal Jugular ſends to the Glandula Thyroides. The left Gutturalis comes from the upper or poſterior Part of the left Subclavian near its Origin.

65. The ſmalleſt internal pectoral Veins do not always ariſe ſeparately, but have ſometimes a ſmall common Trunk, eſpecially on the right Side; and of all theſe ſmall Veins, the Mammaria Interna is the moſt conſiderable.

Venæ Subclaviæ.

66. The right ſubclavian Vein, as has been already ſaid, is very ſhort, and its Courſe very oblique, ſo that it appears to riſe higher than the left Vein. It ſends off, firſt of all, four large Branches already mentioned, *viz.* the Vertebralis, which is the firſt and moſt poſterior; the Jugularis Interna, Jugularis Externa and Axillaris.

67. The left Subclavian ſeems to aſcend but very little after the Bifurcation, becauſe it runs further and more tranſverſely than the right; and in this Courſe it covers the Origin of the three large Arteries, which come from the Curvature of the Aorta. It ſends off four large Branches beſides the ſmall pectoral Veins, and receives the Ductus Thoracicus.

68. It likewiſe gives off, before its principal Diviſion, a ſmall Trunk for the left ſuperior Intercoſtals, which are ſometimes ſix in Number, and communicate with the inferior Intercoſtals, and with a Branch of the Vena Azygos. This ſmall common intercoſtal Trunk furniſhes likewiſe the left Bronchialis.

69. Each Subclavian Vein, near the Middle of the Clavicula, ſends off a Branch called Cephalica, which deſcends near the Surface of the Body, between the Deltoides and Pectoralis Major, and reaches the Arm in the Manner which ſhall be related hereafter.

Venæ Jugulares Externæ.

70. Each external Jugular Vein ariſes from the Subclavian on the ſame Side, ſometimes from the Axillaris, and ſometimes from the Union of theſe two Veins. The right and left do not always ariſe in the ſame Manner; for ſometimes the right comes from the Subclavian, and the left from the internal Jugular on the ſame Side. They run up between the Muſculus Cutaneus and Sterno-Maſtoidæus, being covered by the former, and croſſing over the latter.

71. Sometimes they are double from their very Origins; and when they are ſingle, each of them divides afterwards into two, one anterior, and the other poſterior or rather ſuperior. The anterior Vein goes to the Throat and Face, running up toward the Angle of the lower Jaw, and the poſterior goes to the Temples and Occiput.

72. The anterior external Jugular Vein is often a Branch of the Jugularis Interna, and ſometimes ariſes from the Communications of the two Jugulares in ſuch a Manner as that it cannot be ſaid to belong more to the one than to the other. Sometimes, but very rarely, it comes from the Vena Axillaris. *Vena Jugularis Externa Anterior.*

73. It runs up toward the lateral Part of the lower Jaw, between the Angle and the Chin, like a Vena Maxillaris, and ſends ſeveral Branches forwards, backwards and inwards.

74. Posteriorly it gives, (1) a large Branch on the Side of the upper Part of the Larynx, which communicates with the Jugularis Interna; and likewiſe with a large ſhort Branch of the Jugularis Externa Poſterior, of which below. (2) A ſmall Branch which has the ſame Communication, but which is not always to be found. (3) Another ſmall Branch a little below the lower Jaw, which communicates with the Jugularis Externa Poſterior.

75. Anteriorly it ſends ſeveral Branches to the Muſcles of the Larynx, Sterno-Hyoidæi, Thyro-Hyoidæi, and to the Integuments; and below the Larynx it ſends communicating Branches to the Jugularis Externa Anterior of the other Side.

76. A little higher, oppoſite to the Cartilago Thyroides, it gives off a tranſverſe Branch, which runs on the anterior and lower Part of the Muſculi Sterno-Maſtoidæi, and communicates with the Jugularis of the other Side, though not always by a Vein of the ſame Kind.

77. The ſuperior and inferior tranſverſe Branches communicate on each Side by Branches more or leſs perpendicular, and ſend a ſmall Branch to the Muſculus Quadratus of the Chin, to the Muſculus Cutaneus and Integuments.

78. It ſends another large Branch anteriorly toward the Symphyſis of the lower Jaw, which after having ſupplied the maxillary Glands is diſtributed to the Digaſtric Muſcle, to the Chin and under Lip.

79. Interiorly at the ſame Place it ſends out a large Branch, which furniſhes the Glandulæ Sublinguales, runs down toward the Cornua of the Os Hyoides, to communicate with ſome Branches of the Jugularis Interna, and ſends ſeveral Rami to the Tongue, called Venæ Raninæ. It gives off likewiſe a ſmall Branch, which running upon the Muſculus Labiorum Triangularis, to the Commiſſure of the Lips, is diſtributed to the neighbouring Parts.

80. The ſame Branch which gives out the Venæ Raninæ, detaches another to the lateral Parts of the Septum Palati, which is diſtributed to the Amygdalæ, and to the Uvula, and ſends Rami forward to the Membrane, which lines the Arch of the Palate. Another Branch goes out from it to the Pterygoidæus Internus, Periſtaphylini and Cephalo-Pharyngæi.

81. Afterwards the Trunk of the anterior external Jugular Vein runs up to the Muſculus Triangularis, where it receives the Name of Vena Triangularis, in a winding Courſe from the Angle of the lower Jaw to the great or internal Angle of the Orbit, ſending Branches on each Side to the Muſcles and Integuments.

82. These

82. These Branches communicate with each other, especially one which passes under the Zygoma, behind the Os Malæ, to the inferior Orbitary or Spheno-Maxillary Fissure, and another small Branch, which runs along the inferior Portion of the Orbitary Muscle, to the small or external Angle of the Eye, where it communicates with the Rami Temporales and Frontales.

83. It is here to be observed that under the Angle of the lower Jaw, there is a great Variety of Communications between the external and internal Jugular Veins, and also a great Variety in the Distribution of these Veins.

84. Almost all the Ramifications, which at this Place go from the external Jugular Vein, to be distributed on the upper Part of the Throat and on the Face in some Subjects, arise in other Subjects from the internal Jugular; and sometimes one Part of them comes from the external Jugular, the rest from the internal.

85. The Trunk of the Vena Angularis having reached the Bones of the Nose, sends out a Branch through the lateral Cartilages of the Nose, which is distributed to the Nares; and another which runs down in a winding Course to the upper Lip.

86. At the great or inner Angle of the Eye, the same Trunk sends off several other Branches; the first of which goes to the Root of the Nose, and communicating with its Fellow from the other Side, gives several small Veins to the Holes of the Ossa Nasi.

87. The second Branch runs up the Forehead, by the Name of Vena Frontalis, antiently Præparata; and is distributed to each Side, communicating with its Fellow, when any such Vein is found.

88. The third Branch enters the Orbit in a winding Course, on one Side of the cartilaginous Pulley, and communicates with the Sinuses of the Dura Mater, by the Orbitary Sinus of the Eye.

89. The fourth Branch goes along the Musculus Superciliaris and the upper Part of the Orbicularis, to the small or external Angle of the Eye, to communicate with the Vena Temporalis and with that Vein which runs along the lower Part of the orbicular Muscle, with which it forms a Kind of Circle.

Vena Jugularis Externa Posterior, sive Superior.

90. The posterior or superior external Jugular Vein runs up toward the Parotid Gland, and lower anterior Part of the Eye, giving out several considerable Branches toward each Side.

91. At its Origin it sends out posteriorly, a principal Branch with its Ramifications, to the Muscles which cover the Scapula, and Joint of the Humerus, commonly called Vena Muscularis, and which might be named Super-Humeralis.

92. A little higher, it gives off the Vena Cervicalis which goes to the Vertebral Muscles of the Neck. This Vein communicates with the Humeralis, by the several Areolæ, or Venal Mashes, and they are both ramified in different Manners.

93. These Ramifications and Communications are in Part covered by the Musculus Trapezius, and communicate likewise with some Branches of the Vena Occipitalis, and with a Branch of the superior Intercostal Vein, which perforates the first Intercostal Muscle.

94. Near

94. NEAR the cervical Vein, but a little more outward, it gives off ſometimes the ſmall Vena Cephalica, which runs down between the Pectoralis Major and Deltoides, as was ſaid N° 69. and unites with the Vena Cephalica of the Arm, which ſhall be deſcribed hereafter.

95. BACKWARD it detaches the Vena Occipitalis, which is diſtributed on the Occiput, and ſometimes comes from the Vena Vertebralis or Axillaris, *&c.* It likewiſe ſends out a ſmall Vein, which enters the Cranium by the poſterior Maſtoide Hole, and terminates in one of the lateral Sinuſes of the Dura Mater. This Branch comes ſometimes from another Vein.

96. HAVING reached as far as the Parotid Gland, it forms Communications with the anterior external Jugular, under the Angle of the lower Jaw; and then paſſes through the Parotid Gland, between that Angle and the Condyle, giving off a large Branch which communicates with another Branch common to the internal and anterior external Jugulars.

97. SOMETIMES there are ſeveral Branches, which having run a very little Way, unite together and repreſent the ſhort large Branch, forming Areolæ or Maſhes through which the Nerves paſs.

98. AFTERWARDS it paſſes before the Ear, taking the Name of Vena Temporalis, which is diſtributed to the Temples and lateral Parts of the Head, towards the Occiput and Fore-head. Sometimes the temporal Vein has two Origins, whereof one is from the Jugularis Interna.

99. THE temporal Vein of one Side communicates above with its Fellow on the other Side; before, with the Vena Frontalis, and behind, with the Vena Occipitalis. Oppoſite to the Ear, it gives out a large Branch, one Ramus of which runs under the lower Edge of the Zygoma, and then returning, communicates with another Ramus from the ſame Jugularis, a little below the Condyle of the lower Jaw, forming a Kind of Iſland irregularly round.

100. BEHIND this Condyle, it gives Branches to the temporal Muſcle, to the neighbouring Parts of the upper Jaw, and to the Inſide of the lower Jaw, almoſt in the ſame Manner as is done by the Arteries.

101. ONLY one of theſe Branches runs from without inward, between the Condyloide and Coronoide Apophyſes, to be diſtributed to the Muſculus Temporalis and Pterygoidæi; ſending off a Ramus to the Maſſeter, in its Paſſage.

Vena Jugularis Interna.

102. THE internal jugular Vein is the largeſt of all thoſe that go to the Head; though not ſo large as its ſeems to be, when injected.

103. IT runs up behind the Sterno-Maſtoidæus and Omo-Hyoidæus which it croſſes; along the Sides of the Vertebræ of the Neck, by the Edge of the Longus Colli, to the Foſſula of the Foramen Lacerum of the Baſis Cranii.

104. THE firſt Branches which it ſends off are ſmall and go to the Thyroide Glands. About two Fingers Breadth higher up, it detaches a middle-ſized Branch, which runs laterally toward the Larynx, and may be named Vena Gutturalis.

105. THIS Guttural Vein divides chiefly into three Branches; the loweſt of which goes to the Thyroide Gland and neighbouring Muſcles; the middle

Branch to the Larynx, Muſculi Thyroidæi, *&c.* and the third runs upward to the great Communication between the two Jugulares already mentioned. In this, however, there is ſome Variety, and I have ſeen the left Guttural Vein go out from the Axillaris.

106. About the ſame Diſtance upward, almoſt oppoſite to the Os Hyoides, the internal Jugular gives another Branch, which ſends Rami to the Muſcles belonging to that Bone, and others which communicate with the foregoing Branch. This other Branch runs upward toward the Parotid Gland and Angle of the lower Jaw, where it ſends communicating Branches forward and backward to the two external Jugulares.

107. It is at this Place likewiſe that the internal Jugular ſometimes produces the Vena Maxillaris Interna and all its Ramifications, as has been already ſaid in the Deſcription of the Jugularis Anterior Externa.

108. The internal Jugular ſends another Branch backward, which is diſtributed to the Occiput, where it communicates with a Branch of the Vertebralis; and through the poſterior Maſtoide Hole, with the lateral Sinus of the Dura Mater. This Communication is ſometimes by an Anaſtomoſis with a Branch of the external Jugular, or of the Cervicalis which goes thither.

109. Afterwards it reaches the Foramen Lacerum of the Baſis Cranii, bending a little, and ſending off ſmall Twigs to the Pharynx and neighbouring Muſcles.

Vena Vertebralis.

110. The vertebral Vein ariſes poſteriorly from the Subclavia or Axillaris, ſometimes by two Stems, ſometimes by one, which ſoon afterwards divides into two.

111. The firſt and principal Stem gives out a Branch called Vena Cervicalis, which is diſtributed to the neighbouring Muſcles, and afterwards runs up through the Holes of the tranſverſe Apophyſes of the Vertebræ Colli. This cervical Branch comes ſometimes from the Axillaris.

112. The other Stem of the vertebral Vein runs up on the Side of the Vertebræ, and having reached the fourth, or ſometimes higher, it runs in between the tranſverſe Apophyſes of that Vertebra and of the fifth, to join the firſt or principal Stem.

113. Thus the vertebral Vein accompanies the Artery of the ſame Name, ſometimes in one Trunk, ſometimes in ſeveral Stems, through all the Holes of the tranſverſe Apophyſes of the Vertebræ Colli, all the Way to the great Foramen Occipitale, communicating with the occipital Veins and ſmall occipital Sinuſes of the Dura Mater.

114. In its Paſſage it gives off one Branch, which enters by the poſterior Condyloide Hole of the Os Occipitis, and communicates with the lateral Sinus of the Dura Mater; but it is not always to be met with.

115. As theſe Veins run through the Holes in the tranſverſe Apophyſes, they ſend Branches forward to the anterior Muſcles of the Neck, and to the ſmall interior Muſcles of the Head.

116. Other Branches go likewiſe outward and backward to the Muſculi Tranſverſales and Vertebrales Colli; and inward to the great Canal of

the ſpinal Marrow, where they form Sinuſes, which communicate with thoſe on the other Side.

117. These vertebral Sinuſes are pretty numerous, and placed one above another all the Way to the Occiput; the lower communicate with the upper; and at the great Foramen of the Os Occipitis there is a Communication between them and the occipital Sinuſes of the Dura Mater.

Vena Axillaris.

118. The ſubclavian Vein having ſent off the Branches already deſcribed, goes out of the Thorax, and paſſes before the anterior Portion of the Muſculus Scalenus, and between the firſt Rib and the Clavicle, to the Axilla. Through this Courſe it takes the Name of Vena Axillaris, and gives off ſeveral Branches, the chief of which are the Venæ Muſculares, Thoracicæ, and Vena Cephalica, which is ſometimes double.

119. The firſt Veins which it ſends off are the Muſculares, diſtributed to the middle Portion of the Muſculus Trapezius, to the Angularis, Infra-Spinatus and Scapularis; and as ſome of theſe Branches go to the Shoulder exteriorly, others interiorly, the Venæ Scapulares are diſtinguiſhed into external and internal.

120. A little before the Axillaris reaches the Axilla, it ſends out the Venæ Thoracicæ, one of which is ſuperior, called alſo Mammaria Externa, and the other inferior. It likewiſe ſends Rami to the Muſculus Subſcapularis, Teres Major, Teres Minor, Supra-Spinatus, Latiſſimus Dorſi, Serratus Major, Pectoralis Minor, Pectoralis Major, and to the Glands of the Axilla; and ſometimes gives a communicating Branch to the Vena Baſilica.

121. The Axillaris having reached the Side of the Head of the Os Humeri, produces a very conſiderable Branch named Vena Cephalica, and afterwards runs along the Arm by the Name of Vena Baſilica; which however appears ſometimes to be rather a Branch, than a Continuation of the Trunk of the Axillaris; in which Caſe the Cephalica and Baſilica might be looked upon as two principal Branches of the Axillary Vein.

Vena Cephalica.

122. The cephalic Vein, which is a Branch of the Axillaris, at a ſmall Diſtance from its Origin, joins the ſmall Cephalica which runs down from the Subclavia or Jugularis Externa; having till then run near the Surface of the Body between the Deltoides and Pectoralis Major, and ſometimes theſe two Veins communicate before their Union.

123. The great Cephalica runs down between the Tendons of the laſt mentioned Muſcles, and along the outer Edge of the external Portion of the Biceps; communicating ſeveral Times with the Vena Baſilica, and ſending ſmall Rami on each Side, to the neighbouring Muſcles, Fat and Skin. Some Branches go out from its upper Part, which, lower down, unite again with the Trunk.

124. A little below the external Condyle of the Os Humeri, it detaches a Branch backward, which runs up between the Muſculus Brachialis and the upper Portion of the Supinator Longus, and afterwards bends back between the Os Humeri and Anconæus Externus, where it communicates with ſome Branches of the Baſilica.

125. HAVING reached very near the Fold of the Arm, it is divided into two principal Branches, one long, the other ſhort. The long Branch is named Radialis Externa, and the ſhort one may be called Mediana Cephalica; to diſtinguiſh it from another Mediana, which is a ſhort Branch of the Baſilica; and therefore ought to be called Vena Mediana Baſilica.

126. THE external radial Vein runs along the Radius between the Muſcles and Integuments, giving off Branches toward both Sides, which communicate with other Branches of the ſame Vein, and with ſome from the Baſilica, forming Areolæ much in the ſame Manner as the Saphena does in the lower Extremity.

127. THE Mediana Cephalica runs down obliquely toward the Middle of the Fold of the Arm, under the Integuments, and over the Tendon of the Biceps, where it joins a ſhort Branch of the ſame Kind from the Baſilica, which I have already named Mediana Baſilica. Theſe two Medianæ unite in an Angle, the Apex of which is turned downward.

128. FROM this angular Union, or Anaſtomoſis, a conſiderable Branch goes out, which runs down on the Fore-Arm, uniting on one Side with the Vena Cephalica, and communicating on the other with the Baſilica, by ſeveral irregular Areolæ. The Name of Mediana is given to this large Branch, as well as to the two ſhort ones, by the Union of which it is formed; but that they may not be confounded, this large Branch may be termed Mediana Major or Media, the Names already given to the other two, being retained.

129. FROM this Union of the two lateral Medianæ, and ſometimes from the Origin of the Mediana Media, which is the true Mediana of *Riolan*, a Branch goes out which runs down on the Inſide of the Fore-Arm, oppoſite to the interoſſeous Ligament, and is called Vena Cubiti Profunda. It goes to the neighbouring Muſcles, and communicates with the other Veins of the Fore-Arm. The Mediana Cephalica ſometimes ſends down a long Branch, called Radialis Interna, which lies almoſt parallel to the Radialis Externa already mentioned.

130. AFTERWARDS, the Cephalica having reached the Extremity of the Radius, is diſtributed by numerous Areolæ, almoſt in the ſame Courſe with the radial Artery.

131. A PARTICULAR Branch goes out from it, which runs more or leſs ſuperficially between the Thumb and Metacarpus, by the Name of Cephalica Pollicis. The Areolæ furniſh the interoſſeous Muſcles and Integuments, and communicate with a ſmall Ramus from the Baſilica, called by the Ancients Salvatella.

Vena Baſilica. 132. THE Ancients termed the Baſilic Vein of the right Arm, the Vein of the Liver, or Vena Hepatica Brachii; and that of the left Arm, the Vein of the Spleen, or Vena Splenica Brachii. It has ſometimes a double Origin, by a Branch of Communication with the Trunk of the Axillaris.

133. IT ſends off firſt of all, under the Head of the Os Humeri, a pretty large Branch, which paſſes almoſt tranſverſely round the Neck of that Bone, from within, backward, and from behind, outward, running up on the Scapula, where it is ramified on the Deltoides, and communicates with the Venæ

Scapulares Externæ. This Branch may be named Vena Sub-humeralis or Articularis, as the Artery which lies in the ſame Place, they both having much the ſame Courſe.

134. This articular Vein ſends down two principal Branches, one of which runs along the Inſide of the Bone, to which, and to the Perioſteum, it gives ſmall Veins. The other turns forward, toward the Middle of the Arm, between the Bone and the Biceps, and communicates with the Cephalica.

135. Below the Neck of the Os Humeri, near the Hollow of the Axilla, and behind the Tendon of the Pectoralis Major, the Baſilica ſends out a conſiderable Branch, which runs down on the Side of the Brachial Artery, and furniſhes the neighbouring Muſcles on both Sides. This Vein is named Profunda Brachii, or Profunda Superior.

136. Immediately afterwards, the Baſilica detaches two or three ſmall Veins, which run down very cloſely joined to the Brachial Artery, ſurrounding it at different Diſtances by ſmall Twigs, which communicate with each other. Theſe Veins might be named Venæ Satellites Arteriæ Brachialis.

137. These ſmall Veins, which often ariſe from the Profunda Superior, communicate with the Baſilica and Cephalica; and having reached the Fold of the Arm, they divide like the Artery, and the ſame Diviſions are continued along the whole Fore-Arm; through all which Space they accompany and ſurround the arterial Branches in the Manner already ſaid.

138. Afterwards the Baſilica continues its Courſe along the Inſide of the Os Humeri, between the Muſcles and Integuments, forming many Communications with the Vena Profunda, Satellites and Cephalica, and ſupplying the Muſcles and Integuments.

139. Having reached the inner Condyle, and having ſent off obliquely in the Fold of the Arm, the Mediana Baſilica, it runs along the Ulna, between the Integuments and Muſcles, a little toward the Outſide, by the Name of Cubitalis Externa, ſtill communicating with the Profunda, Satellites and Cephalica.

140. Having detached the Mediana Baſilica, it ſends out another Branch, which runs down along the Inſide of the Fore-Arm near the Ulna, and communicates with the Mediana Major, *&c.* This Branch may be named Cubitalis Interna.

141. The Baſilica having at length reached the Extremity of the Ulna, ſends ſeveral Branches to the convex Side of the Carpus; one of which, named Salvatella, goes to that Side of the Little Finger next the Ring Finger, having firſt communicated with the Cephalica, by Means of the Venal Areolæ conſpicuous on the Back of the Hand. In the other Fingers this Vein follows nearly the ſame Courſe with the Artery.

142. In general the external or ſuperficial Veins of the Fore-Arm are larger than the internal; but they are accompanied only by ſmall Arteries, whereas the deep Veins accompany large Arteries.

143. The inferior Vena Cava having run down about a Quarter of an Inch from the right Auricle of the Heart, within the Pericardium, as has been *Vena Cava Inferior.*

been already ſaid, pierces that Membrane, and the tendinous Portion of th Diaphragm, which adhere very cloſely to each other.

144. At this Place it gives off the Venæ Diaphragmaticæ or Phrenicæ, which are diſtributed to the Diaphragm, and appear chiefly on its lower Side, one towards the right Hand, and one towards the left. The right Vein is more backward and lower than the left. The left is diſtributed partly to the Pericardium, and partly to the Diaphragm; and ſometimes they ſend Rami to the Capſulæ Renales, much in the ſame Manner as the Arteriæ Phrenicæ.

145. The inferior Cava having perforated the Diaphragm, paſſes through the poſterior Part of the great Fiſſure of the Liver, penetrating a little into the Subſtance of that Viſcus, between the great Lobe and the Lobulus Spigelii, being however covered but very little on the Backſide by the Subſtance of the Liver, till it reaches the Lobulus.

146. In its Paſſage it ſends off commonly three large Branches, called Venæ Hepaticæ, which are ramified in the Liver. Sometimes there are only two, and ſometimes four.

147. Beſides theſe large Branches, it ſends out ſome other ſmall ones, either before or immediately after it goes out of the Liver; which, according to ſome Anatomiſts, anſwer to the Branches of the Hepatic Artery, as the large Branches do to thoſe of the Vena Portæ.

148. In the Fœtus, as the Vena Cava paſſes by the Liver, it gives off the Ductus Venoſus, which communicates with the Sinus of the Vena Portæ, and in Adults is changed to a flat Ligament.

149. After its Paſſage through the Liver, the Vena Cava turns from before backward, and from right to left, toward the Spina Dorſi, placing itſelf on the right Side of the Aorta, which it accompanies from thence downward.

150. Having got as low as the Arteriæ Renales, it gives off the Veins of the ſame Name, termed formerly Venæ Emulgentes, and which are the largeſt of all the Veins that go from the Cava Inferior, from the Liver to the Bifurcation.

151. The right Renal Vein is the ſhorteſt, and runs down a little obliquely, becauſe of the Situation of the Kidney. The left Vein, which is the longeſt, croſſes on the Foreſide of the Trunk of the Aorta, immediately above the ſuperior Meſenteric Artery; and both Veins accompany the Renal Arteries.

152. They ſend up the Venæ Capſulares, which go to the Glandulæ Renales, and downward the Venæ Adipoſæ, which go to the fatty Covering of the Kidneys; and ordinarily the left Renal Vein furniſhes the left Spermatic Vein. Afterwards they run to the Sinus, or Cavity of the Kidneys, in the Subſtance of which they are diſtributed by numerous Ramifications.

153. A little below the Renal Veins, the Trunk of the Cava ſends out anteriorly toward the right Side, the right Vena Spermatica. The left ſpermatic Vein comes commonly, though not always, from the left Renalis, as has been already obſerved. Both Veins accompany the ſpermatic Arteries to the Parts to be mentioned hereafter.

154. In

154. In their Paſſage they ſend ſeveral ſmall Branches on each Side, to the Peritonæum and Meſentery, where they ſeem to be joined by Anaſtomoſes with the Venæ Meſaraicæ, and conſequently with the Vena Portæ.

155. They ſometimes ſend a conſiderable Branch over the Iliac Muſcle, which afterwards dividing into two, one Ramus runs up to the Membrana Adipoſa of the Kidneys, the other runs down on the laſt-mentioned Muſcle.

156. About the ſame Height with the ſpermatic Vein, the inferior Cava ſends off poſteriorly in ſome Subjects, a Branch which runs upward, and communicates with the Vena Azygos. Sometimes this Branch goes out from one or other of the Renales, and appears to be a true Continuation of the Extremity of the Azygos.

157. The Cava ſends likewiſe off poſteriorly the Venæ Lumbares, which commonly ariſe in Pairs, in the ſame Manner as the Arteries of the ſame Name go out from the Aorta. Theſe may be divided into ſuperior and inferior Veins.

158. Their Origins vary in different Manners. Sometimes the Cava gives off a Branch to each Side below the firſt Vertebra of the Loins, which, like a common Trunk, furniſhes the Lumbar Veins. This Branch communicates with the Azygos.

159. Sometimes a conſiderable Branch goes out from the lower Extremity of the Cava, near the Bifurcation, chiefly on the right Side, which afterwards running up between the Bodies and tranſverſe Apophyſes of the Vertebræ, detaches the Venæ Lumbares, and communicates with the Azygos.

160. Sometimes a like Branch comes from the Beginning of the left Vena Iliaca, and running up on that Side in the ſame Manner, produces the Lumbares. This Branch likewiſe communicates with the Azygos, and with the ſuperior or deſcending Ramus Lumbaris.

161. The Venæ Lumbares on one Side communicate by tranſverſe Branches with thoſe of the other Side, and likewiſe with each other by Branches more or leſs longitudinal. The firſt and ſecond often go from the Azygos, and thereby they communicate with the intercoſtal Veins.

162. The Lumbar Veins ſend ſmall Capillaries, in their Paſſage, to the Subſtance of the Bodies of the Vertebræ; and they are diſtributed to the Muſcles of the Abdomen, Quadratus Lumborum, Pſoas, Iliacus, *&c.* They ſend Branches backward to the neighbouring vertebral Muſcles, and to the Canal of the Spine, and communicate with the venal Sinuſes, in the ſame Manner as the Intercoſtals.

163. The inferior Cava having reached as low as the laſt Vertebra of the Loins, and near the Bifurcation of the Aorta, runs in behind the right Iliac Artery, and there is divided into two ſubaltern Trunks, called the right and left Iliac Veins.

164. The Extremity of the Trunk of the Vena Cava paſſes in ſome Subjects behind the Origin of the right Iliac Artery; in others, it is the left Iliac Vein which paſſes there, and conſequently croſſes the right Iliac Artery.

Afterwards

Afterwards the left Iliac Vein accompanies the Inſide of the left Artery, till it goes out of the Abdomen. Therefore the Iliac Veins lie on the Inſides of the Arteries at this Place.

165. From this Bifurcation of the Vena Cava, and often from the Origin of the left Iliaca, the Vena Sacra goes out, and accompanies the Artery of the ſame Name in its Diſtribution to the Os Sacrum, to the Nerves which lie there, and to the Membranes which cover both Sides of that Bone.

Venæ Iliacæ. 166. Each original Iliac Vein is divided on the Side of the Os Sacrum, much after the ſame Manner as the Arteries, into two large Trunks, or ſecondary Iliac Veins. This ſecond Bifurcation is about a Finger's Breadth below that of the Iliac Arteries.

167. One of theſe Trunks is named Vena Iliaca Externa, or Anterior; the other Interna, or Poſterior. The external Vein is likewiſe named ſimply Iliaca, and the internal, Hypogaſtrica. The external Vein ſeems to be the true Continuation of the Trunk, and the Hypogaſtrica only a Branch. I here ſpeak of adult Bodies, becauſe in the Fœtus there is a conſiderable Variation.

168. These Veins follow nearly the Courſe and Diſtribution of the Iliac Arteries, except that the Hypogaſtric Vein does not ſend off the Vena Umbilicalis. The external Iliac Veins lie more or leſs on the Inſide of the Arteries, in the Manner already ſaid; but the Hypogaſtric Veins in the Bottom of the Pelvis lie almoſt behind the Arteries on the ſame Side.

169. From the common Trunk of the Iliac Veins, and ſometimes from the Origin of the Iliaca Externa, a particular Branch goes out, which is diſtributed to the Muſculus Pſoas, Iliacus, and Quadratus Lumborum; and afterwards ſends a Ramus on the Foreſide of the laſt tranſverſe Apophyſis of the Loins, to communicate with the laſt Lumbar Vein.

170. The external Iliac, a little before it leaves the Abdomen, near the Ligamentum Fallopii, lying on the Pſoas and Iliac Muſcles, gives off almoſt the ſame Branches with the Artery of the ſame Name, and follows the ſame Courſe. The chief Branches are theſe.

171. A little before it goes out of the Abdomen, it ſends off from the Outſide a ſmall Branch, which runs up along the Criſta of the Os Ilium, and gives Branches on each Side, to the lateral and poſterior lower Portions of the Muſculi Abdominis, to the Muſculus Iliacus, *&c.*

172. From the Inſide, before it leaves the Abdomen, it ſends off the Vena Epigaſtrica, which having furniſhed ſome ſmall Rami to the neighbouring conglobated Glands, runs up along the Inſide of the Muſculi Recti, on which it is ramified both Ways; as alſo on the broad Muſcles of the Abdomen, by other ſmall Branches, which penetrate from within outwards.

173. Afterwards the Vena Epigaſtrica runs upward, and joins the Ramifications of the Mammaria, by an equal Number, accompanying the Epigaſtric Artery. From the Inſide of the Epigaſtric Vein, a Branch is ſometimes detached to the Muſculus Obturator Internus, where it joins another Ramus, named Vena Obturatrix.

174. Before

174. Before the Iliac Vein gets from under the Ligamentum Fallopii, it ſends ſeveral ſmall Rami to the neighbouring Lymphatic Glands; and immediately afterwards, loſing the Name of Iliaca, it takes that of Cruralis.

175. The Hypogaſtric or internal Iliac Vein runs behind the Artery of the ſame Name, making the ſame Kind of Arch, from which the following Branches go out. *Vena Hypogaſtrica.*

176. From the poſterior or convex Part of the Arch, it gives a Branch to the ſuperior lateral Part of the Os Sacrum, which is diſtributed to the Muſculus Sacer or Tranſverſo-Spinalis Lumborum, and other Muſcles thereabouts, and to the Cavity of the Bone, which it enters through the firſt great Hole.

177. A little lower, on the ſame Side, it ſends out another, which is diſtributed much in the ſame Manner with the former, and enters the ſecond Hole.

178. From the external lateral Part of the ſame Arch, a little anteriorly, it ſends out a large Branch, which runs behind the great Sciatic Sinus, and is diſtributed to the Muſculi Glutæi, Pyriformis and Gemelli.

179. Lower down, the ſame lateral Part of the Hypogaſtric Vein gives out another large Branch; which having run a little Way, detaches ſeveral Rami, and afterward reaching the Foramen Ovale of the Os Innominatum, perforates the Obturator Muſcles, communicates with the Vena Cruralis, and is diſtributed to the Muſculus Pectineus, Triceps, and neighbouring Parts. This Vein is termed Obturatrix, from its paſſing thro' the Muſcles of that Name.

180. Among the Branches ſent off by the Vena Obturatrix, before it perforates the Muſcles, one is ſituated exteriorly, which runs toward the Sciatic Sinus, to the Muſculus Iliacus, the ſuperior Part of the Obturator Internus, and to the Os Ilium, near its Symphyſis with the Os Iſchium.

181. Interiorly, the ſame Obturator Vein ſends off another Branch, which is diſtributed to the Ureters, Bladder, and internal Parts of Generation in both Sexes. It communicates with the Spermatic Veins, and is more conſiderable in Women than in Men.

182. Laſtly, the Hypogaſtric Vein runs backward, and goes out of the Pelvis, above the Ligament which lies between the inferior lateral Part of the Os Sacrum and Spine of the Iſchium; and as it goes out, it is ramified chiefly upward and downward.

183. It ſends a large Branch upward to the lower Part of the Os Sacrum, and two or more downward; which running behind the ſame Ligament, are diſtributed to the Buttocks, Anus, neighbouring Portion of the Muſculus Pectineus, and to the external Parts of Generation, nearly in the ſame Manner with the Artery which accompanies them.

184. The Veins that go to the Anus are termed Hæmorrhoidales Externæ, and they that go to the Parts of Generation, Pudicæ Internæ. The external Hæmorrhoidales communicate with the internal Veins of the ſame Name, which come from the ſmall Vena Meſaraica, one of the Branches of the Vena Portæ, as we ſhall ſee hereafter.

Vena Cruralis.

185. The Crural Vein goes out under the Ligamentum Fallopii, on the Inside of the Crural Artery, and immediately gives small Branches to the inguinal Glands, the Musculus Pectineus, and Parts of Generation. These last are termed Pudicæ Externæ, and evidently communicate with the internal Veins of the same Name.

186. About an Inch below where it leaves the Abdomen, the Crural Vein produces a large Branch, which runs down anteriorly between the Integuments and the Sartorius, following the Direction of that Muscle almost all the Way to the Inside of the Thigh.

187. This Branch having afterwards got beyond the Condyles of the Os Femoris, runs down between the Integuments and inner Angle of the Tibia, to the Forepart of the inner Ankle, and is distributed to the Foot. All this large Branch is named Vena Saphena, or Saphena Major.

188. After the Origin of the Saphena, as the Trunk of the Crural Vein runs down, it sinks in between the Muscles, and is distributed to all the inner or deep Parts of the lower Extremity, accompanying the Crural Artery to the very Extremity of the Foot, being all along more considerable than the Artery, both for Capacity and Ramifications, a Thing very common in the Veins.

189. As the Saphena is a Vein of very large Extent, I shall here describe it all together, and afterwards return to the Vena Cruralis.

Vena Saphena.

190. The Vena Saphena, in its Passage from the Inguen to the Foot, is covered only by the Skin and Fat. Immediately after its Rise, it gives small Veins to the inferior inguinal Glands; and then it gives out others more anteriorly, which running under the Integuments, communicate with each other by numerous Areolæ, or Mashes. Sometimes these Communications come all from the Rami of one Branch.

191. The Saphena having run down on the Thigh, as low as the Middle of the Sartorius, sends off to the same Side several Branches, which communicate with each other, and with the superior Branches already mentioned; and as they run down, they communicate again with the Trunk of the Saphena.

192. These two Sorts of Communications furnish a third collateral Kind, from which likewise particular Branches are detached, which communicate with each other at different Distances all the Way to the Knee.

193. Between these upper and lower Branches, the Saphena sends backward a particular Branch; which, after being distributed to the Integuments which cover the Gracilis Internus and Triceps, turns backward; and a little below the Ham, runs in among the Muscles situated there, and communicates with another Branch, which may be termed Saphena Minor.

194. Afterwards the Trunk of the great Saphena runs down on the Inside of the Tibia, lying always near the Skin; and at the upper Part of that Bone, it sends Branches forward, outward and backward.

195. The anterior Branches go to the Integuments on the upper Part of the Leg; the posterior, to those which cover the Gastrocnemii, and communicate with the little Saphena; and the external Branches are likewise distributed

distributed to the Fat and Integuments, and having reached as low as the Middle of the Tibia, it sends a communicating Branch to the Trunk of the great Saphena.

196. From this Communication, a Branch goes out anteriorly, which runs along the Integuments of the Tibia all the Way to the outer Ankle, having in its Passage communicated again with the great Saphena.

197. As the Saphena runs down on the Inside of the Tibia, it sends out a Branch near the Middle of that Bone, which runs up behind the Tendons of the Sartorius, Gracilis Internus, and Semi-Nervosus, then between the Tibia and upper End of the Soleus, and is joined by an Anastomosis with the Crural Vein.

198. It likewise detaches to the Forepart of the Tibia, some Branches irregularly transverse; which having been distributed to the Periosteum and Bone, communicate with other Branches already mentioned.

199. At the lower Part of the Tibia, the Saphena produces a considerable Branch, which runs obliquely forward over the Joint of the Tarsus toward the outer Ankle, sending off several Rami which communicate with each other, and with the Trunk of the Saphena.

200. Lastly, the Extremity of this Trunk passes on the Foreside of the inner Ankle, and runs irregularly under the Skin, along the Interstice between the first two Metatarsal Bones toward the Great Toe, where this Vein terminates.

201. Having got below the inner Ankle, it sends a Branch outward and forward, which runs under, and in some Measure accompanies the anterior Tibial Artery. Interiorly it sends another Branch, almost from the same Place, which passes under the Foot, communicating with the external Tibial Vein by irregular Arches, from which Veins are sent to the Toes.

202. Lastly, before the Saphena terminates at the Great Toe, it detaches a Kind of transverse Arch over the Metatarsus, which communicates by several Branches with that Arch which lies on the Joint of the Tarsus, and sends others to the Toes. This Arch gives off likewise another Branch, which runs up behind the outer Ankle, and communicates with the Vena Tibialis Externa.

Continuation of the Vena Cruralis.

203. The Crural Vein having sent off the Saphena, and the small Branches for the Pectineus, *&c.* as has been said, runs down on the Thigh behind the Crural Artery. Opposite to the little Trochanter, it produces two large short Branches, or one which afterwards divides into two, whereof one is anterior, the other posterior.

204. The anterior Branch runs more or less transversely forward, to be distributed to the Vastus Internus, lower Part of the Pectineus, and of the second Triceps, and to the other two Muscles of the same Name, running in between them as it goes from one to the other.

205. The posterior Branch runs more or less transversely backward, and furnishes the Glutæi, Vastus Externus, and Beginning of the Biceps.

206. A LITTLE below these two Branches, about the upper Extremity of the Vastus Internus, the Crural Vein produces a Branch which runs down on the Side of the Trunk, covering the Crural Artery, almost as low as the Ham, where it is again united to the Trunk by an Anastomosis, and sometimes it is continued separate a little Way down on the Leg. It has the Name of Vena Sciatica from the Sciatic Nerve which it accompanies.

207. ON the Outside of this Anastomosis, the Crural Vein gives off a Branch which runs backward between the Biceps and neighbouring Muscles, and so downward on the Backside of the Leg a little exteriorly, and very near the Skin, all the Way to the outer Ankle. This Vein is termed Saphena Minor or Externa.

Saphena Minor.

208. THE little Saphena having got near the Integuments in its Course downward, gives out a Branch which runs backward, and communicates with the great Saphena about the Middle of the Backside of the Thigh, as has been already observed.

209. IMMEDIATELY above and below the Ham, this Vein sends out other Branches, which likewise communicate with the Saphena Major, and having run down about one third Part of the Backside of the Tibia, it sends off another Branch which is afterwards re-united to the Trunk.

210. ABOUT the Beginning of the Tendo Achillis, the little Saphena runs outward in the Integuments, toward the outer Ankles, where it terminates in cutaneous Ramifications sent to every Side.

211. THE Crural Vein having detached the little Saphena, runs down between the Biceps and the other Flexors of the Leg, closely accompanied by the Crural Artery, between which and the inner Condyle of the Os Femoris, it is situated.

Vena Poplitea.

212. A LITTLE above the Ham, it takes the Name of Vena Poplitea, and as it runs down betwixt the two Condyles, it gives Branches to the Flexor Muscles above mentioned, to the lower and posterior Parts of both Vasti, and to the Fat which lies above the Interstice of the two Condyles.

213. IT likewise gives off several other Branches, one of which runs up laterally between the outer Condyle and the Biceps, and then turning forward, is ramified in the same Manner with the Artery. Another Branch goes backward, sending Ramifications to the Beginning of the Gastrocnemii, after which it runs down on the Backside of these Muscles, to the Tendo Achillis.

214. NEAR the internal Condyle, the Poplitea sends some lateral Branches to the Extremities of the neighbouring Muscles, especially those of the Semi-Nervosus, Semi-Membranosus, *&c.* Lastly, it sends a Branch toward the external Condyle, which having run for a small Space on the Peronæus Longus, goes back again into the Trunk.

215. THE Vena Poplitea runs down immediately behind the Muscle of the same Name, at the lower Part of which it sends off several Ramifications to each Side, which divide and unite again in different Ways and Degrees; and afterwards it loses its Name being divided into three considerable Branches, called Tibialis Anterior, Tibialis Posterior, and Peronæa; of which

which the Tibialis Posterior is most frequently a Continuation of the Trunk, and the other two like Branches.

216. The anterior Tibial Vein having distributed some small Branches from its very Beginning to the Muscles behind the Heads of the two Bones of the Leg, perforates the interosseous Ligament from behind, forward, and runs between the superior Portions of the Musculus Tibialis Anticus, and Extensor Digitorum Communis. *Vena Tibialis Anterior.*

217. As soon as it pierces the interosseous Ligament, it distributes small superficial Branches to the Head of the Tibia and Fibula, which run to the Joint of the Knee, and communicate with the lateral Branches of the Vena Poplitea, already mentioned.

218. Afterwards it divides into two or three Branches, which run down together on the Foreside of the interosseous Ligament in Company with the anterior Tibial Artery, which they surround at different Distances, by small communicating Circles.

219. These Branches having reached the lower Extremity of the Leg, unite in one, which afterwards divides into several, the Ramifications of which are distributed to the Foot.

220. A particular Branch goes out from the re-united Portion, which, at the lower Part of the Leg, perforates the interosseous Ligament from before backward, and communicates with the Vena Tibialis Posterior.

221. The posterior Tibial Vein gives off from its Beginning, a Branch toward the Inside, which is distributed to the Gastrocnemii and Soleus. This Vein is named Suralis. *Vena Tibialis Posterior.*

222. Afterward the Posterior Tibialis runs down between the Soleus and Tibialis Posticus, giving Branches to each of them. It is divided in the same Manner as the Tibialis Anterior, into two or three Branches, which, as they run, surround the corresponding Artery, by small communicating Circles formed at different Distances.

223. It continues this Course in Company with the Artery as low as the outer Ankle, furnishing the Musculus Tibialis Posticus, and the long Flexors of the Toes. At the lower Part of the Leg, it communicates with a transverse Branch of the Saphena, and with the anterior Tibial Vein, in the Manner already said.

224. Lastly, it passes on the Inside of the Os Calcis, under the Sole of the Foot, where it forms the Venæ Plantares, by dividing into several transverse Arches, which communicate with each other, and with the Saphena, and send Ramifications to the Toes, nearly in the same Manner as the Arteria Plantaris.

225. The Vena Peronæa is likewise double, and sometimes triple. It runs down on the Inside of the Fibula, almost in the same Direction with the Arteria Peronæa, which it likewise surrounds at different Distances, by communicating Branches, after the Manner of the Tibialis Posterior. *Vena Peronæa*

226. It runs down as low as the outer Ankle, communicating several Times with the Tibialis Posterior, and sending Ramifications to the neighbouring Portions of the Musculi Peronæi, and long Flexors of the Toes.

227. The

227. The laſt of theſe Communications makes the Venæ Plantares in ſome Subjects, to appear rather to come from this Vein, than from the Tibialis Poſterior, from which they commonly ariſe, as we have already obſerved.

Vena Portæ. 228. The Vena Portæ is a large Vein, the Trunk of which is ſituated chiefly between the Eminences on the lower or concave Side of the Liver, called Portæ by Anatomiſts; and from thence this Vein has got the general Name of Vena Portæ, or Vena Portarum.

229. It may be conſidered as made up of two large Veins, joined almoſt endwiſe by their Trunks, from each of which, the Branches and Ramifications go out in contrary or oppoſite Directions. One of theſe Trunks adheres to the Liver, and is ramified in that Viſcus, its Branches accompanying the whole Diſtribution of the Hepatic Artery.

230. The other Trunk is without the Liver, and ſends its Branches to the Viſcera ſupplied by the reſt of the Arteria Cæliaca, and by the two Meſentericæ, that is, to the Stomach, Inteſtines, Pancreas, Spleen, Meſentery and Omentum.

231. The firſt Portion of this Vein may be termed Vena Portæ Hepatica, Superior or Minor, the Trunk of which is commonly known by the Name of Sinus Venæ Portarum. The other Portion may be called Vena Portæ Ventralis, Inferior or Major; and this is what I am now to deſcribe, referring the Diſtribution of the other to the Hiſtory of the Liver.

232. The large Trunk of the Vena Portæ Inferior or Ventralis, is ſituated under the lower or concave Side of the Liver, and joined by an Anaſtomoſis to the Sinus of the Vena Portæ Hepatica, between the middle and right Extremity of that Sinus, and conſequently at a good Diſtance from the left Extremity. From thence it runs down a little obliquely from right to left, behind or under the Trunk of the Arteria Hepatica, bending behind the Beginning of the Duodenum, and under the Head of the Pancreas; its Length being about five Fingers Breadth.

233. Having reached to the Head of the Pancreas, this Trunk loſes the general Name of Vena Portæ, and terminates in three large principal Branches, which are diſtributed by numerous Ramifications, to the Viſcera already named. The firſt Branch is termed Vena Meſaraica, or Meſaraica Major; the ſecond, Splenica; and the third, Hæmorrhoidalis Interna, or Meſaraica Minor.

234. The Vena Meſaraica Major appears to be a Continuation of the Trunk of the Vena Portæ Inferior. The Splenica is a capital Branch of that Trunk; and the Hæmorrhoidalis Interna has ſometimes a common Origin with the Splenica, and ſometimes is no more than a Branch of that Vein. In ſome Subjects the Meſaraica Major and Splenica appear to ariſe by an equal Bifurcation of the Trunk of the Inferior Vena Portæ, and in others, the Hæmorrhoidalis ariſes from the very Angle of that Bifurcation.

235. The Inferior Vena Portæ, before the Formation of theſe three Branches, ſends off from the Trunk ſeveral ſmall Rami, which are commonly the Venæ Cyſticæ, Hepatica Minor, Pylorica, Duodenalis, and ſometimes the Gaſtrica Recta, and Coronaria Ventriculi.

236. All theſe ſmall Veins ſometimes ariſe ſeparately; and in other Subjects, ſome of them go out by ſmall common Trunks. It ſometimes happens that ſeveral of them do not come immediately from the Trunk of the Vena Portæ, but from one of its great Branches.

237. The Cyſtic Veins run along the Veſicula Fellis from its Neck to the Bottom; and as they are often no more than two in Number, they are called Cyſticæ Gemellæ, a Name given likewiſe to the Arteries which accompany them. They go out from the right Side of the great Trunk near its Beginning, ſometimes ſeparately, ſometimes by a ſmall and very ſhort common Trunk.

238. The ſmall Hepatic Vein is commonly a Branch of one of the Cyſticæ, or of their common Trunk.

239. The Vena Pylorica ariſes from the great Trunk, almoſt oppoſite to the Origin of the Cyſticæ; and ſometimes is only a Branch of the right Gaſtrica. It paſſes over the Pylorus to the ſhort Arch of the Stomach, where it is joined by Anaſtomoſis with the Coronaria Ventriculi.

240. The Duodenal Vein, commonly called Vena Inteſtinalis, goes out from the great Trunk near the Cyſticæ, and ſometimes from the ſmall common Trunk of theſe Veins. It is diſtributed chiefly to the Inteſtinum Duodenum, and ſends likewiſe ſome Rami to the Pancreas. There is another Vein called alſo Duodenalis, which is a Branch of the Gaſtrica of the ſame Side.

241. The Vena Gaſtrica, or Gaſtro-Epiploica Dextra, and the Coronaria Ventriculi, come more ſeldom from the Trunk of the Vena Portæ, than from its great Branches, with which I therefore chuſe to deſcribe them.

242. The Inferior Vena Portæ, having given off the Splenica, changes its Name to that of Meſaraica, or Meſaraica Major, which often appears to be rather a Continuation of the Trunk, than one of the great Branches, as has been already obſerved. *Vena Meſaraica Major.*

243. It bends toward the ſuperior Meſenteric Artery, ſending off two Veins, and afterwards running up over that Artery, it accompanies it in thoſe Portions of the Meſentery and Meſocolon, which belong to the ſmall Inteſtines, the Cæcum, and right Portion of the Colon. As it runs down, it forms an oblique Arch almoſt like that of the Artery, which is likewiſe ramified on both the convex and concave Sides, but not ſo regularly.

244. The firſt particular Branch from this Trunk is called by *Riolan* Vena Colica. It goes out from the anterior Part of the Trunk, before it joins the Artery, and runs directly to the Middle of the Colon, where it divides to the right and left, and forms Arches. On the left Hand it communicates with the ſuperior, or aſcending Branch of the Hæmorrhoidalis; and on the right, with the ſecond Branch of the Meſaraica.

245. This ſecond Branch is a little under the firſt, or Colica Anterior, and ſomething more toward the right Hand. It may be named Gaſtro-Colica, and is ſoon divided into two Branches, one ſuperior, the other inferior.

246. The

246. The ſuperior Branch of the Vena Gaſtro-Colica ſends ſmall Veins to the Head of the Pancreas, and forms the Vena Gaſtrica, or Gaſtro-Epiploica Dextra, which goes from the Pylorus to the great Curvature of the Stomach, and communicates with the Gaſtrica Siniſtra. In its Paſſage it ſupplies the Stomach and Omentum, and communicates with the Pylorica, Coronaria Ventriculi, *&c.* as has been already ſaid; and ſometimes it forms the Pylorica.

247. The inferior Branch of the Vena Gaſtro-Colica, which may be called Colica Dextra, goes to the right Portion of the Colon; and from thence to the upper Part of that Inteſtine, where it is divided archwiſe, and communicates with the right Branch of the Colica Anterior, and with a Branch of the Vena Cæcalis, as we ſhall ſee hereafter.

248. The Trunk of the great Meſaraic Vein ſends out ſometimes, oppoſite to the Gaſtrica, a particular Branch to the Omentum, called Epiploica Dextra. But almoſt immediately before it aſcends over the Meſenteric Artery, it produces two large Branches very near each other, which paſs behind and under the Artery, being diſtributed to the Jejunum and Part of the Ileum by numerous Ramifications, which form Arches and Areolæ like thoſe of the Artery.

249. Afterwards the Trunk of the Meſaraica paſſes over the ſuperior Meſenteric Artery, to which it adheres very cloſely, and from the convex Side of its Arch ſends out ſeveral Branches almoſt in the ſame Manner with the Artery; but with this Difference, that oftentimes the Branches do not ariſe immediately from the Vein in ſo great Numbers; and each of them ſends out many more Ramifications.

250. From the concave Side of the Meſaraic Vein, a little below the Origin of the ſecond Branch from the convex Side, ariſes a Branch, called by *Riolan* Vena Cæcalis, which runs to the Beginning of the Colon, croſſing one of the Branches of the ſuperior Meſenteric Artery.

251. This Cæcal Vein divides by two Arches, the uppermoſt of which communicates with the lower Branch of the Vena Gaſtro-Colica; the other, after having ſent Ramifications to the Inteſtinum Cæcum, and Appendicula Vermiformis, communicates below with the Extremity of the great Meſaraic Vein.

Vena Splenica. 252. The Splenic Vein is one of the three great Branches of the Vena Portæ, and may be ſaid in ſome Meaſure to be a ſubordinate Trunk of that Vein. It runs tranſverſely from the right to the left, firſt under the Duodenum, and then along the lower Side of the Pancreas, near the poſterior Edge.

253. In this Courſe it gives off ſeveral Veins, *viz.* the Vena Coronaria Ventriculi, Pancreaticæ, Gaſtrica, or Gaſtro-Epiploica Siniſtra, and Epiploica Siniſtra. It likewiſe often gives Origin to the Hæmorrhoidalis Interna, the third capital Branch of the Vena Portæ.

254. It terminates afterwards by a winding Courſe, being divided into ſeveral Branches that go to the Spleen; one of which produces the ſmall Veins called by the Ancients Vaſa Brevia.

255. The

255. The Coronaria Ventriculi, ſo called becauſe it ſurrounds more or leſs the upper Orifice of the Stomach, runs along the ſmall Arch of that Viſcus toward the Pylorus, where it joins and becomes continuous with the Vena Pylorica. In its Paſſage it gives ſeveral Rami to the Sides of the Stomach, which there form numerous Areolæ, and communicate with the Veins of the great Arch.

256. It ariſes pretty often from the Beginning of the Splenica, and ſometimes from the left Side of the Extremity of the great Trunk of the Vena Portæ, behind the Hepatic Artery; and in that Caſe it is the moſt conſiderable of all the ſmall Veins that go out from the great Trunk.

257. The Venæ Pancreaticæ are ſeveral ſmall Branches ſent by the Splenica to the Pancreas, along its lower Side. There are other ſmall Pancreatic Veins which do not ariſe from the Splenica, as has been ſaid in the Deſcription of the Gaſtro-Colica, one of the Branches of the great Meſaraic Trunk.

258. The left Gaſtric or Gaſtro-Epiploic Vein goes out from the Splenica at the left Extremity of the Pancreas; from whence it runs to the great Extremity of the Stomach, and along the great Arch, till it meets the Gaſtrica Dextra, which is continuous with the Siniſtra.

259. In its Paſſage it gives ſeveral Branches to both Sides of the Stomach, which are diſtributed by numerous Ramifications, from many Areolæ, and communicate with the Branches of the Coronaria Ventriculi.

260. At a ſmall Diſtance from its Origin, this Gaſtric Vein ſends out a Branch, which is diſtributed to the Omentum; and on this Account it has been called Gaſtro-Epiploica. This Branch ſeems to communicate with the Hæmorrhoidalis Interna.

261. The Vena Epiploica Siniſtra ariſes at the ſmall Extremity of the Pancreas, and is ramified on the Omentum, all the Way to the Colon, where it communicates with the Hæmorrhoidalis Interna. When this Vein is wanting, the Branch of the left Gaſtrica already mentioned ſupplies its Place. It ſometimes comes from the moſt anterior Branch, which the Splenica ſends to the Spleen.

262. Lastly, the Vena Splenica reaches the Fiſſure of the Spleen, which it enters through its whole Length by ſeveral Branches, almoſt in the ſame Manner as the Splenic Artery. It is from the moſt poſterior of theſe Branches that the Veins are ſent off to the great Extremity of the Stomach, formerly known by the Name of Vaſa Brevia, which communicate with the Coronaria Ventriculi, and Gaſtrica Siniſtra.

263. The internal Hæmorrhoidal Vein is one of the three great Branches of the Vena Portæ, coming ordinarily from the Beginning of the Vena Splenica, and ſometimes from the Extremity or Angle of the Bifurcation of the great Trunk of the Vena Portæ. *Vena Hæmorrhoidalis Interna, ſive Meſaraica Minor.*

264. At a ſmall Diſtance from its Beginning, it gives to the Duodenum a ſecond Vena Duodenalis, which is ſometimes more conſiderable than the firſt, or that which comes from the great Trunk of the Vena Portæ.

265. Afterwards it is divided into two Branches, one ſuperior or aſcending, the other inferior or deſcending. The firſt runs to the upper Part

of the Arch of the Colon, where, after many Ramifications, it communicates with a Branch of the great Meſaraica, with the Ramifications of the Gaſtro-Epiploica Siniſtra, and with thoſe of the neighbouring Epiploica.

266. The inferior Branch runs down on the left Portion of the Colon, on the lower Incurvations of that Inteſtine, and on the Rectum all the Way to the Anus. In this Courſe it ſupplies the Meſocolon, and forms Arches, which ſend out numerous ſmall Ramifications, which ſurround theſe Inteſtines. It ſeems likewiſe to communicate by ſome capillary Twigs with the left Spermatic Vein.

267. This Vein has been named Hæmorrhoidalis, from the Tumours often found at its Extremity next the Anus, which are called Hæmorrhoides. The Word Interna is added to diſtinguiſh this Vein from the Hæmorrhoidalis Externa, which comes from the Vena Hypogaſtrica, and with which this Vein communicates by capillary Ramifications. The Name of Meſaraica Minor agrees to it very well, becauſe of its Situation, with Reſpect to the inferior Meſenteric Artery, which is alſo leſs than the ſuperior.

SECT. VI.

A Deſcription of the Nerves.

1. ALL the Nerves of the Human Body come originally from the Cerebrum or Cerebellum, by means of the Medulla Oblongata, or Medulla Spinalis. They go out in Bundles regularly diſpoſed in Pairs, like ſo many diſtinct Trunks, which are afterwards divided into Branches, Rami, Ramifications and Filaments. *Introduction.*

2. THE Nerves of the Medulla Oblongata go out, for the moſt Part, through the Baſis of the Cranium, at Holes ſituated according to their Diſpoſition. Thoſe of the Medulla Spinalis paſs through the lateral Foramina of all the Vertebræ, and through the great anterior Foramina of the Os Sacrum.

3. WE commonly reckon ten Pairs of theſe Faſciculi or nervous Trunks to the Medulla Oblongata, nine of which go out ſeparately through particular Holes of the Baſis Cranii; and the Tenth, which ariſes from the Extremity of that Medulla, paſſes through the great Occipital Foramen.

4. THE Trunks from the Spinal Marrow are twenty-four Pairs, and may in general be termed Nervi Vertebrales, or Intervertebrales. Seven of them are called Cervical Nerves; twelve, Dorſal or Coſtal, being true Intercoſtal Nerves; and five, Lumbar; to which muſt be added, five or ſix Pairs that paſs out through the Os Sacrum.

5. BEFORE I enter upon the particular Diſtribution of all theſe Nerves, and the Courſe of their Branches, Ramifications and Filaments, I think it proper to give a general Idea of them in the following Table.

6. THE Nerves of the Medulla Oblongata are theſe: *Nerves of the Medulla Oblongata.*

First Pair; Nervi Olfactorii.
Second Pair; Nervi Optici.
Third Pair; Nervi Motores Oculorum, Oculares Communes, Muſculares Communes, Oculo-Muſculares Communes.
Fourth Pair; Nervi Trochleares, Muſculares Obliqui Superiores, vulgo Pathetici.
Fifth Pair; Nervi Innominati Trigemini. The ſubordinate Trunks of this Pair are three on each Side, *viz.* The Nervus Orbitarius, Maxillaris Superior, and Maxillaris Inferior.
Sixth Pair; Nervi Motores Externi, Oculares Externi, Muſculares Externi, Oculo-Muſculares Externi.
Seventh Pair; Nervi Auditorii; which are two on each Side, one called Portio Mollis Nervi Auditorii; the other, Portio Dura, to which I give the Name of Nervus Sympatheticus Minor.
Eighth Pair; Par Vagum Minus, which I call Nervi Sympathetici Medii.

Ninth Pair; Nervi Hypogloſſi, vulgo Guſtatorii vel Linguales.
Tenth Pair; Nervi Sub-Occipitales.

Nerves of the Medulla Spinalis.

7. The Nerves of the Medulla Spinalis are theſe:

One Pair called Nervi Acceſſorii of the eighth Pair from the Medulla Oblongata.

One Pair commonly called Nervi Intercoſtales, which I name Nervi Sympathetici Majores.

Seven Pairs of Nervi Cervicales, or Intervertebrales Colli.

Twelve Pairs of Nervi Dorſales, Coſtales, Intercoſtales Veri, or Intervertebrales Dorſi.

Five Pairs of Nervi Lumbares, or Intervertebrales Lumborum.

Five or ſix Pairs of Nervi Sacri.

Two Nervi Diaphragmatici, each formed by a Trunk of the ſecond, third, and fourth Pair of Cervical Nerves.

Nervi Brachiales of each Side, formed by the fifth, ſixth, and ſeventh Pairs of Cervical Nerves, and by the firſt Pair of the Dorſales.

From theſe Nerves, ſix Branches ariſe on each Side, *viz.*

Nervus Muſculo-Cutaneus.
Nervus Medianus.
Nervus Cubitalis.
Nervus Cutaneus Internus.
Nervus Radialis.
Nervus Axillaris, ſive Articularis.

Nervi Crurales of each Side, formed by the firſt, ſecond, and third Pairs of the Nervi Lumbares; and partly by the fourth and fifth.

Each of theſe Nerves is divided into three Portions, which are

Nervus Femoris Cruraris, ſive Cruralis Superior.
Nervus Tibiæ Cruralis, ſive Cruralis Tibialis.
Nervus Cruralis Pedis, ſive Cruralis Pedalis.

Nervi Sciatici, each formed by the Trunks of the laſt two Pairs of the Nervi Lumbares, and by the three or four following Pairs of the Nervi Sacri.

The principal Diviſion of each of theſe Nerves produces the following:

Nervus Sciatico-Cruralis.
Nervus Sciatico-Popliteus.
Nervus Sciatico-Tibialis.
Nervus Sciatico-Peronæus.
Nervus Plantaris Internus.
Nervus Plantaris Externus.

8. I REFER the Subdiviſions of the Nervi Innominati, or of the fifth Pair, and thoſe of the three Nervi Sympathetici, to the particular Deſcription, in which I ſhall trace the Branches, Ramifications, and even the moſt remarkable Filaments, all the Way to where they enter the Muſcles, Viſcera, Organs, *&c.* and I ſhall purſue their Courſe ſtill further in the particular Hiſtory of each of theſe Parts.

Nervi Olfactorii.

9. THE firſt Pair of Nerves of the Medulla Oblongata, or Nervi Olfactorii, formerly named Proceſſus Mammillares, ariſe by medullary Fibres, anteriorly and exteriorly, from the Eminences of the Cerebrum, called Corpora Striata, between the anterior and middle Lobes.

10. THEY run forward, toward the Os Ethmoides, on each Side the Criſta Galli, in Form of medullary Ropes, having a very ſlender Conſiſtence; and in this Courſe they receive ſome medullary Fibres from the anterior Lobes of the Cerebrum.

11. THEY are at firſt very thin, but as they advance, they grow gradually larger and ſofter, and having reached the Sides of the Criſta without any Communication betwixt them, they ſend off a great Number of Filaments, which run through the Holes of the Lamina Cribroſa.

12. IN their Paſſage through theſe Foramina, they are accompanied and inveſted by the ſame Number of ſmall Productions from the two Laminæ of the Dura Mater, as by particular Vaginæ; and they are afterwards diſtributed by an Infinity of ſmall Filaments to the Membrane, which lines all the internal Parts of the Noſe.

13. EACH Olfactory Nerve communicates by particular Filaments with ſome Branches of the Nervi Ophthalmici and Maxillaris Superior.

Nervi Optici.

14. THE Optic Nerves ariſe from the Eminences of the Cerebrum, called Thalami Nervorum Opticorum; and being firſt of all incurvated outward, they afterwards approach each other, as they run over the Sella Sphenoidalis of the Baſis Cranii, at which Place they unite a little, and afterwards ſeparate again in their Paſſage to the Foramina Optica, to the Orbits, and Globe of the Eyes.

15. THIS Union of the Optic Nerves is on the anterior Part of the Glandula Pituitaria, and is of a very ſingular Kind, as we ſhall ſee in the particular Deſcription of the Head.

Nervi Motores Oculorum Communes.

16. THE third Pair of Nerves, commonly called Motores Oculorum, ariſe immediately before the Border of the anterior Edge of the great tranſverſe Protuberance, ordinarily termed the Proceſſus Annularis of the Medulla Oblongata.

17. EACH Nerve perforates the Dura Mater, behind the lateral Parts of the poſterior Apophyſis of the Sella Sphenoidalis; and afterwards runs along the upper Part of the Sinus Cavernoſus of the Dura Mater, on one Side the Curvature of the Carotid Artery, to the ſuperior Orbitary, or Sphenoidal Fiſſure.

18. FROM thence it paſſes into the Orbit, and divides into four Branches, one ſuperior, one internal, and two inferior, one of which is long, the other ſhort.

19. The ſuperior Branch goes off as ſoon as the Trunk enters the Sphenoidal Fiſſure, and runs directly to the lower Side of the Muſculus Rectus Superior of the Globe of the Eye.

20. Having reached the Middle of that Muſcle, or thereabouts, it ſends up a Ramus to the Levator Palpebræ Superioris; and when this Ramus goes off nearer the Sphenoidal Fiſſure, it may be looked upon as the ſecond ſuperior principal Branch of the Motor Oculi.

21. The other three Branches go off at ſome Diſtance from the ſuperior Branch. The internal Branch is diſtributed to the Muſculus Rectus Internus of the Eye; the ſhort inferior Branch, to the Rectus Inferior; and the long inferior Branch, to the Obliquus Inferior, into the Subſtance of which it penetrates, after having run along the Rectus Inferior.

22. Beſides theſe four or five Branches, there is a ſmall ſhort Branch, which ariſes moſt commonly from that which goes to the Muſculus Obliquus Inferior; and it forms a ſmall lenticular Ganglion, that detaches ſeveral very fine Filaments round the Optic Nerve.

23. The Filaments of the Ganglion perforate the Tunica Sclerotica of the Eye, and then run between this Coat and the Choroides, all the Way to the Iris, where they are diſtributed by very fine Ramifications.

24. The ſmall lenticular Ganglion produces likewiſe other nervous Filaments, which communicate with the Ramus Internus or Naſalis of the Orbitary Nerve.

Nervi Trochleares.

25. The fourth Pair of Nerves of the Medulla Oblongata, or Nervi Trochleares, are long and ſmall, ariſing behind the Eminences called Nates, from the lateral Part of the medullary Expanſion, which lies above the Paſſage between the third and fourth Ventricles of the Brain.

26. From thence they go on each Side to the Edge of the Fold formed by the Dura Mater, on the Extremity of the Apophyſis Petroſa, behind the Sella Sphenoidalis, that is, by the anterior Portions of the Septum Tranſverſum.

27. There each Nerve perforates the Edge of the Fold, above the Paſſage of the Nerve of the third Pair, and more backward and outward. Afterwards, it runs in the Duplicature of that Fold, on one Side of the Nerve of the third Pair, along the upper Part of the Sinus Cavernoſus, and paſſes into the Orbit through the Sphenoidal Fiſſure, and into the Muſculus Trochlearis. Its Courſe is oblique over the other Nerves and neighbouring Muſcles, and it ſends off ſmall Filaments on each Side; appearing to communicate with the firſt Branch of the fifth Pair or Nervus Ophthalmicus.

Nervi Trigemini.

28. The fifth Pair of Nerves is very large, and they ariſe anteriorly from the lateral Parts of the tranſverſe Protuberance of the Medulla Oblongata, by a great Number of Filaments cloſely united together, which afterwards form two large flat Trunks, one on each Side. Each Trunk runs toward the Apex of the neighbouring Os Petroſum, where it perforates the Dura Mater, a little below the Edge of the Extremity or anterior Portion of the Septum Tranſverſum of the Brain.

29. Having

29. HAVING detached ſome Filaments to the Apex of the Apophyſis Petroſa, or to a Kind of Seſamoide Bone, which is often found near this Apex, it enters the Sinus Cavernoſus, and having ſent ſome other Filaments to the Dura Mater, it expands in the Sinus, and forms a Kind of Plexus, or flat irregular Ganglion.

30. AFTERWARDS the Trunk is divided into three large Branches, more or leſs flatted, which run through the cavernous Sinus, being cloſely connected to the ſpungy Filaments thereof, and bathed in the Venal Blood which it contains. Theſe three Branches are diſpoſed laterally on one vertical Plane, and ſeparate, after the Manner of a Gooſe's Foot.

31. THE firſt Branch, commonly called Nervus Ophthalmicus Williſii, is the ſmalleſt and longeſt of the three, and enters the Orbit through the Sphenoidal Fiſſure; for which Reaſon I name it Nervus Orbitarius.

32. THE ſecond or middle Branch, called alſo Nervus Maxillaris Superior, paſſes through the ſuperior Maxillary Foramen of the Os Sphenoides.

33. THE third or inferior Branch, called likewiſe Nervus Maxillaris Inferior, goes down through the Foramen Ovale, or Maxillare Inferius of the Sphenoidal Bone. The two Maxillary Nerves are united at their Origin, for which Reaſon ſome Anatomiſts have divided the large Trunk into two principal Branches; and the ſecond of theſe Branches into two others.

34. THE Orbitary or Ophthalmic Nerve, which is the firſt Branch of the fifth Pair, as ſoon as it enters the Orbit, through the Sphenoidal Fiſſure, is divided into three Rami, one ſuperior or frontal, one internal or naſal, and one external or lacrymal; and before its Entry, it ſometimes gives and ſometimes receives communicating Branches. It communicates by a Filament or two with the Nerve of the ſixth Part, and with the Nerve commonly called Intercoſtalis. *Nervus Orbitarius, vulgò Ophthalmicus.*

35. THE Ramus Superior or Frontalis, which might likewiſe be termed Nervus Superciliaris, is the moſt conſiderable of the three, and runs along the ſuperior Part of the Orbit, cloſe to the Membrane which lines it, ſending Filaments to the Fat which ſurrounds the Globe of the Eye, to the neighbouring Membranes, and to the Muſculus Levator Palpebræ.

36. AFTERWARDS it paſſes through the Foramen Superciliare, and being divided towards each Side, it is ſpent on the neighbouring Portions of the Muſculus Frontalis, Orbicularis and Integuments, communicating with a neighbouring Ramus of the Portio Dura of the Auditory Nerve.

37. THE Ramus Internus, or Naſalis of the Orbitary Nerve, runs toward the Noſe, and near its Origin ſends off a Filament, which communicates with the ſmall lenticular Ganglion already mentioned.

38. THIS Filament comes ſometimes from the Trunk of the Orbitary Nerve before the Diviſion, and adheres to the internal Ramus, all the Way to where the Motor Communis is divided.

39. THIS Naſal Ramus runs firſt of all obliquely over the Optic Nerve, and under the two Muſculi Levatores, giving off ſome Filaments to the neareſt Parts of theſe Muſcles. Afterwards it runs between the Muſculus Rectus Internus, and Obliquus Major, along the Inſide of the Orbit; and in

in its Paſſage ſends a ſmall Filament through the internal Orbitary Hole, of which hereafter.

40. From thence it paſſes over the Muſculus Rectus Internus, to the great or internal Angle of the Eye, where it is diſtributed to the neighbouring Parts, that is, to the Caruncula and Sacculus Lacrymalis, to the neareſt Portions of the Muſculus Orbicularis, Superciliaris, Pyramidalis Naſi, and to the Integuments.

41. The ſmall lateral Filament which it ſends through the Orbitary Hole, returns into the Cranium, running up from before backward, on one Side of the Os Cribroſum, and having reached the Forepart of the Duplicature of the Dura Mater, it joins the Filaments of the Olfactory Nerve on the Lamina Cribroſa, together with which it paſſes through the anterior Holes of that Lamina, and is diſtributed to the Noſe.

42. The Ramus Externus, or Lacrymalis, goes chiefly to the Glandula Lacrymalis, upon which it is diſtributed, and from whence it has its Name. It ſeems ſometimes to be a Branch from the Ramus Frontalis, and it often ariſes from the Orbitary Nerve more poſteriorly than the other Branches. It adheres cloſely to the Dura Mater, and runs obliquely along the Inſide of the Orbit, on the Muſculus Rectus Externus, to the Glandula Lacrymalis.

43. Before it reaches the Gland, it ſends a ſmall Branch to the external lateral Part of the Orbit, which is ſometimes loſt in the Diploë of the Cranium, and ſometimes perforates the neighbouring Part, either of the Os Frontis, or Os Malæ, *&c.* ſending Filaments to the neareſt Portions of the Muſculus Temporalis, Orbicularis Palpebrarum, Maſſeter, &c. and of the Integuments; and it likewiſe gives Filaments to the Fat and Membrana Conjunctiva of the Eye.

Nervus Maxillaris Superior.

44. The ſuperior Maxillary Nerve, the ſecond Branch of the fifth Pair, goes out of the Cranium between the Foramen Ovale, and Fiſſure of the Os Sphenoidale, paſſing through the Foramen Rotundum, or Maxillare Superius of the ſame Bone.

45. Immediately after its Paſſage, it ſends a Filament to the Outſide of the Orbit, which having perforated the Os Malæ, is diſtributed to the Parts which cover that Bone, communicates with a neighbouring Branch of the Portio Dura of the Auditory Nerve, and ſends ſmall Filaments to the Fat in the lower Part of the Orbit.

46. Soon afterwards it is divided into three Rami, the firſt of which I name Suborbitarius, the ſecond, Palatinus, and the third, Spheno-Palatinus, which laſt is ſometimes only a Branch of the firſt; but ſtill the common Diviſion may be retained.

47. The Sub-Orbitary Ramus is the moſt conſiderable of the three. It runs in the Canal of the inferior Portion of the Orbit, and goes out by the exterior Orbitary Hole, which is ſometimes double.

48. In this Paſſage it ſends downward, through the Holes of the Canal, ſmall Filaments, which enter the Sinus Maxillaris, and are diſtributed to the Membrana Pituitaria in that Sinus, to the Subſtance of the Bone, to the Alveoli,

Alveoli, to the anterior Dentes Molares, and to the Dentes Canini and Inciſores.

49. As it enters the Canal, it ſometimes gives off a Filament to the poſterior Molares; and among all theſe Filaments there is at leaſt one, which runs along the upper Side of the Arch of the Palate, to the Union of the Oſſa Maxillaria.

50. This Ramus having paſſed out of the bony Canal, through the Foramen Sub-Orbitarium Anterius, is diſtributed to the Muſculus Orbicularis Palpebrarum, to the neighbouring Muſcles of the Noſe and Lips, and to the Integuments; communicating with a Ramus of the Portio Dura of the Auditory Nerve.

51. The Ramus Palatinus of the ſuperior Maxillary Nerve runs down before the Pterygoide Apophyſes of the Os Sphenoides, in the Canal formed by the Os Maxillare, and Os Palati; and having paſſed out of that Canal through the Foramen Palatinum Poſterius, it is diſtributed by ſeveral Filaments to the Glandular Coat of the Palate, to the Septum Palati and Muſcles belonging to that Part. Some of theſe Filaments go as far as the Foramen Palatinum Anterius or Inciſorium.

52. As it runs down in the Canal, it is at firſt a little bent, and then ſends Filaments to the Muſculus Pterygoidæus Externus, to the Peri-Staphylini, and to the Arch of the Pharynx. It likewiſe ſends other Filaments through the ſmall Holes in the poſterior Part or Tubercle of the Os Maxillare, to the Sinus Maxillaris and poſterior Dentes Molares.

53. The Ramus Spheno-Palatinus paſſes through the bony Hole of the ſame Name, and is diſtributed to the Muſculus Pterygoidæus Internus, to the poſterior Parts of the Nares, to the neighbouring Sinus Sphenoidalis, and to the Tuba Euſtachiana.

54. It likewiſe ſends a Filament through the Foramen Pterygoides, which perforates the Root of the Apophyſis Pterygoides from behind forward, and joins the Nervus Maxillaris Inferior.

55. The inferior Maxillary Nerve, the third Branch of the fifth Pair, is larger at its Origin, than the other two. It goes out of the Cranium by the Foramen Ovale of the Sphenoidal Bone, and runs between the two Muſculi Pterygoidæi, below the great Sinus of the lower Jaw, where it enters the bony Canal of that Jaw. *Nervus Maxillaris Inferior.*

56. As ſoon as it leaves the Cranium, it ſends off four principal Branches, and before it enters the Canal of the lower Jaw, it gives off another to the Tongue. The four firſt Branches ariſe very near each other, ſo that the Size of this Nerve decreaſes very much between the Muſculi Pterygoidæi.

57. The firſt Branch of this Trunk runs up to the Temporal Muſcle, on the Inſide of which it is diſtributed, and alſo between its Fibres.

58. The ſecond Branch runs behind the Condyle of the lower Jaw, where it divides into two Filaments, which run from within, outward, and communicate with the neighbouring Ramus of the Portio Dura of the Auditory Nerve, behind the Outſide of the Condyle.

59. At the Origin of these two Filaments, it sends off a small Ramus, which runs up before the external Ear toward the Temples, giving Filaments to the Concha of the Ear in its Passage.

60. The Ramus of this Trunk passes between the two Apophyses of the lower Jaw, perforates the lower Part of the Temporal Muscle, and gives it several Filaments.

61. Afterwards it bends downward upon the Musculus Masseter, to which it is chiefly distributed, giving Filaments to the neighbouring Integuments, and communicating with the Portio Dura of the Auditory Nerve, on the Side of the Os Malæ. It terminates by Filaments, which go to the Musculus Buccinator, to the Muscles of the under Lip, and to the Integuments of these Parts.

62. The fourth Branch of the Trunk of the inferior Maxillary Nerve, is oftentimes no more than a Ramus of the third Branch, which goes off near its Origin. It passes over the Musculus Pterygoidæus Externus, to which it gives Filaments, and is distributed to the Pterygoidæus Internus, and to the neareſt Portion of the Temporalis.

63. It is likewise distributed to the Musculus Buccinator, to the Glands of the Mouth, and Muscles of the Lips. Sometimes it sends off a Filament, which runs up upon the Concha of the external Ear.

64. Besides these four Branches, several small Filaments go off on each Side, one of which runs to the Foramen Pterygoidæum, where it joins a Filament of the Nervus Maxillaris Superior, and then continues its Course to the Membrane which covers the Vomer, and neighbouring Parts of the internal Nares.

65. The Ramus that goes to the Tongue, which may be termed Nervus Lingualis, or Hypoglossus Minor, to distinguish it from the Hypoglossus Major, which belongs to the ninth Pair, is detached from the Maxillaris Inferior, as it passes between the Musculi Pterygoidæi, and sometimes a little sooner.

66. It is a very considerable Branch, and sometimes nearly as large as the Trunk which it accompanies between the two Muscles already mentioned, and leaving it a little above the Canal of the lower Jaw, it runs over the Pterygoidæus Internus, and gives it some Filaments.

67. This Ramus Lingualis, a little after its Origin, communicates with the Trunk by a short collateral Branch, which is sometimes plexiform. At this Place it sustains a particular Filament, which, according to the common Opinion, arises from it, and goes to the internal Ear.

68. This particular Filament of the Nervus Lingualis is supposed by Anatomists to be a Recurrent, which runs up backward through the Tympanum, and joins the Portio Dura of the Auditory Nerve; but as the Angle which it makes with the small Nervus Lingualis is very acute, and turned forward, there is more Reason to think that it comes from the internal Ear to that Nerve, as we shall see more at Length in the Description of that Organ.

69. Afterwards this Lingual Ramus passes under the lateral Part of the Tongue, and over the Glandula Sublingualis, giving Filaments to the neigh-

neighbouring Portions of the Muſcles of the Tongue, and to thoſe of the Os Hyoides and Pharynx.

70. HAVING communicated by ſeveral Filaments with the Extremities of the Nerve of the ninth Pair, or Lingualis Major, it enters the Subſtance of the Tongue, and terminates near its Apex or Point.

71. LASTLY, the inferior Maxillary Nerve, before it enters the Canal of the lower Jaw, ſends Filaments to the neighbouring Portions of the Muſculus Pterygoidæus Internus, Digaſtricus, *&c.* It likewiſe detaches a Filament or two along the Perioſteum, to be diſtributed to the Muſculus Mylo-Hyoidæus, and Glandula Sublingualis. The Marks of theſe Filaments often appear upon the Bone, all the Way from their Origin, and ſometimes they paſs through a ſmall entire bony Canal, lying on the Surface of the Inſide of the Bone.

72. AFTER the inferior Maxillary Nerve enters the Canal of the lower Jaw, it runs under the Alveoli, and diſtributes Filaments to each Tooth, all the Way to the Hole near the Chin, where it ſends another Ramus forward, into the Diploë, which is diſtributed to the other Teeth that lie between that Hole and the Symphyſis of the Chin.

73. THE Motores Externi, which make up the ſixth Pair of Nerves from the Head, are ſmaller, but yet a little larger than thoſe of the fourth Pair. They ariſe from the Union of the Medulla Oblongata, between the great tranſverſe Protuberance, and the Corpora Olivaria; from whence they advance to the Dura Mater, and enter it on the Extremity of the Production of the Os Occipitis behind, and a little on one Side of the Symphyſis of that Bone with the Os Sphenoides. *Nervi Motores Externi.*

74. EACH of theſe Nerves runs afterwards in the cavernous Duplicature of the Dura Mater, on one Side of the Bottom of the Sella Sphenoidalis, and of the Carotid Artery, to which it adheres very cloſely, and it there communicates with a Branch of the fifth Pair, by one or two ſhort Filaments, as has been already ſaid in the Deſcription of the Orbitary Nerve.

75. IMMEDIATELY after, and behind this Communication, the Motor Externus ſends down a Filament, which at firſt appears to run from before backward, like a Recurrent, and preſently enters the large bony Canal of the Apophyſis Petroſa, on one Side of the internal Carotid Artery.

76. THIS nervous Filament, which is ſometimes double, is commonly taken for the Root or Origin of the celebrated Intercoſtal Nerve, which I term Sympatheticus Major; but as it makes an acute Angle in an oppoſite Direction with the Nerve of the ſixth Pair, it ſeems rather to run up with the Carotid Artery, and to join that Nerve, than to ariſe from it. The Progreſs of this Nerve ſhall be continued in the Deſcription of the great Sympatheticus.

77. THE Nerve of the ſixth Pair, which I have ſometimes ſeen double, or ſplit in two Parts, before it enters the Dura Mater, paſſes afterwards through the Sphenoidal or Superior Orbitary Fiſſure, to the Muſculus Rectus Externus of the Globe of the Eye.

Nervi Auditorii.

78. The Nerves of the ſeventh Pair, termed Auditorii, ariſe from the lateral and poſterior Part of the great tranſverſe Protuberance of the Medulla Oblongata. Each of theſe Nerves is double, or conſiſts of two Ropes, which accompany each other very cloſely to the Foramen Auditorium Internum of the Apophyſis Petroſa.

79. One of theſe Ropes is ſmall, ſolid, and anterior, being called the Portio Dura; the other leſs ſolid and poſterior, called Portio Mollis.

80. The Portio Mollis terminates in the great Foſſula of the Foramen Auditorium Internum, and is diſtributed to the Organ of Hearing through ſeveral other ſmall Holes. This Portion alone deſerves the Name of the Auditory Nerve; but the particular Deſcription thereof muſt be referred to that of the Ear.

81. The Portio Dura paſſes through the ſmall Foſſula of the internal Auditory Hole, into the winding Duct of the Apophyſis Petroſa, and goes out by the Foramen Stylo-Maſtoidæum, to the Face and other neighbouring Parts. As it paſſes through the winding Duct, or Aqueduct of Fallopius, it touches the Dura Mater at the ſmall Opening on the upper Side of the Apophyſis Petroſa, where it joins ſome Filaments from the fifth Pair.

82. It likewiſe gives off a Filament to the Muſcle of the Stapes; and as it goes out, it gives or receives another Filament, which paſſes by the Tympanum, and joins the Ramus Lingualis of the inferior Maxillary Nerve, as we ſhall ſee more particularly in the Hiſtory of the Ear.

83. I choose to call this Portion of the Auditory Nerve, Nervus Sympatheticus Minor; to the Deſcription of which I now proceed.

Nervi Sympathetici Minores.

84. The Trunk of each Nerve of the Portio Dura, or of the Sympathetici Minores, having paſſed through the Ductus Petroſus Fallopii, and having communicated with the Dura Mater, *&c.* as has been already ſaid, ſends off, at about the ſixth Part of an Inch from where it goes out at the Stylo-Maſtoide Hole, two Branches, one upward, the other downward.

85. The ſuperior Ramus runs up chiefly to the poſterior Parts of the external Ear, to which it is diſtributed, communicating, as it paſſes behind the Ear, with a Ramus of the ſecond Pair of the Cervical Nerves; and forward with a Branch of the Maxillaris Inferior.

86. The inferior Ramus is ſpent on the three Muſculi Styloidæi Digaſtricus, and on the ſuperior Extremity of the Sterno-Maſtoidæus, reaching in ſome Subjects as far as the Middle of that Muſcle. In Place of theſe two ſingle Rami, ſmall Ramifications go out ſometimes from the Trunk.

87. Afterwards the Trunk of the Portio Dura advances forward, through the Parotid Gland, to which it gives ſeveral Filaments; ſome of theſe Filaments running from without inwards, and ſurrounding that Branch of the external Carotid Artery, which runs behind the Ear. Sometimes, though very ſeldom, the Trunk itſelf is ſplit to give Paſſage to the Artery.

88. This Trunk having paſſed through the Parotid Gland, behind the Angle of the lower Jaw, is divided into two large Branches, one ſuperior, the other inferior.

89. The

89. The ſuperior Branch of the Portio Dura is the moſt conſiderable of the two, and having run upwards for about the third Part of an Inch, it divides into ſeven or eight Rami.

90. These Rami are ſpread ſuperficially, and in an irregular radiated Manner, on all the lateral Parts of the Face, from the Hair as low as the under Lip, between the Ear and Noſe, diſtributing a prodigious Number of cutaneous Nerves.

91. In ſome Subjects theſe Rami, at their firſt Separation, form a Kind of Plexus, which reſembles a Gooſe's Foot.

92. The firſt, ſecond, and third Rami, are diſtributed to the anterior Part of the Ear, on the lateral Parts of the Head, the Temporal and Frontal Muſcles, and the neighbouring Parts.

93. One of theſe Rami, and ſometimes the large ſuperior Branch, detaches inward behind the Condyle of the lower Jaw, and before the Temporal Vein, two or three Filaments, which communicate with the inferior Maxillary Nerve.

94. The fourth Ramus goes to the Foramen Superciliare, or Supra-Orbitarium, giving in its Paſſage ſeveral Filaments to the external, lateral, and ſuperior Parts of the Muſculus Orbicularis Palpebrarum, and afterwards communicating with the Orbitary Nerve, which goes out by the ſame Foramen.

95. The fifth Ramus is diſtributed by ſmall Filaments on the lateral Part of the Cheek, and is partly loſt in ſome ſmall Holes at the Baſis or Root of the Zygoma, giving likewiſe ſome Filaments to the external lower Part of the Muſculus Orbicularis Palpebrarum.

96. The ſixth and ſeventh Rami, and likewiſe the eighth, when it is found, are ſpread on the whole Cheek as far as the Noſe.

97. One of theſe latter Rami paſſes under or behind the Muſculus Zygomaticus, to which it gives Filaments; and then perforating and giving Filaments to the middle lower Part of the Muſculus Orbicularis Palpebrarum, it goes to the inferior Orbitary Hole in the Os Maxillare, and communicates with the Nervus Maxillaris Superior.

98. The laſt Ramus communicates, by ſome Filaments, with a neighbouring Ramus of the large inferior Branch of the Portio Dura.

99. This large inferior Branch, which is ſomething leſs than the ſuperior, runs under the Angle of the lower Jaw, and is diſtributed, by ſeveral Rami, to all the inferior lateral Parts of the Face, and to the neighbouring Parts of the Throat, where it chiefly terminates by a vaſt Number of cutaneous Filaments.

100. The upper Rami of the large inferior Branch run up on the Muſculus Maſſeter, to the lower Part of the Zygomaticus, Buccinator, and other Muſcles of the Lips.

101. One of theſe ſuperior Rami communicates with one of the inferior Rami of the upper Branch, as has been already ſaid; and by the Intervention thereof, it communicates likewiſe in ſome Meaſure with the Sub-Orbitary Ramus of the Nervus Maxillaris Superior, or that which goes out by the Foramen Sub-Orbitarium.

102. The

102. The moſt conſiderable of all theſe Rami runs forward along the Baſis of the lower Jaw, ſending Filaments to the Muſculus Cutaneus, and to the Muſcles of the under Lip, which it perforates near the Chin, and there communicates with the Nervus Maxillaris Inferior.

103. The inferior Rami run under the lower Jaw, giving Filaments to the Glandula Sub-Maxillaris, and are diſtributed to the Throat on the Muſculus Cutaneus, interſecting the external Jugular Vein. One or more of theſe Rami are obſerved to run down to the Middle of the Muſculus Sterno-Maſtoidæus, where it communicates with a Ramus of the ſecond Vertebral Pair.

Nervi Sympathetici Medii.

104. The Nerves of the eighth Pair, called by the Ancients Par Vagum, and which I have named Nervi Sympathetici Medii, ariſe from the poſterior Part of the Medulla Oblongata, from the great tranſverſe Protuberance, and from the anterior Part of the Corpora Olivaria, by ſeveral ſeparate Filaments, which are afterwards collected in a Faſciculus that runs toward the anterior Part of the Foramen Lacerum of the Baſis Cranii, where it perforates the Dura Mater, immediately before the Extremity of the great lateral Sinus.

105. The Paſſage of this Nerve is divided from that of the Sinus, by a ſmall membranous Septum of the Dura Mater, and by the little bony Prominences of the Foramen Lacerum, mentioned in the Deſcription of the Sceleton.

106. This great Faſciculus does not penetrate the Dura Mater through a ſingle Opening, and as one Rope, for ſeveral of the anterior Filaments form a particular Portion, divided from the main Body by a very thin membranous Septum.

107. The Filaments which compoſe the large Portion, when carefully examined, ſeem to perforate the Dura Mater ſeparately, by ſmall Holes or Pores, which lie very near each other.

108. Though theſe two Portions go out ſeparately, they are looked upon as a common Trunk, and the ſmall Portion is looked upon as a Branch of the great one, which lies behind the other, and is eſteemed the true Trunk of this eighth Nerve.

109. As this Trunk goes out, it receives backward a ſmall nervous Rope, which runs up laterally from the Spinal Canal, and paſſing through the great Occipital Hole on the Dura Mater, joins this Trunk. This ſmall Rope is termed Nervus Acceſſorius Octavi Paris, or Nervus Spinalis.

110. As the two Portions paſs through the Dura Mater and Foramen Lacerum, they are cloſely united together, and communicate by Filaments, which increaſe the Size of the ſmall Portion. The large Portion communicates likewiſe with the Nervus Acceſſorius, to which it is ſtrongly connected during this Paſſage.

111. The ſmall or anterior Portion having paſſed out of the Cranium, ſeparates from the large one as a Branch from a Trunk, and from thence it has been called the firſt Branch of the eighth Pair.

112. It is bent in Form of an Arch, and paſſing interiorly on the Side of the Digaſtric Muſcle, it ſupplies the Muſculi Genio-Hyoidæi, thoſe near the Baſis of the Tongue, and thoſe of the Pharynx.

113. About two Fingers Breadth from where it leaves the Cranium, this Portion ſends backward one Ramus, which is bent in the ſame Direction like an inverted Arch; and detaches from its convex Side, at leaſt three Filaments. The firſt, which is ſometimes double, communicates with the Trunk of this eighth Pair, on one Side of the Ganglion of the Intercoſtal or great Sympathetic Nerve. The ſecond joins the Nervus Acceſſorius, and the third goes to the Pharynx.

114. Afterwards this ſmall Portion goes to the Tongue, as has been ſaid, where it communicates with the Extremities of the ſmall Nervus Hypogloſſus, or Ramus Lingualis of the inferior Maxillary Nerve, and with thoſe of the great Hypogloſſus or Nerve of the ninth Pair.

115. The large Portion of the eighth Pair, or middle Sympathetic Nerve, adhering by one Side to the firſt Ganglion of the Sympatheticus Maximus, and by the other, to the Hypogloſſus Major, to both which it gives communicating Filaments, ſends off a little below the ſmall Portion, another ſmaller Branch, which goes by ſeveral Filaments to the Pharynx.

116. A little below, or on one Side of the Union of the eighth Pair with the ninth, this Portion or Trunk forms a Ganglion, and gives off a third Branch, which runs before the internal Carotid Artery, to the Larynx, Muſculi Laryngis, Glandula Thyroides, and Muſcles of the Os Hyoides.

117. This third Branch paſſes between the Cornu of the Os Hyoides and the Ala of the Cartilago Thyroides, and running in between that Cartilage and the Cartilago Cricoides, it communicates with the Extremities of the Nervus Recurrens, of which hereafter.

118. Afterwards, the large Trunk runs down on the Foreſide of the firſt Ganglion of the Nervus Sympatheticus Maximus, along the anterior Vertebral Muſcles of the Neck, by the Side of the Carotid Artery, and behid the internal Jugular Vein; being accompanied by the Intercoſtal Nerve as far as the laſt Vertebra of the Neck.

119. Through all this Courſe, this Trunk is inveſted by a Kind of cellular, filamentous, or membranous Vagina, common to it with the internal Carotid Artery, the internal Jugular Vein, and the great Sympathetic Nerve. In its Paſſage it gives ſmall Rami to the neighbouring Parts, to the Pharynx, Œſophagus, and to the Carotid Artery and Jugular Vein. One of theſe ſmall Rami, in its Courſe downward, joins a ſmall Ramus of the ſecond Cervical Pair, and is diſtributed to the Glandula Thyroides.

120. The Trunk having reached as low as the Larynx and Glandula Thyroides, ſends out a Ramus, which, running down on the Foreſide of the internal Carotid Artery, joins a Filament from the ſecond Ganglion of the Intercoſtal Nerve, with which it runs to the Plexus Pulmonaris.

121. Afterwards, both Trunks of the Nerves of the eighth Pair enter the Thorax, before the Origin of the Subclavian Arteries, which they croſs, and run behind the Lungs to the Œſophagus. At this Place there is ſome

Difference

Difference in the Diſtribution of the two Trunks, which in every other Reſpect is pretty much the ſame.

122. As the right Trunk paſſes before the Subclavian Artery, it ſends off a conſiderable Branch which bends backward under the Artery, and runs up on one Side of the Aſpera Arteria; to which, and to the Œſophagus, it ſends Filaments as high as the Larynx. This Branch is called Nervus Recurrens.

123. This Recurrent Nerve having reached the Larynx, ſends Rami to the Muſcles thereof, to the Pharynx and Glandula Thyroides. Then it runs in behind the Cornua of the Cartilago Thyroides, where it joins the Extremity of the third Branch of the Trunk of this eighth Pair, communicating with it in the Manner already ſaid.

124. The right Trunk having given off the Recurrent of the ſame Side, runs down on one Side of the Aſperia Arteria, and behind the Origin of the right Lung, where it adheres to the Œſophagus; and in this Courſe it ſends out ſeveral Branches.

125. The uppermoſt Branches run on the Fore-ſide of the lower Extremity of the Aſpera Arteria and Bronchia, and are all united to Filaments of the great Sympathetic Nerve, before the Bifurcation of the Trachea, and likewiſe to the Ramifications of the ſame Nerve from the other Side. The other Branches which the Trunk ſends off, as it runs down behind the Bronchia and Lungs, unite with Filaments of the great Sympathetic Nerve.

126. The left Trunk of the eighth Pair is ramified in the Thorax, much in the ſame Manner with that of the right Side, with this Difference only, that the left Recurrent Nerve goes out lower than the right; for it paſſes below the great Curvature of the Aorta, and behind the Ductus or Ligamentum Arterioſum, and afterwards runs up on one Side of the Trachea Arteria, to the Larynx, much in the ſame Manner with the other.

127. This Difference in the going off of the two Recurrents, is the Reaſon why the left Trunk does not run down ſo ſtraight as the right; and the left Recurrent gives off ſome of the Branches, which anſwer to thoſe which come from the Trunk itſelf on the right Side.

128. Immediately after the Origin of the left Recurrent, the left Trunk ſends down a Branch which goes partly to the Plexus Pulmonaris, and partly to the Œſophagus and Aorta.

129. These reciprocal Ramifications of both Trunks of the eighth Pair, and their mutual Communications with the Filaments of the Intercoſtal or great Sympathetic Nerve, of which preſently, form particular Intertextures called Plexus; the moſt conſiderable of which are thoſe called Plexus Cardiacus, and Plexus Pulmonaris.

130. The Plexus Cardiacus is formed above the Lungs, on the Foreſide of the Bronchia, and produces a great Number of Filaments; ſome of which go to the Pericardium, and the reſt go through it, round the great Veſſels, to be diſtributed to the Heart.

131. The Plexus Pulmonaris is compoſed of the following Ramifications which the two Trunks ſend off, as they run down behind the Lungs. Some of

of the Filaments detached from thence, run above the Bronchia at their Origin; but the greateſt Part run below, being diſtributed along with them through the whole Lungs.

132. Besides theſe Plexus, the two Trunks give off Rami to the Parts near which they paſs; ſuch as the poſterior Part of the Mediaſtinum, Œſophagus, and Aorta; and by all theſe Ramifications the Trunks are gradually diminiſhed.

133. After having ſent off the two Plexus, theſe Trunks change in a very remarkable Manner. The Trunk on the right Side runs inſenſibly backward, as it deſcends, and to that on the left Side, forward in the ſame Manner.

134. In their Paſſage, they ſend ſeveral Filaments forward and backwark to the Œſophagus, which unite at different Diſtances, both with the Filaments from the ſame Trunk, and with the like Filaments from the Trunk on the other Side; and the poſterior Filaments from the left Trunk, are in ſome Subjects more conſiderable than the anterior ones from the right Trunk.

135. These repeated Diviſions, and Re-unions which repreſent a Kind of Plexus, cauſe the original Trunks to degenerate, in ſome Meaſure, into two particular Ropes, one anterior, the other poſterior, which are called Nervi Stomachici.

136. The poſterior Stomachic Nerve ariſes principally from the right Trunk, and the anterior from the left Trunk; and accordingly the poſterior Rope is oftentimes much ſtronger than the anterior, becauſe of the Difference between the Filaments, of which each of them is made up.

137. These two Stomachic Ropes paſs along with the Extremity of the Œſophagus, through the Opening in the ſmall Muſcle of the Diaphragm, and are diſtributed on the Stomach. The anterior Rope is ſpread on the upper, or as it is commonly called, the Foreſide, and the poſterior, on the lower or Backſide.

138. The Ramifications of both Ropes communicate with each other, and form particular Intertextures chiefly near the upper Orifice of the Stomach, and along the ſmall Curvature, all the Way to the Pylorus; by all which a kind of Plexus is formed, called Coronarius Stomachicus.

139. This Coronary Plexus, thus formed, ſends off near its Origin two ſmall Ropes; one of which ſeems to come chiefly from the great anterior Stomachic Rope, the other from the poſterior Rope. Theſe two ſmall Ropes unite near the Trunk of the Hepatic Artery, which having accompanied for a little Way, they are divided into two very ſhort Branches.

140. These two Branches run preſently afterwards to the right and left Hands, immediately above the tranſverſe Rope, which forms the Communication between the ſemi-lunar Ganglions of the two great Sympathetic Nerves; and they terminate by uniting with this Rope in a triangular Form.

141. In this Manner end the Nerves of the eighth Pair, or the Sympatheticus Medius of each Side, by contributing, together with the Sympatheticus Maximus, to the Formation of ſeveral Plexus in the Abdomen, which

are aſcribed principally to the laſt named Nerve. Among theſe, are the Plexus Hepaticus, Splenicus, Meſenterici, and even the Renales.

142. We ſee likewiſe that theſe two great Pairs of Nerves have a perpetual Correſpondence through all the Viſcera of the Abdomen, as well as in the Thorax, as we ſhall ſhow more particularly hereafter.

Nervi Acceſſorii Octavi Paris.

143. The Nervi Acceſſorii of the eighth Pair ariſe by ſeveral Filaments from both Sides of the Medulla Spinalis of the Neck, ſometimes higher, and ſometimes lower. Each of them runs up between the two nervous Planes which come out from the Spinal Marrow, to form the Vertebral Nerves, and they gradually increaſe in their Courſe upwards by means of ſeveral Filaments which they receive from the poſterior Nervous Planes.

144. Having reached above the firſt Vertebra, each Nerve is fixed to the Backſide of the Ganglion of the Nervus Sub-Occipitalis, or that of the tenth Pair; and having, at the upper Part of this Adheſion, received two Filaments from the poſterior Portion of the Medulla, they part from the Ganglion, and continue their Courſe upward. I have ſometimes found theſe two Filaments without any Communication with the Ganglion, or with the anterior Plane; ſo that they ſeem rather to belong to the Nervus Acceſſorius, than to the Sub-Occipitalis.

145. They enter the Cranium by the great Occipital Foramen; and having communicated with the Origin of the Sub-Occipitalis, or Nerves of the tenth Pair, and with the great Hypogloſſi or ninth Pair, they return out of the Cranium with the Nerves of the eighth Pair, or Sympathetici Medii, with which they communicate in their common Paſſage through the Cranium.

146. As ſoon as they get without the Cranium, each of them gives off a conſiderable Branch, which divides into two. One is very ſhort, and immediately joins the Trunk of the eighth Pair; the other, which is longer, joins the ſmall Portion or firſt Branch, which goes to the Tongue. They likewiſe communicate with the great Hypogloſſus and Sympatheticus on each Side.

147. Afterwards the Nervus Acceſſorius runs backward, and perforating the Muſculus Sterno-Maſtoidæus, runs to the Trapezius, on which it is diſtributed, and terminates after having ſupplied the Rhomboides. In this Courſe, it communicates with the firſt three Pairs of the Cervical Nerves, and gives Rami to the Glands of the Neck, to the Muſculus Angularis of the Scapula, the Complexus, Occipitalis, and to the Integuments.

Nervi Hypogloſſi Externi, ſive Majores.

148. The ninth Pair of Nerves, as they are commonly called, or the Par Linguale, ariſes on each Side, between the Corpora Pyramidalia and Olivaria, by ſeveral ſmall Filaments, which uniting together, form ordinarily two ſmall Ropes on each Side. Theſe two Ropes perforate the Dura Mater, by two ſmall ſeparate Holes, and afterwards ſoon unite in one Trunk on each Side, which goes out of the Cranium, by the anterior Condyloide Hole of the Os Occipitis.

149. As

149. As ſoon as they leave the Cranium, each Trunk adheres very cloſely to the Outſide of the Trunk of the eighth Pair, and to that of the tenth. From thence each Nerve paſſes on the Foreſide of the large Ganglion of the Sympatheticus Maximus, and runs between the internal Jugular Vein, and the neighbouring Carotid Artery, and then to the Tongue on one Side of the Digaſtric Muſcle.

150. In its Paſſage between the Jugular and Carotid, it ſends down a Branch to the Jugular Glands, Muſculus Cutaneus, *&c.* and behind the firſt Ganglion of the Intercoſtalis, it detaches another, which runs down till it joins the Nerve of the eighth Pair, or Sympatheticus Medius. A little afterwards, it gives off a third to the Muſculus Omo-Hyoidæus, Sterno-Hyoidæus, and to the ſmall Muſcles of the Larynx.

151. Afterwards this Trunk of the ninth Pair bends near the Angle of the lower Jaw, and runs forward between the Muſculus Cerato-Baſio-Gloſſus and Mylo-Hyoidæus, under the Genio-Gloſſus; to all which Muſcles it gives Filaments, and it is afterwards loſt in the Tongue, communicating with the Filament of the Ramus Lingualis of the inferior Maxillary Nerve, and with the Ramus of the ſame Name, belonging to the eighth Pair.

152. Before it bends near the Angle of the lower Jaw, a little below the Apophyſis Styloides of the Os Temporis, it communicates with the firſt Cervical Pair, and then ſends a ſmall Ramus to the Larynx, and another more conſiderable one, which runs down behind the Muſculus Sterno-Maſtoidæus, on the anterior Muſcles of the Neck, and communicates with the firſt and ſecond Vertebral Pairs.

153. This laſt Ramus communicates likewiſe with the Portio Dura of the Auditory Nerve, and with the following Vertebral Pairs; after which, it terminates chiefly in the Muſculus Sterno-Hyoidæus, and Sterno-Thyroidæus.

154. The Sub-Occipital Nerves, or thoſe of the tenth Pair, ariſe a little lower, and more laterally than the former, at the Extremity of the Medulla Oblongata, oppoſite to the poſterior Part of the Condyloide Apophyſes of the Os Occipitis. *Nervi Sub-Occipitales.*

155. They come on each Side from the anterior Part of the Medulla, by a ſingle Plane of ſmall Filaments, and communicate by ſome collateral Filaments, with the firſt Cervical Pair, before they pierce the Dura Mater.

156. They pierce the Dura Mater directly outward, oppoſite to their Origin, at the ſame Place where the Vertebral Arteries perforate it inwards; both going, in a Manner, through the ſame Holes, and the Nerves lying below the Arteries.

157. Afterwards they run down in the Duplicature of the Dura Mater, and emerge again under the Edge of the great Occipital Foramen, croſſing the Elongation or Occipital Funnel of that Membrane.

158. Having paſſed out of the Cranium, each of them runs to the poſterior Notch of the ſuperior oblique Apophyſis of the firſt Vertebra of the

Neck, in which it runs from behind forwards, in Company with the Vertebral Artery, which lies above it in the ſame Notch.

159. Where it leaves this Notch, it forms a Ganglion, and gives Filaments to the Muſculi Recti and Obliqui of the Head, beſides one which runs down in the tranſverſe Foramina of the Vertebræ of the Neck, along the Blood-Veſſels which lie there.

160. Having formed this Ganglion, and ſent off theſe Filaments, it runs forward and downward over the tranſverſe Apophyſis of the firſt Vertebra, forming a ſort of Arch with an aſcending Ramus of the firſt Cervical Pair.

161. This Arch ſurrounds the Forepart of the tranſverſe Apophyſis, and has ſeveral Communications with the firſt Ganglion of the great Sympathetic Nerve, and by its convex Side, adheres very cloſely to thoſe of the eighth and ninth Pairs.

162. The ſuperior Part of this Arch or Ganglion ſends up a conſiderable Nerve, which is increaſed by the Addition of a ſhort Ramus belonging to the firſt Cervical Pair, and running upward and backward on the convex Side of the Os Occipitis, is diſtributed to the ſuperior and lateral Parts of the Head, by ſeveral Ramifications. This Branch is termed Nervus Occipitalis.

163. These Sub-Occipital Nerves have this in common with the other Nerves of the Medulla Oblongata, that each ariſes only by one anterior Faſciculus of Filaments, without any poſterior Faſciculus, as in the Vertebral Nerves. We ſometimes obſerve, indeed, a ſmall poſterior ſingle Filament on each Side, but this ſeems rather to belong to the Nervus Acceſſorius of the eighth Pair, than to the Tenth.

164. The particular Deſcription of the Courſe, Diviſion, and great Extent of the Nervi Sympathetici Maximi, commonly called Intercoſtales, will come in moſt properly after that of all the Vertebral Nerves, with which they almoſt univerſally communicate.

The Vertebral Nerves in general.

165. The Vertebral Nerves are all thoſe which ariſe from the Medulla Spinalis, and go out from the great Canal of the Spine, through the lateral Foramina formed by the correſponding Notches in the Vertebræ.

166. The Original Trunk of each Vertebral Nerve ariſes commonly by two flat Faſciculi of medullary or nervous Filaments, one anterior, the other poſterior. Theſe two Faſciculi on each Side run towards each other, and perforate laterally the Production of the Dura Mater; after which, they preſently unite in a kind of Ganglion, from which the Trunk is produced.

167. I reckon the Vertebral Nerves by Pairs, in the common Manner, beginning by thoſe which paſs between the firſt and ſecond Vertebræ. This Enumeration agrees with that of the Vertebræ themſelves; there being ſeven Pairs of Vertebral Nerves belonging to the Neck, termed Cervicales; twelve to the Back, called Dorſales; five to the Loins, named Lumbares; and five or ſix to the Os Sacrum, called Sacri.

168. This Diſtribution is fixed chiefly by the Dorſal Nerves, called Coſtales; for there is exactly the ſame Number of theſe Nerves as of Ribs, and the

the first Pair of Costal Nerves passes between the First and Second Vertebræ of the Back.

169. This is not the proper Place to take Notice, that the Spinal Marrow, from which all these Nerves arise, does not go down so low as the bony Canal of the Spine, &c. These Observations must be referred to the Description of the Brain, of which this Medulla is the true Continuation.

170. The first Pair of Cervical Nerves passes between the first and second Vertebræ of the Neck; lying more backward than the subsequent Pairs, and having larger Ganglions.

First Pair of Cervical Nerves.

171. The Trunk of each of these Nerves sends out anteriorly a small Ramus, which runs up on the Foreside of the Transverse Apophysis of the First Vertebra, and forms a communicating Arch with the small descending Ramus of the Nervus Sub-Occipitalis of the same Side, already mentioned; and consequently communicates likewise with the great Sympathetic Nerve.

172. Posteriorly it sends out a considerable Branch, which is soon increased by a communicating Branch from the second Cervical Pair. This Branch communicates also with the Sub-Occipitalis, and afterwards passes between the Musculus Complexus and Rectus Minor Posticus of the Head; and bending backward, is distributed to the other small posterior Muscles of the Head, and to the Splenius, Complexus, and Trapezius. It passes, next, over these Muscles to the Occiput, where it is ramified, backward, upward, and forward, to the Musculus Occipitalis, and Temporalis of the same Side.

173. It likewise gives off a Filament, which dividing into two, sends up one Portion to the Musculus Sterno-Mastoidæus, round the Nervus Accessorius Octavi Paris, or Sympatheticus Medius, and running afterwards behind that Muscle, it is distributed to the Splenius.

174. The other Portion of this Filament runs downward, and bending in a particular Manner, communicates with the second Cervical Pair, and with the Sympatheticus Major. It likewise sends smaller Filaments to the anterior Muscles of the Head and Neck, and to the Sterno-Mastoidæus, and Splenius.

175. One of these small Filaments communicates with the great Nervus Lingualis, or ninth Pair from the Brain, and goes to the Musculus Sterno-Hyoidæus, Thyro-Hyoidæus, and Thyroide Glands.

Second Pair of Cervical Nerves.

176. The second Cervical Pair passes between the second and third Vertebræ of the Neck; and as it goes out, communicates forward with the great Ganglion of the Sympatheticus Maximus, upwards, with the first Cervical Pair, and downward, with the third.

177. Afterwards the Trunk on each Side is divided into several Branches; but from the Place of its Union with the first Pair, it sends off, first of all, one Filament, and then another from where it joins the third Pair.

178. Lower down, these two Filaments unite into one, which runs down along the internal Jugular Vein, and then forming a considerable Arch, runs up along the Carotid Artery, as high as the Parotid Gland, where it joins and communicates with the Trunk of the ninth Pair of the Medulla Oblongata.

longata. A Filament is detached from the Curvature or Arch, which is ſpent on the Muſculus Coraco-Hyoidæus, Sterno-Hyoidæus, and Sterno-Thyroidæus.

179. Opposite to the Sterno-Maſtoidæus, the Trunk ſends off a Branch, which, behind that Muſcle, communicates with the Nervus Acceſſorius of the eighth Pair, after the Manner of a Plexus.

180. This Branch runs afterward behind the Muſculus Splenius, perforates the upper Portion of the Trapezius, between the great Occipital Nerve and the Ear, and aſcends to the lateral Part of the Occiput, where it communicates with its Fellow from the other Side. It is diſtributed on each Side, to the Muſcles juſt mentioned, and to the Angularis Scapulæ.

181. The Trunk of this ſecond Cervical Pair ſends down other Branches to the middle Part of the Muſculus Trapezius, Sterno-Maſtoidæus, and neighbouring Vertebral Muſcles; and ſometimes we obſerve a Communication backward, between this Trunk and the third Cervical Pair.

182. Having given off theſe Branches, this Trunk advances toward the poſterior Edge of the middle Portion of the Sterno-Maſtoidæus, upon which it bends from behind forward, ſending out ſeveral Branches. The firſt Branch runs downward and backward, and is diſtributed by ſeveral Rami to the Muſculus Scalenus, Tranſverſalis Colli, *&c.*

183. The ſecond Branch communicates with the third Cervical Pair, at the Place where this Pair produces the Diaphragmatic Nerve, to the Formation of which it contributes. The third Branch is only a Filament, which running upward, communicates with one or two Filaments of the inferior Branch of the Portio Dura Nervi Auditorii.

184. The Extremity of this Curvature on the Foreſide of the Sterno-Maſtoidæus, is divided into two Branches, one of which runs upward, the other downward. The ſuperior Branch aſcends on this Muſcle, to the lower Part of the Ear, ſending one Ramus behind the Ear, and another to the Parotid Gland, where it joins the Trunk of the Portio Dura of the Auditory Nerve, and runs up on the Foreſide of the Ear.

185. The inferior Branch runs from behind forward, to be ramified on the Muſculus Cutaneus, and diſtributed to the Integuments of the Throat, in which it is loſt near the Larynx, having firſt given Rami to the Muſculi Sterno-Hyoidæi. It likewiſe communicates with a deſcending Branch of the Portio Dura, and with another of the ninth Pair from the Brain.

186. Near its Origin, this inferior Branch ſends down a Ramus on the Backſide of the Sterno-Maſtoidæus, gives other Rami to the Jugular Glands, to the Fat and Integuments of the lateral and lower Part of the Neck, and paſſes before the middle Portion of the Clavicula, below which it is loſt in the lateral Integuments of the Thorax.

Third Pair of Cervical Nerves.

187. The third Cervical Pair paſſes between the third and fourth Vertebræ of the Neck, and communicates upward with the ſecond Pair, downward with the fourth, and forward with the great Sympathetic Nerve, and with a Filament from the ninth Pair of the Medulla Oblongata. It communicates

municates likewiſe with the Nervus Acceſſorius of the Sympatheticus Medius, by a Filament which goes to the Muſculus Trapezius.

188. Each Trunk of this third Pair ſends ſeveral Branches to the anterior, poſterior, and lateral Parts of the Neck, that is, to the Muſcles, Glands, Membranes, Fat and Skin, all the Way to the neighbouring upper Parts of the Thorax and Shoulder.

189. Among the poſterior Branches, there is one which goes to the Muſculus Supra-Spinatus, and paſſing over the Notch in the ſuperior Coſta of the Scapula, gives Filaments to the Extremity of the Omo-Hyoidæus; and there is another ſmall one, which, in its Paſſage to the Muſculus Trapezius, communicates with a Filament of the Nervus Acceſſorius of the eighth Pair.

190. Of the middle Branches, ſome go to the Jugular Glands, to the Muſculi Subclavii, to the neighbouring Portions of the Pectoralis, Deltoides, and Trapezius, and to the Integuments which lie thereabouts.

191. Among the anterior Branches, there is one, which being ſtrengthned by a Ramus from the ſecond Cervical Pair, unites lower down with another Ramus of the fourth Pair, and thus forms the Nervus Diaphragmaticus.

192. This Diaphragmatic Nerve runs on the Foreſide of the Muſculus Scalenus, and enters the Thorax behind the anterior Extremity of the Clavicula, receiving immediately afterwards, a Filament from the firſt Dorſal Pair, and communicating with the great Sympatheticus. It runs down obliquely forward, before the Subclavian Artery, and on one Side of the Nervus Sympatheticus Medius, near the Origin of the Recurrent.

193. In the Thorax, this Diaphragmatic Nerve runs down immediately before the Origin or Root of the Lungs, along one Side of the Pericardium, to which it adheres very cloſely, and then running a little backward, it ſoon enters the Diaphragm.

194. It is diſtributed by numerous Ramifications on the great Muſcle of that Organ, ſending likewiſe ſome Filaments to the lower Portion, by which it communicates with the great Sympathetic Nerve, and with the neighbouring Plexus of the Abdomen.

195. The right Diaphragmatic Nerve runs along the Vena Cava Superior, and on that Account appears to be ſituated more anteriorly than the left.

196. This left Diaphragmatic Nerve lies firſt of all a little backward, toward the Trunk of the Aorta, and afterwards runs in a longer Courſe than the right, being bent, in order to paſs by that Portion of the Pericardium, which anſwers to the Apex of the Heart; for which Reaſon it is longer than the right. From thence it is bent backward, and diſtributed to the Diaphragm in the ſame Manner with the other.

The laſt four Pairs of Cervical Nerves in general.

197. The laſt four Cervical Pairs paſs between the Portions of the Muſculus Scalenus, being in general larger than the three former. They are united by their Trunks, and together with the communicating Branch of the third Pair, and Trunk of the firſt Dorſal Pair, they form a very large Plexus, which is in a Manner incloſed in a membranous Vagina, and produces

ſix

ſix conſiderable Ropes, like ſo many particular Trunks, which are diſtributed to the upper Extremity, and go by the general Name of Nervi Brachiales.

The Brachial Nerves in general.

198. The Brachial Nerves conſiſt of ſix Ropes on each Side, as has been ſaid; and in the Year 1697, M. *Duvernay* gave to five of them, the following Names: Nervus Muſculo-Cutaneus ſive Cutaneus Externus, Medianus, Cubitalis, Cutaneus Internus, and Radialis, taking for a Branch of the Radialis that Nerve which I look upon as the ſixth principal Rope, and which I name Axillaris, or Articularis.

199. These ſix Ropes do not ariſe ſeparately; and their Origin is ſo complicated, that it is not an eaſy Matter to determine it: But in general, it ſeems that each of the five Vertebral Pairs, which form the great Plexus, contributes to the Formation of each Brachial Rope.

200. Four of theſe Nerves ariſe anteriorly from the great Plexus, *viz.* the Muſculo-Cutaneus, Medianus, Cubitalis, and Cutaneus Internus; and the other two, the Radialis and Axillaris, ariſe poſteriorly.

201. The five Vertebral Pairs form the large Plexus in the following Manner.

202. The fourth and fifth Cervical Pairs, about an Inch or more after they go out, unite into one common Trunk. The ſeventh Cervical and firſt Dorſal Pair unite likewiſe into one Trunk, very near their Origin. The ſixth Cervical Pair runs ſingly for a conſiderable Space, between the two other Trunks, and afterwards is increaſed by a communicating Portion which it receives from each of them.

203. These five large Vertebral Nerves on each Side, thus mingled, interwoven and complicated together, divide again, and are diſpoſed in a quite different Manner from what is ordinary, forming the ſix Brachial Ropes. There is, however, ſome Variety in this Plexiform Union and Mixture.

204. The Manner in which the ſix Brachial Nerves ariſe from the great Plexus, is commonly as follows.

205. The Nervus Muſculo-Cutaneus is formed by the Union of the fourth and fifth Cervical Pairs, and by their collateral Communication with the third and ſixth Pairs.

206. The Medianus comes on one Side, from the Union of the ſixth Cervical Pair, with the fourth and fifth; and on the other, from the Union of the ſeventh Pair, with the firſt Dorſalis. Theſe two Unions form an acute Angle, the Apex of which produces the Median Nerve.

207. The Cubitalis goes out from the Union of the ſeventh Cervical, with the firſt Dorſal Pair, a little nearer the lower Side of the Angle of the Medianus.

208. The Cutaneus Internus ariſes much in the ſame Manner.

209. The Radialis is the largeſt of the ſix, and goes out from the Apex of another Nervous Angle, the upper Side of which is formed by the Union of the Trunks of the fourth, fifth and ſixth Pairs; and the lower Side by the Union of the ſeventh Cervicalis and firſt Dorſalis.

210. The Axillaris goes out cloſe to the Radialis, chiefly from the upper Side of the Nervous Angle, and it communicates with all the reſt.

211. Besides the great Brachial Nerves, several small Branches go out from each of the last four Pairs; and it will be proper to describe all these Branches, together with the Trunks they belong to, before we go on to the Distribution of the Brachial Nerves.

Fourth Pair of Cervical Nerves.

212. The fourth Cervical Pair passes between the fourth and fifth Vertebræ of the Neck, and communicates above with the third Pair, below with the fifth, and forward with the great Sympathetic.

213. It sends several Rami to the Musculus Scalenus, Angularis Scapulæ, Rhomboides, Trapezius, and Pectoralis Major; and likewise gives off a Filament, which contributes to the Formation of the Nervus Diaphragmaticus. Afterwards it advances a Finger's Breadth without any Ramification, and joins the Trunk of the fifth Cervical Pair.

214. At the Place of this Union, or a little before, it gives out a pretty considerable Branch, which having sent a Filament to the Musculus Subscapularis, passes through the small Notch in the superior Costa of the Scapula, and gives other Filaments to the Supra-Spinatus. This Ramus runs afterwards under the last named Muscle, and under the Acromium, to the Infraspinatus, and Teres Minor.

Fifth Pair of Cervical Nerves.

215. The fifth Cervical Pair passes between the fifth and sixth Vertebræ of the Neck, communicating with the fourth and sixth Pairs, and with the great Sympatheticus.

216. Afterwards each Trunk sends forward a Ramus, which uniting with a like Ramus from the sixth Pair, is distributed to the Musculus Scalenus, to the Surface of the Pectoralis Major, and to the neighbouring Integuments. This Trunk sends off likewise near its Origin another Ramus, which runs down behind the Origin of the sixth Pair, from which it receives a small communicating Filament.

217. Being thus strengthened, it runs down on the Outside of the Thorax, and is distributed to the Muscles situated there; passing first under the two Pectorales, and then between the Serratus Major and Subscapularis.

218. Afterwards continuing its Course downward, it reaches the anterior, middle, and almost the lower Part of the Latissimus Dorsi at the third false Rib, and terminates in this Muscle, and in the Integuments.

The last two Pairs of Cervical Nerves.

219. The sixth and seventh Cervical Pairs having passed in the common Manner, under the sixth and seventh Vertebræ of the Neck, and having communicated with the other Nerves near them, send several Filaments to the neighbouring Parts.

220. The Branch of the sixth Pair, which unites anteriorly with a like Branch of the fifth Pair, to be distributed on the Thorax, as has been said, sends down a Filament, which together with another common to the seventh Cervical, and first Dorsal Pair, forms a Kind of Arch, under which the Axillary Artery passes.

221. All these Nerves give Filaments to the neighbouring Integuments; and some go likewise to the Axillary Glands.

Nervus Musculo-Cutaneus.

222. The Musculo-Cutaneous Nerve, which naturally lies on one Side of the Cutaneus Internus, arises from the Union of the fourth and fifth

Cervical Pairs, and partakes of their lateral Communication with the third and ſixth Pairs.

223. HAVING reached the upper Extremity of the Muſculus Coraco-Brachialis, it perforates it obliquely from above downward, and gives it ſeveral Filaments. Afterwards it runs down on the Arm behind, and under the Biceps, to both Portions of which it gives Ramii.

224. HAVING got from behind the Biceps, it runs from within outward, between the lower Extremity of that Muſcle and of the Brachialis, which it likewiſe ſupplies. In the Fold of the Arm, it reaches the Skin immediately behind the Vena Mediana, and there it becomes a true Nervus Cutaneus. From thence it runs along, between the Supinator Longus and the Integuments, on the Inſide of the Cephalic Vein, all the Way to the Thumb.

225. IT is diſtributed to the Integuments on the Foreſide of the Carpus to thoſe of the Thumb and of the convex Part of the Hand. Before it reaches the Wriſt, it paſſes over the Cephalic Vein, and communicates at the Thumb with a Branch of the Radial Nerve.

Nervus Medianus.

226. THE Nervus Medianus lies between the Muſculo-Cutaneus and Cubitalis. It ariſes from the Union of three Branches, one belonging to the ſixth Cervical Pair, one to the ſeventh, and one to the firſt Dorſalis. In ſome Subjects it is formed by the Union of two principal Branches, one of which comes from the Union of the firſt Dorſalis with the laſt Cervicalis, the other from the Union of the fourth, fifth, and ſixth Cervicales.

227. IT runs down on the Arm, along with the Brachial Artery, under the inner Edge of the Biceps, having firſt paſſed behind the inferior Inſertion of the Coraco-Brachialis, and reaches the Fold of the Arm between the lower Extremity of the Muſculus Brachialis and Pronator Teres; giving Filaments in its Paſſage to all theſe Muſcles on both Sides.

228. IT paſſes behind the Ramus Medianus of the Baſilic Vein, as it approaches the inner Condyle; and then runs backward croſs the Pronator Teres, and downward between the Perforatus and Perforans, to which it gives Rami.

229. BELOW the Pronator Teres, it ſends off a particular Ramus, which runs along the Interoſſeous Ligament, behind the Pronator Quadratus, all the Way to the Wriſt, giving Filaments to that Muſcle.

230. AFTERWARDS, having detached ſome Cutaneous Ramifications, the Trunk paſſes under the internal tranſverſe Ligament of the Carpus, to the Palm of the Hand, where it ſends off numerous Rami to the Muſculus Thenar and Anti-thenar, two to the lateral concave Parts of the Thumb, two to thoſe of the Index, two to thoſe of the middle Finger, and one to the neareſt Side of the Ring Finger, after having communicated with a Ramus of the Cubital Nerve. Theſe Rami go all the Way to the Ends of the Fingers, ſupplying the Integuments, Ligaments, and Tendons.

Nervus Cubitalis.

231. THE Cubital Nerve ariſes from the Union of the ſeventh Cervical, with the firſt Dorſal Pair; and communicates with the lower Root of the Median Vein.

232. IT

232. It runs down on the Inside of the Arm, along the Musculus Anconæus Maximus, between the Brachial Artery and the Basilic Vein, sending off only small Filaments to the neighbouring Muscles and Integuments.

233. It runs in between the inner Condyle of the Os Humeri and the Olecranum, where it is covered only by a Kind of Ligament, and by the common Integuments; and this is what makes Strokes upon the Elbow so painful, even all the Way to the Little Finger, where this Nerve ends.

234. Afterwards it runs down on the Musculus Ulnaris Internus, giving Filaments to the neighbouring Muscles, to the Pronator Quadratus and Integuments; and at the lower Extremity of the Ulna it is divided into two Branches, one large, the other small.

235. The large Branch, which may be reckoned the Continuation of the Trunk, passes on one Side of the Os Pisiforme, under the great transverse Ligament of the Carpus, to that Part of the Palm of the Hand which answers to the last two Fingers, where it gives some Filaments to the Integuments and Ligaments of the Carpus.

236. Afterwards it divides into three particular Branches, one of which forms a Kind of Arch, being distributed to the neighbouring small Muscles of the Thumb and to the Interossei; the second is bifurcated, and goes to the corresponding lateral concave Parts of the Ring and Little Fingers; and the third goes to the opposite lateral Part of the Little Finger, and to the neighbouring Muscles.

237. The small Branch is turned outward behind the Tendon of the Ulnaris Externus, and goes to that Part of the Back of the Hand which answers to the last two Fingers. It is distributed to the lateral convex Parts of these two Fingers, much in the same Manner as the other Branch to the lateral concave Parts. It likewise supplies the Musculus Hypothenar, Metacarpius, and the Integuments, and communicates with a Ramus of the Nervus Medianus.

238. The internal cutaneous Nerve is very small, and arises from the Union of the seventh Cervical and first Dorsal Pairs, but chiefly from the latter. It runs over the other Brachial Nerves, and passes down on the Inside of the Arm, between the Muscles and Integuments. *Nervus Cutaneus Internus.*

239. It divides first of all into two Branches, which accompany each other very closely as far as the inner Condyle, on one Side of the Vena Basilica, being covered by the Ramus Medianus of that Vein.

240. One of these Branches runs down under the Integuments which cover the Musculus Radialis Internus, and Ulnaris Gracilis, and is afterwards ramified on the Skin which covers the Wrist and Beginning of the Palm of the Hand.

241. The other Branch runs a little more backward, along the Integuments which cover the Musculus Ulnaris Internus and Ulna, upon which it is ramified all the Way to the Little Finger.

242. The Radial Nerve, so called because it accompanies the Radius and the Radial Artery, arises from the Union of three compound Branches, *Nervus Radialis.*

one of which comes from the united Trunks of the fourth and fifth Cervical Pairs, the ſecond from the ſingle Trunk of the ſixth Pair, and the third from the united Trunks of the ſeventh Cervical and firſt Dorſal Pairs.

243. The Trunk of this Nerve lies deeper than the reſt, and it runs firſt of all from before backward, bending round the Os Humeri, between the Muſculi Anconæi and that Bone.

244. This Curvature is oblique and contorted, anſwering to the Impreſſion obſervable on the Bone; and above it the Radial Nerve gives Branches to the three Anconæi, eſpecially to the Longus and Externus. Afterwards it turns from behind forward, between the Anconæus Externus and Brachialis.

245. It ſends off from the Curvature or Arch, ſome cutaneous Rami, the moſt conſiderable of which goes to the external Condyle of the Os Humeri, and is diſtributed to all the Integuments which cover the Radius on the fore and outer Sides, and to thoſe which cover the exterior Parts of the Carpus and Back of the Hand, all the Way to the Thumb.

246. At the Fold of the Arm the Radial Nerve turns outward, and runs down between the lower Extremity of the Muſculus Brachialis, and upper Extremity of the Supinator Longus, giving Rami to theſe and to the neighbouring Muſcles.

247. Having reached the Extremity of the Radius, it divides into two, or rather ſends off a large Branch, which paſſes between the Radius and Supinator Longus, below the Middle of the Bone, where it runs in between the Supinator Longus and Radialis.

248. This Branch accompanies the external Radial Artery near the Integuments, and having got to the lower Part of the Radius, it is diſtributed in three Rami to the convex lateral Parts of three Fingers and an half.

249. One Ramus goes to the internal lateral Part of the Thumb, and to the Integuments. The ſecond is divided into two, for the external lateral Part of the Thumb, and anterior lateral Part of the Index, giving Filaments in its Paſſage to the Integuments of the Metacarpal Bones. The third Ramus is divided into ſeveral leſſer Ramifications, which go to the poſterior lateral Parts of the Index, to both Sides of the Middle Finger, and to the anterior lateral Part of the Ring Finger.

250. Through all this Courſe this Branch ſupplies the Integuments and Interoſſeous Muſcles.

251. The Trunk, or largeſt Branch of the Radial Nerve, paſſes between the upper Extremity of the Radius and Muſculus Supinator Brevis, and in its Paſſage ſupplies this Muſcle, the Anconæus Minimus, Supinator Longus, and Radialis Externus.

252. Afterwards it is loſt in the Extenſor Digitorum Communis, and in the Muſcles of the Carpus and Thumb, having firſt communicated with a Ramus of the Muſculo-Cutaneous Nerve.

Nervus Axillaris.

253. The Axillary or Articular Nerve ariſes from the laſt two Cervical Pairs, and ſometimes ſeems to be no more than a large Branch of the Nervus Radialis. It runs in the Hollow of the Axilla, behind the Head of

of the Os Humeri, between the Muſculus Teres Major and Minor, and bends or turns from within outward and backward, round the Neck of that Bone, running between the Articulation and the upper Extremity of the Anconæus Longus, to the Deltoides.

254. It is divided into ſeveral Rami, which go chiefly to the upper and lower Parts of the Deltoides, upon which they are ramified, ſupplying in their Paſſage the Sub-ſcapularis, the upper Extremity of the Anconæus Longus, Teres Major and Minor, and Supra-Spinatus. It likewiſe gives ſome Nerves to the Latiſſimus Dorſi, and Anconæus Externus.

255. The Dorſal or Coſtal Nerves conſiſt of twelve Pairs, as has been already ſaid, and they deſerve more juſtly to be called Intercoſtales, than the great Sympathetic Nerve to which that Name has been commonly given. *Nervi Dorſales ſive Coſtales.*

256. They have this in common with each other, that as ſoon as they leave the Vertebræ of the Back, before they begin to accompany the Ribs, they ſend out two Filaments anteriorly, which communicate with the great Sympathetic Nerve, and ſeveral Filaments backward, to the Vertebral and other Muſcles.

257. Each of theſe twelve Pairs is numbered from the Vertebra, under which it goes out; thus the firſt Pair is that which paſſes under the firſt Vertebra of the Back, and ſo of the reſt.

258. The firſt Pair enters the Compoſition of the Nervi Brachiales, as has been ſaid, and together with the ſecond Pair, it ſends off the Rami Thoracici.

259. The ſeven ſuperior Pairs run along the under Sides of the true Ribs, all the Way to the Sternum, being diſtributed to the Intercoſtal Muſcles, which they perforate likewiſe from within outward, to go to the Serratus Major, Pectorales, and external Integuments.

260. The ſeventh Pair having reached the Cartilaginous Portion of the ſeventh true Rib, runs down to the broad Muſcles of the Abdomen, to which it is diſtributed.

261. The loweſt five Pairs leave the Extremities of the falſe Ribs, and go to the Muſcles of the Abdomen.

262. The eleventh Pair gives likewiſe ſome Filaments to the Diaphragm, and then runs in between the Muſculi Tranſverſales and Peritonæum.

263. The twelfth is diſtributed to the Tranſverſales and Obliqui Interni.

264. All theſe Nerves ſend numerous Ramifications through the Muſcles to the Integuments, which form the cutaneous Nerves of the Thorax, of the upper two Regions of the Abdomen, and of the ſuperior Portion of the Loins.

265. All the five Pairs of Lumbar Nerves ſend Filaments backward to the Vertebral Muſcles, communicate with each other, and with the great Sympatheticus on each Side, and are covered by the Pſoas Muſcle. *Nervi Lumbares.*

266. The Branches which communicate with the great Sympathetic Nerve are long, becauſe they advance forward a conſiderable Way on the Bodies of the Vertebræ Lumbares.

267. The

267. The Lumbar Nerves are denominated from the Vertebræ under which they pass.

First Pair of Lumbar Nerves.

268. The first Pair passes between the first and second Vertebræ of the Loins, and each receives a communicating Branch from the last Dorsal Pair, and gives out another to the second Lumbar Pair, or to a Branch thereof.

269. Each Trunk communicates with the great Sympatheticus, by a pretty long Ramus, and afterwards gives out three Branches, one posterior, and two anterior, whereof one is external and large, the other internal and small.

270. The posterior Branch perforates the Musculus Quadratus Lumborum, runs in between the back Parts of the oblique Muscles of the Abdomen, pierces the Obliquus Externus, and is distributed to the Skin all the Way to the Clunes. This Branch supplies also the Vertebral Muscles, and Sacro-Lumbaris.

271. The external anterior Branch perforates the upper Extremity of the Musculus Psoas obliquely outward, passes over the Quadratus Lumborum, and runs along the Crista of the Os Ilium, to the anterior Spine of that Bone.

272. It gives Filaments to the Abdominal Muscles, and supplies the Fascia Lata, neighbouring Integuments, and those of the anterior Part of the Outside of the Thigh, and the Inguinal Glands.

273. The internal anterior Branch perforates the Psoas almost at the same Place with the former, but a little more forward, and then passes over the Musculus Iliacus, to the Beginning of the Ligamentum Fallopii, where it unites with the other anterior Branch, and by this Union forms a Nerve, which runs along that Ligament, and along the Inside of the Aponeurosis of the Obliquus Externus, all the Way to the Opening, commonly called the Ring of that Muscle.

274. This Nerve goes out by that Opening, and afterwards divides into several cutaneous Filaments, which go to the Pubis and Integuments of the Parts of Generation in both Sexes, *&c.* It likewise supplies the Spermatic Ropes, and those Vascular Ropes falsely called the round Ligaments.

275. Besides these Branches, the Trunk of this first Pair, near its Union with the second, sends out two small Rami, closely united together, which run down behind the Psoas Muscle, over one tendinous Insertion of the small Muscle of the Diaphragm, in the third Vertebra of the Loins, and communicate with the great Sympathetic Nerve.

276. These two Rami accompany each other in this Manner, all the Way to the Ligamentum Fallopii; from whence one goes to the Testicles, in Company with the Spermatic Vessels; the other passes under the Ligament to the Skin and Glands of the Inguen.

277. At the Place of this Division, the Trunk sends a Branch directly downward, which joins the second Lumbar Pair, or rather a Branch thereof, and afterwards contributes to the Formation of the large Rope, termed Nervus Cruralis.

278. The

278. The Trunks of the second Pair of Lumbar Nerves go out between the second and third Vertebræ of the Loins, and having communicated with the first Pair, and with the great Sympathetic Nerve, each Trunk gives off several small Filaments to the neighbouring Parts of the Musculus Psoas, and a large Ramus backward to the Quadratus-Lumborum, Sacro-Lumbaris, Longissimus Dorsi, and neighbouring Vertebral Muscles, the Quadratus having first been perforated by it. *Second Pair of Lumbar Nerves.*

279. Afterwards the Trunk sends out a small Branch, which near its Origin joins a descending Ramus of the first Pair already mentioned. Being thus strengthened, it perforates the Head of the Psoas, runs along that whole Muscle to the Fissure of the Obliquus Externus, and is distributed to the Inguinal Glands, to the Fat and Scrotum in Males, and in Females to the Labia.

280. The same Trunk sends out two other Branches, which accompany each other, and likewise a small Ramus between the Origins of these two, which goes to the upper Part of the Psoas. These two Branches perforate the Psoas in different Places, and afterwards, continuing still near each other, they pass under the upper Part of the Ligamentum Fallopii, and so go out of the Abdomen.

281. As they go out they unite and form one Nerve, which is distributed by several Rami to the Inguinal Glands, the Aponeurosis Cruralis, and Integuments of the Forepart of the Thigh, all the Way to the Knee.

282. Some of these Rami unite with those of the Nervus Cruralis; some are distributed to the Integuments on the Inside of the Thigh; and one accompanies the Crural Artery, over one Branch of which it runs in Form of an Arch.

283. This Trunk sends out oftentimes another Ramus, which unites with one from the third, and one from the fourth Pairs, into a particular Rope, which passing to the Obturator Muscles, is named Nervus Obturator.

284. Afterwards this Trunk runs downward, and having given a Ramus to the middle Portion of the Psoas Muscle, joins the Trunk of the third Pair, and contributes to the Formation of the Crural Nerve.

285. The Trunks of the third Pair of Lumbar Nerves go out between the third and fourth Vertebræ of the Loins. Each Trunk communicates above with the second Pair before, with the great Sympathetic Nerve, and below joins the Trunk of the fourth Pair. It sends a considerable Ramus backward between the transverse Apophyses, which goes to the Vertebral and other neighbouring Muscles. *Third Pair of Lumbar Nerves.*

286. Before it unites with the fourth Pair, it sends a considerable Branch downward, and having received a communicating Branch from the second Pair, unites with one from the fourth Pair, and forms the Obturator Nerve.

287. It detaches likewise another large Branch, which runs down between the Musculus Iliacus and Psoas, and joins the Crural Rope on the Outside of the lower Part of the Muscle last named. It may be reckoned a Sort of Nervus Accessorius to the Cruralis.

288. As-

288. As the Trunk runs along the Pſoas, it gives off Filaments both to that and to the Iliac Muſcle, and ſends down a Ramus, which paſſes under the Ligamentum Fallopii to the Muſculus Pectineus; and laſtly, having joined a Branch of the ſecond Pair, it unites with the fourth Pair to form the Nervus Cruralis.

Fourth Pair of Lumbar Nerves.

289. THE Trunks of the fourth Pair of Lumbar Nerves go out between the fourth and fifth Vertebræ of the Loins, and each communicates above with the third Pair, and before with the great Sympathetic Nerve, oftentimes by two Filaments.

290. EACH Trunk ſends Rami backward to the Vertebral and neighbouring Muſcles, and afterwards compleats the Formation of the Nervus Cruralis, together with the other Portions of the Lumbar Nerves already mentioned.

291. FROM the ſame Place it ſends off a conſiderable Branch, which joining a Branch from the third Pair, and one from the ſecond, forms the Nervus Obturator.

292. LASTLY, the remaining Part of the Trunk joins the fifth Pair of Lumbar Nerves.

Nervus Obturator.

293. THE Obturator Nerve, formed in the Manner already deſcribed, runs along the inner lateral Part of the Pſoas Muſcle to the Pelvis, and goes out of the Abdomen at the upper Part of the Obturator Muſcles, and Foramen Ovale of the Os Innominatum.

294. As it goes out it ſupplies the Muſculi Obturatores and Pectineus, and is afterwards diſtributed by three principal Branches to all the Portions of the Triceps, and ſends other Rami between theſe Portions to the Gracilis Internus.

Fifth Pair of Lumbar Nerves.

295. THE fifth Pair of Lumbar Nerves paſſes between the laſt Vertebra of the Loins and Os Sacrum; each Trunk communicating above with the fourth Pair, and before with the great Sympathetic Nerve. It ſends Rami backward to the Vertebral and neighbouring Muſcles, and even to the Glutæi; and as it bends forward, it ſends a ſmall Ramus to the Crural Nerve.

296. AFTERWARDS the Trunk runs down on the Symphyſis of the Os Sacrum with the Os Ilium, enters the Pelvis, and having received a communicating Branch from the fourth Lumbar Pair, joins the Nervi Sacri, with which it forms a Plexus, that produces the Nervus Sciaticus, the largeſt Nerve of the human Body, which is diſtributed to the lower Extremity.

Nervi Sacri.

297. THE Nervi Sacri are thoſe that come from the Os Sacrum, the chief of which paſs through the anterior Holes of that Bone, the reſt through the lateral Notches at the Extremity of that Bone, and in the Os Coccygis.

298. THESE Nerves are reckoned likewiſe by Pairs, of which there are commonly ſix, four paſſing through the great anterior Holes, and two below them. This Number is increaſed when there are five Pairs of great Holes; and ſome Filaments paſs likewiſe through the poſterior Holes.

299. The firſt Pair is very large; all the reſt diminiſh gradually, and the laſt is very ſmall.

300. Those which paſs through the great Holes, unite together as ſoon as they enter the Pelvis, and together with the fifth Lumbar Pair, form the great Plexus for the Sciatic Nerve, already mentioned. They likewiſe ſend Rami backward through the Membranes of the poſterior Holes, to the neighbouring Integuments

301. The Trunks thus united and interwoven with each other, give off other ſmall Branches, beſides the great Sciatic Trunk; and it will be proper to deſcribe the moſt conſiderable of theſe Branches, together with the inferior Nervi Sacri, before we enter upon the Detail of the Ramifications of the great Sciaticus.

302. This Diſpoſition reſembles very much that of the laſt four Cervical Pairs and firſt Dorſalis, which are not only interwoven together, to form the Brachial Nerves; but likewiſe ſend off many Branches from their Origin.

303. From this Intertexture of the Nervi Sacri, eſpecially from the ſecond Pair, a Branch goes out to the Veſiculæ Seminales, Proſtate Gland, Uterus, Tubæ Fallopianæ, *&c.* Another Branch goes chiefly from the fourth Pair, partly to the Places juſt named, and partly to the Bladder and Inteſtinum Rectum.

304. The ſame Intertexture, and chiefly the third Pair united in ſome Subjects with the ſecond, and in others with the fourth, and ſometimes with both, produces a Branch which goes out of the Pelvis over the Ligamentum Fallopii, paſſes on the Inſide of the Tuberoſity, and inner Part of the Os Iſchium, and is diſtributed to the Corpus Cavernoſum, to the Muſcles thereof in both Sexes, to the neighbouring Parts of Generation, and to the Sphincters of the Anus.

305. The laſt two Pairs of Nervi Sacri are very ſmall. That which goes out immediately below the great Foramina, runs from behind forward, on each Side, between the Extremity of the Os Sacrum, and Ligament of the Os Coccygis; being diſtributed chiefly to the Muſcles of the Anus, and neighbouring Integuments.

306. The next or laſt Pair of Nervi Sacri runs down almoſt directly from the Extremity of the Canal of the Os Sacrum, and is likewiſe diſtributed to the Anus, Integuments, *&c.*

307. From the Extremity of the Plexus of all the Nervi Sacri, immediately before the Formation of the great Sciatic Rope, a Branch goes out to the Glutæus Medius and Minimus. Another goes out poſteriorly, which is diſtributed partly to the Muſcles of the Corpus Cavernoſum, *&c.* and partly to the Glutæus Maximus, and neighbouring Integuments, by ſeveral Filaments, which reach as far as the Ham.

308. The Crural Nerve, formed by the complicated Union of the Trunks of the firſt, ſecond, and third Pairs of Lumbar Nerves, and of a Portion of the fourth, ſometimes increaſed by a Branch of the fifth Pair, as has been already obſerved, paſſes under the Ligamentum Fallopii, and goes out of the *Nervus Cruralis.*

Abdomen, on the Outside of the Crural Artery, which lies between this Nerve, and the Crural Vein.

309. As it goes out, it is divided into several Branches, some of which are detached from its Union with the Ramus Accessorius of the third Pair, but the greatest Number goes out from the Trunk itself.

310. The Branches which go from its Union with the Nervus Accessorius, run down on the Foreside of the Thigh; and having reached the Middle of the Musculus Sartorius, they follow its Course, and are spent on the Integuments of the fore and inner Parts of the Knee.

311. The most anterior Branch passes on the Fascia Lata, or Aponeurosis Cruralis, forming cutaneous Nerves all the Way to the Knee.

312. The internal Branch runs along the Tendon of the Sartorius, in the same Manner, all the Way to its Insertion in the Tibia, where they are spent on the Integuments; and some of them go to the inner Ankle, and convex Part of the Foot.

313. Afterwards the Crural Rope divides into a great Number of Rami, which in their Course downward are distributed to the anterior Muscles, *viz.* to the Rectus, Vasti, and Cruralis; giving Rami in their Passage, to the Triceps, Sartorius, Gracilis Internus, and Semi-Tendinosus.

314. It likewise gives off a Branch, which runs down anteriorly between the Sartorius and Triceps, in the same Course with the Crural Vessels, as far as the Middle of the Thigh.

315. Afterwards it runs near the Integuments, behind the Sartorius, to which it gives several Filaments; and continues this Course all the Way to the Insertion of that Muscle.

316. Having reached the Tibia, it lies near the Vena Saphena, and follows the same Course with it, as far as the inner Ankle, where it detaches a great Number of cutaneous Filaments.

317. Lastly, it ends by Ramifications, on the inner and upper Part of the Foot; where one of the most anterior Ramifications adheres very closely to the Saphena.

Nervus Sciaticus.

318. The great Sciatic Nerve being formed, as has been already said; or as it sometimes happens, from the last two Pairs of the Lumbares, and first three Pairs of the Sacri, runs obliquely backward, under the great Sinus of the Os Ilium, and under the Musculus Pyriformis.

319. It goes this Way, out of the Pelvis, passing between the Pyriformis, and superior Gemellus; and then running on the Foreside of the first of these Muscles, and presently afterwards behind the two Gemelli and Quadratus Femoris, it gives Filaments to each of them.

320. It runs down in the next Place, between the Tuberculum Ischii, and the great Trochanter, along the inner and posterior Part of the Thigh, between the Musculus Biceps and Semi-Nervosus, as far as the Hollow of the Poples, a little nearer to the internal Condyle than to the external; giving Rami in its Passage to all these Muscles, and to the Triceps, and diminishing gradually in Size as it descends.

321. As

321. As it goes out of the Pelvis, it gives out a Branch, which paſſes between the Portions of the Ligamentum Sciaticum, to the Anus, Perinæum, Parts of Generation, *&c.* and this Branch joins a Ramus from the third Pair of the Nervi Sacri, which goes to the ſame Parts, as has been obſerved.

322. As it paſſes between the Tuberoſity of the Iſchium and the great Trochanter, it produces two Rami, one of which is ſpent on the Glutæus Maximus, the other divides into two, for the other two Glutæi.

323. BELOW the great Trochanter, where it may be termed Nervus Sciatico-Cruralis, it ſends back a Ramus, which runs down with the Sciatic Vein, and is diſtributed to the Integuments as low as the Middle of the Calf of the Leg; and ſometimes lower toward the outer Ankle.

324. THE Sciatic Nerve having reached the Ham, is commonly called Nervus Popliteus, and begins to be divided into two Branches, which run at firſt very cloſe to each other between the Extremities of the Biceps and Semi-Nervoſus; and afterwards ſeparate gradually, paſſing behind the Condyles of the Os Femoris, between the ſuperior Extremities of the Gaſtrocnemii.

325. THE innermoſt of theſe two Branches is very large, the outermoſt not ſo large. They are diſtributed to the whole Leg, and through this Courſe, they may be termed Nervi Sciatico-Tibiales.

326. THE large Branch of the Sciatico-Cruralis or Cruralis Internus, which may likewiſe be termed Popliteus Internus, runs down behind the Muſculus Popliteus, on one Side of the Tibialis Gracilis, commonly called Plantaris, and between the two Gaſtrocnemii.

327. AFTERWARDS it pierces the upper Extremity of the Soleus, and runs down between this Muſcle and the great Flexors of the Toes, to the lower Extremity of the Tibia, near the inner Ankle.

328. IN its Paſſage it ſends ſmall Rami to the Joint of the Knee, to the Gaſtrocnemius Internus, to the other Muſcles laſt mentioned, and to the Integuments, all the Way down.

329. BESIDES theſe ſmall Rami, it ſends off another more conſiderable Branch towards its upper Part, from which, one Filament goes to the Tibialis Poſticus, another perforates the Interoſſeous Ligament, and is diſtributed to the upper Part of the Tibialis Anticus.

330. SOON after this, it detaches externally a long Ramus, which runs down on the Backſide of the Leg, between the Integuments and external Gaſtrocnemius, on one Side of the Vena Sciatica or Saphena Externa.

331. THIS long Ramus joins a Branch of the Sciaticus Externus Minor, ſends off Filaments toward each Side, through its whole Courſe, and having ſupplied the Tendo Achillis, paſſes behind and under the outer Ankle.

332. THIS Ramus paſſes afterwards on the Outſide of the Foot, where it is diſtributed to the Integuments, and neighbouring Muſcles, and terminates on both Sides of the Little Toe, and on the Outſide of the Toe next to that.

333. THE large Sciatic Branch or Sciatico-Tibialis, having given off theſe different Ramifications, paſſes behind the inner Ankle, through a particular annular Ligament, and runs downward to the great lateral Sinus of the

Os Calcis, paſſing firſt between that Bone and the Muſculus Thenar, and then between it and the poſterior Inſertion of the Flexor Digitorum Brevis.

334. At this Place, having firſt ſent ſmall Filaments to the neighbouring Parts, it divides into two Rami, named Nervi Plantares, one internal and large, the other external.

335. The Nervus Plantaris Internus is diſtributed to the Foot, much in the ſame Manner as the Radial Nerve to the Hand. It runs firſt along the Inſide of the Sole of the Foot, and ſends Filaments to the Thenar, Flexor Digitorum Brevis, and to the Muſculus Lumbricalium Acceſſorius.

336. Afterwards it ſends four Branches to the lateral concave or lower Parts of the firſt three Toes, and to the neareſt lateral Part of the fourth Toe. The firſt Ramus goes to the Inſide of the Great Toe. The ſecond divides into two, for the correſponding Sides of the Great Toe and the ſecond. The third being bifurcated in the ſame Manner, goes to the ſecond and third Toes; and the fourth to the third and fourth Toes.

337. These Nerves communicate on each Side at the Extremities of the Toes, and in their Paſſage give Filaments to the Muſculi Lumbricales, Interoſſei, and neighbouring Ligaments and Integuments.

338. The external Plantaris paſſes between the Muſculus Lumbricalium Acceſſorius, and the Flexor Digitorum Brevis, giving Filaments to theſe Muſcles, to the Interoſſei, and to the Hypothenar Minimi Digiti; and afterwards it divides into two Branches.

339. The firſt Branch runs in the Interſtice between the laſt two Toes, and being divided, goes to the correſponding lateral Parts of both. The other Branch goes to the inferior external lateral Part of the Little Toe.

340. During this Courſe, the external Nervus Plantaris ſupplies the Aponeuroſis Plantaris, and the Ligaments and Integuments in the ſame Manner as the reſt.

341. The ſmall Sciatic Ramus or Sciaticus Externus, called likewiſe Sciatico-Peronæus, runs outward over the Head of the Fibula; and is divided into ſeveral Rami, among which there are three or four conſiderable, one poſterior, one ſuperior and anterior, one internal and anterior, and one external and anterior.

342. The poſterior Ramus runs down between the Integuments and the Fibula, as low as the outer Ankle, and terminates in the Outſide of the Foot; having detached ſeveral cutaneous Filaments in its Paſſage.

343. About the Middle of the Fibula, it ſends out a ſmall Ramus, which joins another Ramus from the large or Tibial Ramus of the Sciatic Nerve, and is diſtributed together with it in the Manner already ſaid.

344. The poſterior Ramus of the ſmall Sciatic Branch, having reached the outer Ankle, runs up a little Way on the Foot, towards the Root of the fourth Toe, where it divides into two ſmaller Rami.

345. One of theſe Rami divides into two others, for the correſponding lateral Parts of the third and fourth Toes; the other goes to the external lateral Part of the fourth Toe, where it joins a Ramus of the external Nervus Plantaris, which is diſtributed to the laſt two Toes.

346. After

346. After having ſent off the poſterior Ramus, the ſmall Sciatic Branch runs outward over the Head of the Fibula, and having given ſome Filaments to the Gaſtrocnemii and Soleus, it runs acroſs the upper Extremity of the Peronæus Poſticus from behind forward.

347. Afterwards it paſſes between the Bone and the Muſcle laſt named, and ſends ſeveral Filaments forward to the neighbouring Parts, and then produces the three or four Rami already mentioned, which are diſtributed in the following Manner.

348. The ſuperior and anterior Ramus runs a little tranſverſely between the Head of the Fibula and the upper Extremity of the Extenſor Digitorum Longus, and having given Filaments to this Muſcle, and to the Extenſor Pollicis Longus, it is diſtributed to the upper Extremity of the Tibialis Anticus, giving Filaments to the neighbouring Integuments.

349. The inner anterior Ramus runs down on the Foreſide of the Interoſſeous Ligament, between the Extenſor Pollicis Longus and Tibialis Anticus, giving Filaments to each of theſe Muſcles.

350. It paſſes afterwards under the annular Ligament of the Extenſor Muſcles, behind the Extenſor Pollicis to the upper Part of the Foot, under the Extenſor Digitorum Brevis. In its Paſſage it gives Filaments to that Muſcle, and to the firſt ſuperior Interoſſei.

351. Having communicated by a Filament with the external anterior Ramus, it is ſpent on the correſponding lateral Parts of the firſt two Toes.

352. The external anterior Ramus of the ſmall Sciatic Branch runs down betwixt the Fibula and the Peronæus Longus, and then between the Peronæus Medius and Extenſor Digitorum Longus; to which, and to the neighbouring Ligament, it gives Filaments all the Way to the upper Side of the Foot.

353. In this Courſe, having run along above two third Parts of the Leg, and having reached the great annular Ligament, it runs forward and toward the Integuments, being there divided into two Portions, one of which goes to the Great Toe, the other to the laſt Toes.

354. The firſt Portion of this Ramus gives a Nerve to the internal lateral Part of the Great Toe, and is afterwards diſtributed to the neighbouring Integuments on the convex Side of the Foot, and laſtly to the correſponding lateral Parts of the Great and Second Toes.

355. The other Portion, which goes to the laſt Toes, is firſt of all joined to a Filament of the firſt Portion, and afterwards to another from the internal anterior Ramus.

356. After this Union, they are preſently divided, and diſtributed to the laſt two Toes, and to the Integuments. One Filament ariſing from this Union, joins a Ramus belonging to the great Sciatic Branch.

357. It is the common Opinion, that each of the great Sympathetic Nerves begins by a Filament from the ſixth Pair belonging to the Medulla Oblongata, and by two Filaments from the fifth Pair; and that theſe Filaments do at firſt compoſe a very ſmall Nerve which runs backward, to go out

Nervi Sympathetici. Maximi, vulgò Intercoſtales.

out of the Cranium through the bony Canal of the Apophyſis Petroſa, and increaſes gradually in its Courſe downward.

358. But having examined attentively the pretended Origin of theſe Filaments, they ſeem to me rather to aſcend from the Baſis of the Cranium with the internal Carotid, and to run from behind forward to join the fifth and ſixth Pairs; and I find the Angle formed by this Union to be turned forward, and withal ſo very acute, that theſe Nerves cannot be looked upon as Recurrents.

359. And as I have ever ſince that Time, that is, for twenty Years paſt, found this Angle diſpoſed the ſame Way in all the Subjects that I have diſſected, I have always been of Opinion, that what had been taken for the original Root and deſcending Stem of the Nerve called Intercoſtalis, was really an aſcending Branch thereof, which, as it enters the Cranium, is divided into Filaments, by which it becomes cloſely united with the two Pairs already named.

360. The Obſervation communicated to the Royal Academy by M. *Petit*, Doctor of Phyſic, concerning the different Size of the Portions of the ſixth Pair, appears to be indiſputable, he having found this Nerve larger on the Forepart, between the Filament of the ſuppoſed Intercoſtal and the Orbit, than on the Backpart, between the ſame Filament and the Origin of the ſixth Pair; and his Experiments concerning the real Co-operation of this Nerve in Viſion, are ſtill a farther Confirmation of his Obſervation.

361. These Nerves, as I have ſaid, are commonly called Intercoſtales, though this Name does not agree either with their Situation, or with the Extent of their Courſe, as we ſhall preſently ſee; and therefore I believe the Name of Sympathetici Majores, or Maximi, will be more proper, becauſe of their frequent Communications with almoſt all the other principal Nerves of the Body.

362. The Situation of theſe two Nerves in general is on the lateral Parts of the whole twenty-four Vertebræ, immediately before the Roots of the tranſverſe Apophyſes, and likewiſe on the lateral Parts of the Inſide of the Os Sacrum.

363. Through this large Extent they appear like two Ropes divided, and in a Manner interſected at different Diſtances by a great Number of Gangliform Tubercles, by Means of which they communicate backward with the Ganglions of the Medulla Spinalis, by ſhort collateral Filaments, and produce forward all their particular Ramifications.

364. These Ganglions differ more or leſs from each other in Size, Colour and Conſiſtence, and may be looked upon as ſo many Origins or Germina diſperſed through this great Pair of Nerves, and conſequently as ſo many little Brains. I ſhall ſpeak to them more particularly in the Deſcription of the Head; and it will be ſufficient in this Place to purſue their Diſtributions, and the Courſe of their Ramifications.

365. For this Purpoſe we need only conſider theſe Ganglions in the ſame Manner that we did the Vertebral Nerves, as divided into Cervicalia, Dorſalia, Lumbaria, and Sacra, without pretending to determine the Number contained in each Claſs.

366. The

366. The firſt Cervical Ganglion is the moſt conſiderable in Size, but not in Conſiſtence, repreſenting a ſoft oblong Tumor of the Figure of an Olive, and ſituated longitudinally before the Root of the tranſverſe Apophyſes of the firſt three Vertebræ, immediately behind the Pharynx.

367. It produces from its ſuperior Extremity a ſmall ſoft Nerve, which runs up with the internal Carotid Artery of the ſame Side, into the bony Canal of the Apophyſis Petroſa.

368. At its Entry into this Canal, it is divided into ſeveral Plexiform Filaments, which at that Place ſurround the Carotid Artery, and accompany all the Incurvations thereof, till it enters the Cranium. They adhere very cloſely to the Artery, and both they and their Trunks are very tender, having oftentimes neither the Colour nor Conſiſtence of nervous Filaments; for they are reddiſh, and ſometimes in a Manner mucilaginous. We muſt not miſtake for theſe Plexiform Filaments, ſome lacerated Portions of the Dura Mater, which line this bony Canal.

369. Among theſe Filaments there are two or three principal ones, which appear to be only a ſimple Diviſion of the Trunk, and which, as they enter the Cranium, unite again into a ſmall Trunk, more ſolid than the former. The ſmall ſuperior Trunk is immediately afterwards divided into Filaments, one of which is united to the Nerve of the ſixth Pair, the reſt join the fifth Pair, as has been already ſaid. The Filament which goes to the ſixth Pair, is commonly ſingle, but I have ſometimes found it double, or divided all the Way to the Union.

370. Immediately below the inferior Orifice of the bony Canal of the Apophyſis Petroſa, and from thence all the Way down to the Occipital Condyle on the ſame Side, or to the Top of the firſt Ganglion, the ſmall aſcending Trunk is a little ſtronger, and not altogether ſo ſoft as it is in the Canal.

371. The firſt Cervical Ganglion is of a middle Conſiſtence, and adheres very cloſely to the Trunk of the eighth Pair, or Nervus Sympatheticus Medius, by numerous ſmall communicating Filaments.

372. It likewiſe communicates on both Sides, by ſhort Branches, with the ninth and tenth Pairs of Nerves of the Medulla Oblongata; with the firſt, ſecond, and ſometimes the third Cervical Pairs; and alſo with that Branch which the eighth Pair ſends to the Pharynx.

373. In its Paſſage, it gives Filaments to the Pharynx, to the ſmall neighbouring Muſcles, and to the Carotid Artery, from which it receives very fine Capillary Veſſels, which are plainly viſible in Inflammations, and ſeem to form a curious Network, with the nervous Filaments.

374. Lastly, it ſends downward a very long nervous Filament, which runs in the Thorax, and joins other Filaments, of which hereafter.

375. This Ganglion terminates below, in a ſmall Rope or Trunk, which runs down on the anterior Vertebral Muſcles of the Neck, in the ſame Courſe with the eighth Pair, and the Carotid Artery of the ſame Side; to both which it is connected by membranous Expanſions, as by a Kind of Vagina, all the Way to the laſt Vertebra of the Neck.

376. In this Courſe, the deſcending Trunk communicates on the outer or Backſide with the third, fourth, fifth, and often with the ſixth Cervical Pairs, by ſhort Branches, more or leſs oblique, by which it ſeems to be gradually increaſed in Size.

377. At the Places of theſe Communications, we obſerve ſmall Ganglions in this Trunk, which however, in ſome Subjects, are ſcarcely perceptible; and it is very difficult to determine, by which Extremity theſe Branches ariſe, and by which they are inſerted.

378. On the inner or Foreſide, this Trunk gives off two or three Filaments, which run obliquely downward, toward the Aſpera Arteria, into the Thorax. Another Filament goes off, below the firſt Cervical Ganglion, which paſſes on the Foreſide of the Carotid Artery, and joins a Filament of the eighth Pair, with which it forms a ſmall diſtinct Rope.

379. This ſmall Rope runs before the Subclavian Vein, and lower down joins another Filament, which ariſes behind the Subclavian Artery, and runs down in the Manner hereafter to be explained, ſending off Filaments in its Paſſage to the Œſophagus, and neighbouring Parts.

380. The Trunk having reached as far as the laſt Vertebra of the Neck, forms a ſmall Ganglion, called Ganglion Cervicale Infimum, which is pretty ſolid, and ſometimes double.

381. Presently afterwards, the Trunk turns from within outward, towards the Root of the firſt Rib, behind the Subclavian Artery, where it forms a pretty large Ganglion, which is the firſt of the Thoracica or Dorſalia.

382. These two laſt mentioned Ganglions are very near each other, being ſeparated only by a very ſhort Portion of the Trunk, which is ſometimes double, and forms a Kind of ſmall Plexus, behind the Subclavian Artery.

383. From the Forepart of the loweſt Cervical Ganglion, a ſmall nervous Rope goes out, which runs before the Subclavian Artery, bends immediately downward, and ends in the Top of the firſt Dorſal Ganglion, forming by this Courſe a Sort of nervous Arch, which incloſes the Subclavian Artery.

384. These two Ganglions communicate, by ſhort Branches more or leſs oblique, with the neighbouring Vertebral Nerves, that is, with the ſixth and ſeventh Cervical Pairs; and ſometimes with the fourth, by a long deſcending Filament. The firſt Dorſal Ganglion communicates likewiſe with the firſt Dorſal Pair of Nerves.

385. The loweſt Cervical, and ſometimes the firſt Dorſal Ganglion, ſends down a communicating Filament to the Recurrent Nerve of the eighth Pair; and from this Union a Filament is detached, which paſſes behind the common Trunk of the Axillary and Carotid Arteries, joins another Filament from the eighth Pair, and contributes to the Formation of the Plexus Pulmonaris.

386. From the ſmall Plexiform Portion of the Trunk which joins the laſt Cervical and firſt Dorſal Ganglions, behind the Subclavian Artery, a particular Filament goes out, which unites with the ſmall Trunk, common to the great Sympatheticus, and to the eighth Pair, and runs down before the Subclavian Artery, and together with this Filament compoſes the Plexus Cardiacus.

387. On the right Side, this Filament runs down to the right Ventricle of the Heart, and then between the Aorta and Arteria Pulmonaris, where it com-

communicates with ſome Filaments from the left Recurrent of the eighth Pair.

388. On the left Side, a Filament goes out from the laſt Cervical, and another from the firſt Dorſal or Thoracic Ganglion, which unite together to form a Kind of Arch, in which, however, nothing is contained.

389. From this Arch a Nerve goes out, which runs down between the Curvature of the Aorta, and the left Branch of the Pulmonary Artery, where it communicates with a Filament of the eighth Pair, and forms a Gangliform Plexus, with the like communicating and united Filaments from the right Side.

390. From this Gangliform Plexus, which may be looked upon as the Origin of the Plexus Cardiacus Superior, a great Number of Filaments run down, over the Trunks of the great Blood-Veſſels, and over the Auricles and Ventricles of the Heart.

391. The chief of theſe Filaments run in the cellular Subſtance behind the Aorta, or between that and the Trunk of the Pulmonary Artery, where they are divided into a great many ſmall Nerves, which run before and behind the Aorta, to the Baſis and Auricles of the Heart.

392. The Filaments that run down from the Trunk itſelf, between the firſt and laſt Cervical Ganglions, are united and interwoven in the Thorax, with the Filaments common to the laſt Cervical and firſt Dorſal Ganglions, and thus contribute to the Formation of the Plexus Cardiacus, and ſome Part of the Plexus Pulmonaris.

393. The long Filament of the firſt Cervical Ganglion contributes likewiſe to theſe Plexus. It runs along the Inſide of the Trunk, and then unites with the Filaments of the laſt Cervical Ganglion, the firſt Dorſal Ganglion, and the great Recurrent Nerve.

394. From all theſe Conjunctions a particular Nerve is formed in ſome Subjects, which meets a like Rope from the other Side behind the Aorta; and forms, together with that, a Kind of ſubordinate Trunk, about a Finger's Breadth in Length, which ſends out on all Sides ſeveral Filaments that are diſtributed to the neighbouring Parts.

395. From the firſt Dorſal Ganglion, the Trunk runs down on the Foreſide of the Heads and Necks of all the Ribs, over the Articular Ligaments by which they are tied to the Vertebræ. On the laſt falſe Rib, it bends a little toward the Bodies of the Vertebræ.

396. In this Courſe, the Trunk forms a ſmall Ganglion, between each Rib, and communicates backward by two ſhort Filaments, more or leſs oblique, with the correſponding Dorſal or Coſtal Nerves.

397. Of theſe two communicating Filaments, one is more oblique and often ſmaller than the other; one runs backward, towards the neareſt Ganglion of the Coſtal Nerve, the other runs forward on the Head of the Rib, to the Trunk of the great Sympathetic Nerve; and for this Reaſon, one of theſe Filaments appears to be more anterior and longer than the others.

398. Having reached about half Way between its Entry into the Thorax and the laſt Vertebra of the Back, this Trunk ſends commonly five

Branches obliquely downward on the lateral and a little toward the anterior Part of the Bodies of the Vertebræ.

399. The first four Branches come commonly from the fifth, sixth, seventh and eighth Thoracic Ganglions, and the fifth arises from several of the following Ganglions. The first is the longest, and the last the thickest.

400. All these Branches approach each other gradually in their Descent as far as the last Vertebra of the Back, where they unite into one large short collateral Rope, which pierces the upper lateral Part of the lower Muscle of the Diaphragm, sending some Filaments to the upper Side.

401. Having got below the Diaphragm, and given off some Filaments to the lower Side of that Muscle, this great Trunk produces behind the Glandula Renalis, a Kind of irregular Ganglion of a curve oblong Figure, called Ganglion sive Plexus Semilunaris.

402. The convex Side of this Semilunar Plexus or Ganglion is turned obliquely backward and downward, the concave Side forward and upward, one of its Cornua being turned upward, the other forward; so that the inferior Cornua of the two Ganglions on each Side, are turned toward each other.

403. These Ganglions on each Side communicate together, behind the Stomach, on the Cæliac Artery, and likewise with the eighth Pair or Nervus Sympatheticus Medius, chiefly by means of the Nervus Stomachicus Posterior, belonging to that Pair.

404. From the reciprocal Communication of these two Semilunar Ganglions, a Kind of middle Plexus is formed, which partly surrounds the Cæliac Artery, and is partly spent on the Mesocolon.

405. The Semilunar Ganglion on the right Side, together with a large Portion of the Plexus Cæliacus, and some Filaments of the Plexus Stomachicus, forms a particular Intertexture, called Plexus Hepaticus.

406. This Hepatic Plexus having communicated with some Filaments of the Diaphragmatic Nerve, produces several Filaments which surround the Hepatic Artery and Vena Portæ in Form of a reticular Vagina, and accompany the Branches of these Vessels through the whole Substance of the Liver. The Hepatic Plexus supplies likewise the Vesicula Fellis, Ductus Bilarii, Duodenum, Pancreas, and Glandulæ Renales.

407. The left Semilunar Ganglion, formed by the anterior or collateral Trunk of the left Side, produces several Rami, which form the Plexus Splenicus, nearly in the same Manner as has been already mentioned.

408. This Plexus Splenicus, having communicated with the Hepaticus, and by the Intervention of the Plexus Stomachicus, with the eighth Pair, surrounds the Splenic Artery, supplies the Pancreas, and is distributed to the Spleen.

409. This left Ganglion is sometimes accompanied by another, which gives Filaments to the Spleen.

410. Each Semilunar Ganglion sends Rami from its convex Side, which being joined to the Filaments of the first Lumbar Ganglions, form an Intertexture called Plexus Renalis, which surrounds the Renal Artery, is distributed

to the Kidneys, and Glandulæ Renales, and ſends out a Filament, which accompanies the Spermatic Veſſels.

411. THIS Renal Plexus concurs likewiſe with the Semilunar Ganglion, in the Formation of the great Meſenteric Plexus, and communicates by ſeveral Filaments with the Plexus Coronarius Stomachicus.

412. THE right Renal Plexus communicates particularly with the Plexus Hepaticus; and the left, with the Splenicus; and each of them, by two Filaments, with the true Trunk, on the Side of the firſt two Vertebræ of the Loins. This Portion of the principal Trunk is commonly called the inferior Rope of the Intercoſtal Nerve.

413. THE right and left Semilunar Ganglions ſend nervous Faſciculi to each other, which by a particular Intertexture form a Kind of flat Ganglion or Plexus, immediately under the Diaphragm, before the Articulation of the laſt Vertebra of the Back with the firſt of the Loins.

414. FROM this Plexiform Union, called commonly Plexus Solaris, ſeveral Filaments are detached in a radiated Manner to the Meſocolon and Meſentery; and ſome of them go likewiſe to the Diaphragm.

415. A GREAT Number of other Filaments go likewiſe from it, which with the Ramifications thereof form a Kind of nervous Capſula or Vagina, round the ſuperior Meſenteric Artery, and round all its Ramifications on the Inteſtines, and ſupply the Meſenteric Glands. This is termed Plexus Meſentericus Superior, which comes chiefly from the Filaments of the Plexus Hepaticus and Renalis, and of the right Semilunar Ganglion.

416. THE ſuperior Meſenteric Plexus ſends down from its Origin, along the Aorta, and behind the deſcending Portion of the Meſocolon, between the ſuperior and inferior Meſenteric Arteries, ſeveral Filaments or nervous Faſciculi differently interwoven, from which a nervous Vagina is likewiſe formed, that ſurrounds the inferior Meſenteric Artery, and its Ramifications on the Inteſtines. This has been named Plexus Meſentericus Inferior.

417. THE deſcending nervous Faſciculi, between the two Meſenteric Arteries, which may be named Meſenterici Poſteriores, receive ſome communicating Filaments from both Plexus Renales, and likewiſe communicate with the Trunk of the great Sympathetic Nerve, by Filaments which run down obliquely from the Lumbar Ganglions. Afterwards they detach a Filament on each Side, which accompanies the Spermatic Veſſels.

418. THE Faſciculi Meſenterici Poſteriores having produced the Plexus Meſentericus Inferior, ſend other Filaments downward, over the Extremities of the Aorta, behind the inferior Curvature of the Colon.

419. THESE inferior Faſciculi or Filaments adhere ſtrongly to the neighbouring Parts of the Peritonæum, and together with other Filaments from both Sides of the Trunk, form a third Plexus, which may be called Infra-Meſentericus, or Hypogaſtricus.

420. THIS Hypogaſtric Plexus, at the Extremity of the laſt Curvature of the Colon, on the Foreſide of the laſt Vertebra of the Loins, is divided into two flat Ganglions which ſurround the Beginning of the Inteſtinum Rectum backward, to which they are afterwards diſtributed, and alſo to the Bladder and

to the Spermatic Veſſels; and having communicated by lateral Filaments with each Trunk of the great Sympathetic Nerve, they ſend Filaments to all the Parts contained in the Pelvis.

421. The Trunk of the great Sympathetic Nerve having detached the five Rami which form the collateral Rope, becomes much ſmaller, and having reached the eleventh Vertebra of the Back, it approaches the collateral Trunk, and perforates the inferior Muſcle of the Diaphragm.

422. Afterwards it runs more forward on the Bodies of the Vertebræ, and increaſes by the Addition of Filaments from the laſt two Dorſal Pairs of Nerves.

423. It runs down between the Pſoas and neighbouring Tendons of the ſmall Muſcle of the Diaphragm, on the lateral Parts of the Vertebræ Lumbares and anterior Side of the Os Sacrum.

424. At this Place the right and left Sympathetic Trunks approach each other, and at the Extremity of the Os Sacrum, they form a Communication in the Manner of an inverted Arch.

425. In its Paſſage, each Trunk receives commonly two Filaments from each Ganglion of the Nervi Lumbares and Sacri, and likewiſe forms ſmall Ganglions between each Vertebra, which ſend ſome Filaments to the neighbouring Parts, and others which communicate with the Faſciculi of the Plexus Meſenterici.

426. The Pairs of Filaments which come from the two or three firſt Lumbar Ganglions, run a little downward, but the following run gradually upward; and it ought to be obſerved that capillary Blood-Veſſels are diſcernible between and upon the Filaments of each Pair.

427. The inverted Arch, or inferior Union of the two Trunks, gives off, together with the two loweſt Nervi Sacri, ſeveral Filaments to the Rectum, Anus and Muſcles of the Coccyx.

428. Lastly, the great Sympathetic Nerve, from the firſt Vertebra of the Neck to the Extremity of the Os Sacrum, communicates by Filaments with all the Vertebral Nerves, as has been already ſaid; but it muſt be obſerved, that in the Thorax, theſe communicating Filaments are very ſmall and ſlender, where the Sympathetic Trunk is largeſt; and that below the Diaphragm, they are ſtronger, becauſe there the Trunk diminiſhes, eſpecially on the Os Sacrum, where it is very ſmall. The ſame Thing is to be obſerved concerning the Ganglions of the Trunk, the firſt Cervical Ganglion only excepted.

SECT.

SECT. VII.

A Compendious View of the Parts of the Human Body, and a Deſcription of the common Integuments.

ART. I.

A View of the Parts of the Human Body.

Introduction.

1. THE Human Body is compoſed of firm and liquid Parts, commonly called Solids and Fluids. Of the ſolid Parts, ſome are hard, others ſoft and flexible.

2. THE ſolid Parts are the chief Subject of Anatomy, properly ſo called; by which Term, borrowed from the *Greek*, we underſtand not only an artful Decompoſition of the Parts of the Body, but alſo a methodical Demonſtration and Deſcription of the Parts when taken to Pieces.

3. THE Hiſtory of the Fluid Parts comes into a Syſtem of Anatomy, only occaſionally, and by the bye; becauſe it properly belongs to what is called Phyſiology or the Animal Œconomy.

4. ANATOMISTS ordinarily reduce all the ſolid Parts under certain general Claſſes, expreſſed by the common or generical Names of Bone, Cartilage, Ligament, Fibre, Membrane, Veſſel, Artery, Vein, Nerve, Muſcle, Gland, Fat, Viſcus, Organ, *&c.*

5. THE Ancients who ſettled a general Diviſion of the Parts of the Human Body, from the meer outward Appearance of their Structure, called ſome Similar or Simple, and the reſt Organical or Compound; but I look on theſe Terms only as ſo many Anatomical Words, which expreſs ſeveral Parts that have nearly the ſame Structure to outward Appearance: and as they are often mentioned, I ſhall here give an Explication of thoſe which are in moſt frequent Uſe.

Explication of the general Terms of Anatomy.

6. BY Bones, we mean in general the hardeſt, moſt ſolid, and moſt inflexible Parts of the Human Body, the particular Hiſtory of which is contained in the Deſcription which I have given of the dry and freſh Bones.

7. A CARTILAGE is a whitiſh or pearl-coloured Subſtance, ſofter than a Bone, but harder than any other Part, ſmooth, poliſhed, pliable and elaſtic. I explained the Cartilages in the Deſcription of the freſh Bones.

8. A LIGAMENT is a white, fibrous, compact Subſtance, more pliable than a Cartilage, difficult to be broken or to be torn, and yielding but a very little when drawn out with Force. The Ligaments have been explained at full Length in the ſecond Section.

9. THE Name of Fibre is given to ſmall Filaments which appear to be the moſt ſimple Parts of the Body, and which, by their different Diſpoſition and Connections, compoſe all the other Parts. The Fibres themſelves

differ in Subſtance, being either membranous, fleſhy, tendinous or bony; in Direction, being either ſtraight, oblique, longitudinal, tranſverſe, circular or ſpiral; and in Size, being either large, ſmall, long or ſhort.

10. By Membrane we underſtand a pliable-Texture of Fibres diſpoſed or interwoven together in the ſame Plane. They differ in Thickneſs according to the Smallneſs of their Fibres and Number of their Planes. Theſe particular Planes are termed Laminæ, and diſtinguiſhed into external, internal, middle, *&c.*

11. The Difference of Membranes in general depends on that of the Fibres, of which they are compoſed. Small Portions of Membranes, eſpecially when they are very thin, are called Pelliculæ; and ſome membranous Laminæ are united together by the Intervention of a particular Subſtance, compoſed of this Sort of Pellicles, and called the cellular or ſpungy Subſtance.

12. Vessels are Tubes, Ducts or Canals, more or leſs flexible, compoſed of different Membranes, the Strata of which are generally termed Tunicæ or Coats. Some of them are divided into Branches, and theſe again into Rami and Ramifications, which gradually diminiſh, but ſtill remain hollow.

13. The general Deſign of the Veſſels is to contain Fluids, from the Diverſity of which they are diſtinguiſhed into Blood-Veſſels, Vaſa Lactea, Lymphatica, *&c.* The laſt and ſmalleſt Extremities of all Sorts of Veſſels are generally termed Capillaries.

14. The Blood-Veſſels are of two Kinds, one of which receives the Blood from the Heart, and diſtributes it to all the Parts of the Body, which are named Arteries; the other brings the Blood from all the Parts, back to the Heart, which are called Veins, and ſome of theſe have the Name of Sinuſes.

15. The Arteries are thicker than the Veins, and may be diſtinguiſhed by this Mark in dead Bodies; and in living Bodies they are known by a certain beating called the Pulſe. The Veins lie nearer the Surface of the Body than the Arteries, and are furniſhed with Valves, that is, with ſmall membranous Sacculi, fixed at different Diſtances to the Sides of their Cavities. The Openings of theſe Valves are broad, and turned toward that Side where the Vein is largeſt, but their Bottoms are turned the contrary Way, to that Side where the Veins are of the ſmalleſt Diameter. In ſome Places theſe Valves are ſingle, in others double, triple, *&c.*

16. By Nerves, Anatomiſts mean the white Ropes which proceed from the Cerebrum, Cerebellum and Spinal Marrow, and are ſpread over all the Parts of the Body by Filaments and Ramifications.

17. Each nervous Rope may be looked upon as a membranous Veſſel, the Cavity of which is filled by a great Number of membranous longitudinal Septa, and by Medullary Filaments which lie betwixt the Septa.

18. Muscles are Bundles of Fibres, called by Anatomiſts Fibræ Motrices, of a reddiſh Colour, and of different Lengths.

19. The middle Portion of the moving Fibres is the principal, and differs from the Extremities in being red, thick, ſoft, and capable of Contraction, whereas

whereas the Extremities are white, ſmall, compact, and incapable of yielding.

20. This middle Portion of each moving Fibre is ſaid to be fleſhy, and they form what is commonly called Fleſh. The Extremities are called Tendinous, and the Subſtance formed by them, Tendons.

21. Glands are Cluſters or Moleculæ, diſtinguiſhable from all the other Parts of the Body, by their Form, Conſiſtence, Texture and Connexion.

22. They are in general made up of Arteries, Veins, Nerves, and other particular Veſſels, and of a Subſtance which unites all theſe together, in their different Folds, Contortions, and Intertextures, all inveſted by a membranous Covering.

23. The Office of Glands is to ſeparate from the Maſs of Blood, by means of certain Secretory Veſſels, Fluids, which they diſcharge either immediately or by other Veſſels termed Excretory; and theſe Fluids are either accumulated in particular Reſervoirs, collected in the common Cavities, or forced out of the Body.

24. Fat and Marrow are equivocal Terms. By the firſt, we generally underſtand an oily, ſoft, white or yellowiſh Subſtance, of different Conſiſtences, collected between the Skin and the Muſcles, in the Interſtices of the Muſcles, about the Viſcera, &c. and compoſed partly of a cellulous or ſpungy Subſtance, and partly of an oily Matter of different Thickneſſes. This oily Matter is called Fat, eſpecially when ſeparated from the cellulous Subſtance, and likewiſe Corpus Adipoſum by Anatomiſts.

25. Marrow is one Kind of Fat, and differs from it only in the Fineneſs of the membranous Texture, in the Subtlety of the oily Matter, and in its Situation within the Bones. The Word Marrow is equivocal in the ſame Senſe with the Word Fat.

26. By Viſcera, we commonly underſtand Parts contained in a great Cavity, without being connected to it through their whole Extent or Circumference. Such are the Stomach, Inteſtines, &c. in the Abdomen, and the Lungs in the Thorax.

27. Organ or Inſtrument is a Term given to every Part capable of any Function, whether it be ſimple or complex, and in this Senſe we talk of the Organ of Sight, of Reſpiration, &c.

28. The Human Body is commonly divided into the Head, Trunk, and Extremities. The Trunk is again ſubdivided into the Neck, Thorax, and Abdomen; and the Extremities into ſuperior, called the Arms, and inferior, called the Legs. *General Diviſion of the Human Body.*

29. The Ancients divided the Body into three great Cavities, which they termed Venters, and into four Extremities. They called the Head the upper Venter, the Thorax the middle Venter, and the Abdomen the lower Venter. The Neck was by ſome joined to the Head; by others, to the Thorax.

30. The moſt natural and plaineſt Diviſion of the Body, is into the Head, Neck, Thorax, Abdomen, Arms and Legs; each of which Portions may afterwards be ſubdivided.

31. Each

31. Each Portion is to be examined not only with Regard to its Surface or external Conformation, but alſo with Regard to its internal Structure or Compoſition, and to the Viſcera and Organs, which it contains or ſupports.

32. This is what gave Occaſion to the Ancients to divide the Body into Parts containing, and Parts contained; and to ſubdivide the containing Parts into common and proper. The common containing Parts have been named Integuments, by which they meant chiefly the Skin and Fat.

External Parts of the Head.

33. The Head viewed on the Outſide, is divided into the hairy Scalp and Face.

34. The hairy Scalp covers the upper Part of the Os Frontis, the Oſſa Parietalia, the Os Occipitis, and the upper and lower Portions of the Oſſa Temporum.

35. The uppermoſt Part of the hairy Scalp is termed the Vertex or Fontanella; the back Part, Occiput; the lateral Parts, the Temples. The Vertex is diſtinguiſhed from the Occiput, by a contorted Border of Hair; and the Temples, by the Ears.

36. The Arteries on each Side of the hairy Scalp, are theſe:
- Arteria Carotis Externa, in general.
- Arteria Temporalis.
- Arteria Occipitalis.
- Arteria Angularis, by Communication.
- Arteria Cervicalis Poſterior, by Communication.
- Arteria Vertebralis, by Communication.
- Arteria Carotis Interna, by Communication.

37. The Veins on each Side of the hairy Scalp, are theſe:
- Vena Jugularis Externa, in general.
- Vena Jugularis Externa Poſterior.
- Vena Temporalis.
- Vena Occipitalis.
- Vena Vertebralis.
- Vena Jugularis Externa Anterior, by Communication.
- Vena Jugularis Interna, by Communication.
- Sinus Lateralis Duræ Matris, by Communication.
- Vena Axillaris, by Communication.
- Vena Cephalica, by Communication.

38. The Nerves on each Side of the hairy Scalp, are theſe:
- Nervi Sub-Occipitales, commonly called the tenth Pair from the Medulla Oblongata.
- Par Nonum from the Medulla Oblongata.
- Par Primum Cervicale.
- Par Secundum Cervicale, by Communication.
- Nervi Diaphragmatici, by Communication.
- Ramus Frontalis of the Orbitary or Ophthalmic Nerve.

Nevus

Nervus Sympatheticus Minor, called the Portio Dura of the Auditory Nerve.

Nervus Sympatheticus Medius, or Nerves of the eighth Pair from the Medulla Oblongata, by Communication.

Nervus Sympatheticus Maximus, commonly termed Intercoſtalis, by Communication.

39. The Face comprehends all that Portion of the Surface of the Head which lies between the hairy Scalp and the Neck, *viz.* the Fore-Head, Eye-Brows, Palpebræ, Eyes, Noſe, Mouth, Chin, Cheeks and Ears.

40. The External Parts of the Eye, are theſe: The anterior Portion of the Globe of the Eye, the Membrana Conjunctiva, the Cornea Lucida, Iris, Pupilla, Caruncula Lacrymalis, Angles of the Palpebræ; and the Cilia or Hairs of each Palpebra. The internal Parts are: The Globe of the Eye, the Tunica Sclerotica or Cornea Opaca, the Choroides, Arachnoides, Cryſtalline, Vitreous Humour, Aqueous Humour, the anterior and poſterior Chambers, the Muſcles, and the Optic Nerve.

41. The external Parts of the Ear, are theſe: The great Concha, the convex Side of this Concha, or Hinderpart of the Ear, the great Border, the Fold or Helix, the Concavity, the broad Eminence or Anthelix, the ſmall anterior Eminence or Tragus, the ſmall poſterior Eminence or Antitragus, the Lobe or lower Extremity of the Ear, and the Meatus.

42. The external Parts of the Noſe, are theſe: The upper Extremity or Root of the Noſe, the Arch or Back, the Sides of that Arch, the Tip of the Noſe, the Alæ, the Nares and the Septum Narium. The internal Parts are the Cavity and Bottom of the Nares, the Convolutions, the Maxillary, Sphenoidal and Frontal Sinuſes.

43. The external Parts of the Mouth, are theſe: The Lips, one upper, the other lower, the Angles or Commiſſures of the Lips, the Border or Edge of each Lip, the Foſſula which runs from the Septum Narium to the Edge of the upper Lip, and the tranſverſe Fold which ſeparates the under Lip from the Chin.

44. The internal Parts of the Mouth, are theſe: the Palate, the Septum Palati, the Uvula, the Amygdalæ, Gums, Fræna of the Lips, the Tongue, its Apex, Root, Sides and Frænum. The other internal Parts of the Mouth, Eye, Noſe and Ear, ſuch as the Glands, Membranes, Muſcles, *&c.* muſt be referred to the particular Deſcriptions of theſe Parts.

45. The Cheeks are the lateral Parts of the Face, reaching downward from the Eyes and Temples, between the Noſe and Ears. The upper prominent Part of the Cheek is commonly termed Mala.

46. The Chin is the anterior Protuberance, by which the lower Part of the Face is terminated, from whence it runs all the Way to the Neck. This under Part of the Chin is termed the Baſis, and it is diſtinguiſhed from the Throat, by a tranſverſe Fold, which reaches from Ear to Ear. In the Middle of the Chin, there is ſometimes a Foſſula or Depreſſion.

47. The exterior Arteries which belong to each Side of the Face, are theſe:

Arteria Carotis Externa.
Arteria Carotis Interna, by Communication.
Arteria Vertebralis, by Communication.
Arteria Cervicalis, by Communication.

48. The exterior Veins diſtributed to each Side of the Face, are theſe:

Vena Jugularis Externa.
Vena Jugularis Interna, by Communication.
Vena Vertebralis, by Communication.

49. The exterior Nerves ſpread on each Side of the Face, are theſe:

Nervus Olfactorius.
Nervus Opticus.
Nervus Orbitarius ſive Ophthalmicus, which is the firſt Branch of the fifth Pair from the Medulla Oblongata.
Nervus Maxillaris Superior.
Nervus Maxillaris Inferior.
Nervus Trochlearis ſive Patheticus, which is the fourth Pair.
Nervus Motor Oculi Externus ſive Muſcularis Externus, which is the ſixth Pair.
Nervus Sympatheticus Minimus, or the Portio Dura of the Auditory Nerve.
Nervus Sympatheticus Medius, which is the eighth Pair.
Nervus Sympatheticus Maximus ſive Univerſalis, commonly called Intercoſtalis.
Nervus Hypogloſſus Major, which is the ninth Pair.
The ſecond Pair of the Nervi Cervicales.

50. The Arteries of the Fore-Head, are theſe:

Arteria Temporalis, which is a Branch of the external Carotid.
Arteria Angularis, which is a Branch of the internal Carotid.
Arteria Carotis Interna, by Communication.

51. The Veins of the Fore-Head, are theſe:

Vena Frontalis, formerly called Præparata.
Vena Temporalis.
Vena Angularis.
Sinus Orbitarius.
Sinus Longitudinalis Superior, by Communication.
Sinus Longitudinalis Inferior, by Communication.
Vena Jugularis Interna, by Communication.

52. The Nerves of the Fore-Head, are theſe:

Nervus Orbitarius ſive Ophthalmicus, which is the firſt Branch of the fifth Pair from the Medulla Oblongata.

Nervus

Nervus Maxillaris Superior.
Nervus Maxillaris Inferior.
Nervus Sympatheticus Minor, which is the Portio Dura of the Nervus Auditorius.

53. The Arteries which go to the Eye, are theſe:

Arteria Temporalis, which is a Branch of the external Carotid.
Arteria Maxillaris Externa ſive Angularis, which is a Branch of the external Carotid.
Arteria Maxillaris Interna, which is a Branch of the external Carotid.
Arteria Carotis Interna.

54. The Veins which belong to the Eye, are theſe:

Vena Temporalis, which is a Branch of the poſterior external Jugular.
Vena Angularis, which is a Branch of the anterior external Jugular.
Vena Frontalis, formerly named Præparata, which is a Branch of the anterior external Jugular.
Sinus Orbitarius.
Sinus Longitudinalis, by Communication.
Vena Jugularis Interna, by Communication.

55. The Nerves belonging to the Eye, are theſe:

Nervus Olfactorius, by Communication.
Nervus Opticus.
Nervus Motor Communis, or the third Pair.
Nervus Trochlearis, or the fourth Pair.
Nervus Orbitarius ſive Ophthalmicus, a Branch of the fifth Pair.
Nervus Maxillaris Superior, a Branch of the fifth Pair.
Nervus Motor Externus.
Nervus Sympatheticus Minor, or the Portio Dura of the Auditory Nerve.
Nervus Sympatheticus Maximus ſive Univerſalis, commonly called Intercoſtalis.

56. The Arteries diſtributed to the Noſe, are theſe:

The ſame Arteries with thoſe which go to the Eye, among which the internal Carotid ſupplies the Noſe, by Communication.
Arteria Labiorum Orbicularis, by Communication.

57. The Veins belonging to the Noſe, are theſe:

All the Veins already mentioned, as belonging to the Eye.

58. The Nerves which go to the Noſe, are theſe:

Nervi Olfactorii.

Nervus Orbitarius ſive Ophthalmicus, a Branch of the fifth Pair, both immediately, and by Communication.
Nervi Motores Communes, or the third Pair, by Communication.
Nervi Maxillares Superiores, Branches of the ſixth Pair.
Nervus Sympatheticus Minimus.
Nervus Sympatheticus Medius, by Communication.

59. The Arteries which go to the Ear, are theſe:

Arteria Temporalis, a Branch of the external Carotid.
Arteria Auricularis, a Branch of the Temporalis.
Arteria Occipitalis, by Communication.
Arteria Vertebralis, by means of the Arteria Baſilaris, which is a Continuation of it.
Arteria Carotis Interna, by Communication with the Arteria Baſilaris.

60. The Veins belonging to the Ear, are theſe:

Vena Temporalis.
Vena Occipitalis.
Vena Cervicalis.
Vena Maxillaris: Theſe three being Branches of the Jugularis Externa.
Vena Jugularis Interna, by ſeveral Communications.
Sinus Petroſus Duræ Matris.

61. The Nerves diſtributed to the Ear, are theſe:

Nervus Maxillaris Inferior, the third Branch of the fifth Pair.
Nervus Auditorius, the ſeventh Pair.
Nervus Sympatheticus Minimus, the Portio Dura of the Auditory Nerve.
Nervus Hypogloſſus Externus, the ninth Pair, by Communication.
Nervus Sub-Occipitalis, the tenth Pair, by Communication.
The ſecond Cervical Pair.
Nervus Sympatheticus Medius, the eighth Pair.
Nervus Sympatheticus Univerſalis, commonly called Intercoſtalis.

62. The Arteries which go to the Mouth, Tongue, *&c.* are theſe:

The Artery of the Chin.
Arteria Coronaria ſive Orbicularis Labiorum, both being Branches of the external Carotid.
Arteria Maxillaris Interna.
Arteria Sub-Lingualis.

63. The Veins belonging to the Mouth, Tongue, *&c.* are theſe:

Vena Maxillaris Externa.
Vena Maxillaris Interna.

Venæ

Venæ Raninæ. All these are Branches of the external Jugular.
Vena Jugularis Interna, by several Communications.
Vena Gutturalis Superior, a Branch of the internal Jugular.
Vena Axillaris, when it sends off the Guttural Vein.

64. The Nerves distributed to the Mouth, Tongue, and Salivary Glands, &c. are these:

Nervus Maxillaris Superior.
Nervus Maxillaris Inferior, both Branches of the fifth Pair.
Nervus Sympatheticus Minimus, or Portio Dura of the Auditory Nerve.
Nervus Sympatheticus Medius, the eighth Pair.
The ninth Pair from the Medulla Oblongata.
The second Pair of Cervical Nerves.
Nervus Sympatheticus Maximus, by Communication.

65. The Cheeks on each Side are furnished with Arteries and Veins from the nearest Ramifications of the Temporal and Maxillary Arteries and Veins; and with Nerves from the Portio Dura of the Auditory Nerve, and from the superior and inferior Maxillary Nerves.

66. The Neck in general is divided into the anterior Part or Throat, and posterior Part or Nape. The Throat begins by an Eminence, and terminates by a Fossula. The Nape begins by a Fossula, which, as it descends, is gradually lost. The Neck contains the Larynx, a Part of the Trachea Arteria, the Pharynx, a Part of the Œsophagus, the Musculi Cutanei, Sterno-Mastoidæi, Sterno-Hyoidæi, Thyro-Hyoidæi, Omo-Hyoidæi, Splenius, Complexus, the Musculi Vertebrales, which lie upon the first seven Vertebræ, and a Portion of the Medulla Spinalis. *Parts of the Neck in general.*

67. The Arteries which go to the Neck, are these:

Arteriæ Carotides, in general.
Arteriæ Carotides Externæ.
Arteriæ Carotides Internæ.
Arteriæ Vertebrales.
Arteriæ Cervicales.

68. The Veins belonging to the Neck, are these:

Venæ Jugulares, in general.
Venæ Jugulares Externæ.
Venæ Jugulares Internæ.
Venæ Cervicales.
Venæ Vertebrales.

69. The Nerves distributed to the Neck, are these:

Nervi Sympathetici Minimi, or the Portio Dura of the Auditory Nerves.
Nervi Sympathetic Medii, the eighth Pair.

Nervi Acceſſorii Octavi Paris.
The ninth Pair.
Nervi Sub-Occipitales, or the tenth Pair.
The ſeventh Cervical Pair.
Nervi Sympathetici Maximi.

Parts of the Thorax.

70. By the Thorax, we commonly underſtand all that Part of the Body, which anſwers to the Extent of the Sternum, Ribs and Vertebræ of the Back, both outwardly and inwardly.

71. The Thorax is divided into the anterior Part, called commonly the Breaſt, the poſterior Part called the Back, and the lateral Parts called the right and left Sides.

72. The external Parts of the Thorax, beſides the Skin and Membrana Adipoſa, are principally the Mammæ, and the Muſcles which cover the Ribs, and fill the Spaces between them. In the Mammæ we ſee the Papillæ or Nipples, and a ſmall coloured Circle, which ſurrounds them. The Muſcles are the Pectorales Majores and Minores, Subclavii, Serrati Majores, Serrati Superiores Poſtici, Latiſſimi Dorſi, and Vertebrales, and to theſe we may add the Muſcles which cover the Scapula.

73. The internal Parts of the Thorax are contained in the large Cavity of that Portion of the Trunk which the Ancients called the middle Venter; but the Moderns name it ſimply, the Cavity of the Breaſt. This Cavity is lined by a Membrane, named Pleura, and divided into two lateral Cavities, by a membranous Septum named Mediaſtinum, which is a Production or Duplicature of the Pleura.

74. These Parts are the Heart, Pericardium, Trunk of the Aorta, great Arch of the Aorta, Trunks of the Carotid Arteries, Subclavian Arteries, Trunks of the Vertebral and Axillary Arteries, the ſuperior Portion of the deſcending Aorta, the Intercoſtal Arteries, the Vena Cava Superior, Vena Azygos, Subclavian Veins, Trunks of the Jugular, Vertebral and Axillary Veins, a Portion of the Aſpera Arteria, and of the Œſophagus; the Ductus Lacteus, or Thoracicus, the Lungs, Pulmonary Artery, Pulmonary Veins, *&c.*

75. The Arteries and Veins, which particularly belong to the Thorax, are theſe:

Arteriæ & Venæ Thoracicæ, Superiores & Inferiores.
Arteriæ & Venæ Mammariæ, Internæ & Externæ.
Arteriæ & Venæ Intercoſtales, Superiores & Inferiores.
Arteriæ & Venæ Spinales, with the Venal Sinuſes of the Canal of the Spine.

76. The Nerves diſtributed to the Thorax, are theſe:

Nervi Sympathetici Medii, or the eighth Pair.
Nervi Sympathetici Univerſales, commonly called Intercoſtales.
The laſt Cervical Pair.
The twelve Dorſal Pairs.
Nervi Diaphragmatici.

77. The Cavity of the Thorax is terminated downward by the Diaphragm, which parts it from the Abdomen.

78. The Abdomen begins immediately under the Thorax, and terminates at the Bottom of the Pelvis of the Offa Innominata. Its Circumference or outer Surface is divided into Regions, of which there are three anterior, *viz.* the Epigaſtric or ſuperior Region, the Umbilical or middle Region, and the Hypogaſtric or lower Region. There is but one poſterior Region, named Regio Lumbaris.

79. The Epigaſtric Region begins immediately under the Appendix Enſiformis at a ſmall ſuperficial Depreſſion, called the Pit of the Stomach, and in adult Subjects ends above the Navel at a tranſverſe Line, ſuppoſed to be drawn between the laſt falſe Ribs on each Side.

80. This Region is ſubdivided into three Parts, one middle, named Epigaſtrium, and two lateral, termed Hypochondria. The Epigaſtrium takes in all that Space which lies between the falſe Ribs of both Sides, and the Hypochondria are the Places covered by the falſe Ribs.

81. The Umbilical Region begins in Adults, above the Navel, at the tranſverſe Line already mentioned, and ends below the Navel at another tranſverſe Line, ſuppoſed to be drawn parallel to the former, between the two Criſtæ of the Offa Ilium.

82. This Region is likewiſe divided into three Parts, one middle, which is properly the Regio Umbilicalis, and two lateral, called Ilia or the Flanks; and they comprehend the Space between the falſe Ribs and upper Part of the Os Ilium on each Side.

83. The Hypogaſtric Region is extended downward from the inferior Limit of the Umbilical Region, and is divided into three Parts, one middle, called Pubis, and two lateral, called Inguina or the Groins.

84. The Lumbar Region is the poſterior Part of the Abdomen, and comprehends all that Space which reaches from the loweſt Ribs on each Side, and the laſt Vertebra of the Back, to the Os Sacrum and neighbouring Parts of the Offa Ilium. The lateral Parts of this Region are termed the Loins, but the middle Part has no proper Name in Men.

85. Lastly, the Bottom of the Abdomen which anſwers to the Pelvis of the Sceleton, is terminated anteriorly by the Pudenda or Parts of Generation, and poſteriorly by the Clunes or Buttocks, and Anus. The Buttocks are ſeparated by a Foſſa which leads to the Anus, and each Buttock is terminated downward by a large Fold which diſtinguiſhes it from the reſt of the Thigh.

86. This Lumbar Region takes in likewiſe the Muſculus Quadratus Lumborum on each Side, the lower Portions of the Sacro-Lumbares, of the Longiſſimi and Latiſſimi Dorſi, the Muſculus Sacer, *&c.*

87. The Space between the Anus, and the Parts of Generation, is called Perinæum, and is divided into two equal lateral Parts by a very diſtinct Line, which is longer in Males than in Females, as we ſhall ſee in another Place.

88. The Cavity of the Abdomen, formed by the Parts already mentioned, (all which are covered by the Skin and Membrana Adipoſa) is lined on the Inſide by a particular Membrane, called Peritonæum. It is ſeparated from the

the Cavity of the Thorax by the Diaphragm, and terminated below by the Muſculi Levatores Ani.

89. This Cavity contains the Stomach, and the Inteſtines, which are commonly divided into three ſmall, named Duodenum, Jejunum and Ilium; and three large, called Cæcum, Colon and Rectum. It contains likewiſe the Meſentery, Meſocolon, Omentum, Liver, Gall Bladder, Spleen, Pancreas, Glands of the Meſentery, Vaſa Lactea, Receptaculum Chyli, Kidneys, Renal Glands, Ureters, Bladder, and the internal Parts of Generation in both Sexes.

90. The principal Arteries of the Abdomen are theſe:

Arteria Epigaſtrica Superior, which is the loweſt Portion of the Mammaria Interna.
Aorta Inferior.
Arteria Cæliaca.
Arteria Meſenterica Superior.
Arteriæ Renales, called formerly Emulgentes.
Arteriæ Spermaticæ.
Arteria Meſenterica Inferior.
Arteriæ Lumbares.
Arteriæ Iliacæ.
Arteriæ Hypogaſtricæ.
Arteriæ Epigaſtricæ Inferiores.
Arteriæ Hæmorrhoidales.
Arteriæ Pudicæ.

91. The principal Veins of the Abdomen are theſe:

The inferior Portions of the Venæ Mammariæ Internæ.
Venæ Renales.
Venæ Lumbares.
Venæ Spermaticæ.
Venæ Iliacæ.
Venæ Hypogaſtricæ.
Vena Portæ Ventralis.
Vena Portæ Hepatica.
Vena Meſaraica Major.
Vena Splenica.
Vena Meſaraica Minor, ſive Hæmorrhoidalis Interna.

92. The principal Nerves of the Abdomen are theſe:

Nervi Stomachici, formed by the Extremity of the Sympathetici Medii or eighth Pair.
Nervi Sympathetici Maximi, the inferior Portion.
The two Semilunar or Plexiform Ganglions.
Plexus Stomachicus.
Plexus Hepaticus.
Plexus Splenicus.

Plexus

Plexus Renales.
Plexus Meſentericus Superior.
Plexus Meſentericus Inferior.
Nervi Lumbares.
Nervi Sacri.
Nervi Crurales, their Origin.
Nervi Sciatici, their Origin.

93. THE whole Arm is divided, as in the Sceleton, into the Shoulder, the Arm properly ſo called, the Fore-Arm and the Hand. But to theſe we muſt here add the Stump of the Shoulder, the Axilla or Arm-pit, the Elbow, the Fold of the Arm, and the Hollow of the Hand. *Parts of the upper Extremities.*

94. WHAT is called the Stump of the Shoulder, is formed by the fleſhy Belly of the Muſculus Deltoides; and the Axilla, by the correſponding Edges of the Pectoralis Major and Latiſſimus Dorſi. The Elbow anſwers to the Olecranum; the Fold of the Arm is on the Foreſide of the Articulation of the Os Humeri, with the Bones of the Fore-Arm, and the Hollow of the Hand is in the Middle of the Palm.

95. THE Arm, properly ſo called, is principally covered from the Shoulder downward, by the Biceps, Brachialis and the three Anconæi. The Fore-Arm is furniſhed with thoſe Muſcles which move the Radius on the Ulna, and the Carpus on the Fore-Arm. The Hand has few very conſiderable fleſhy Parts, except the Thenar and Hypothenar, between which the Hollow of the Hand is formed.

96. THE Arteries of the whole upper Extremity are theſe;

Arteria Axillaris.
Arteria Humeralis.
Arteriæ Scapulares.
Arteria Articularis.
Arteria Brachialis.
Arteriæ Collaterales.
Arteria Cubitalis.
Arteria Radialis.
Arteria Interoſſea Anterior.
Arteriæ Interoſſeæ Poſteriores.
The arterial Arches in the Palm of the Hand.

97. THE Veins of the whole upper Extremity are theſe:

Vena Cephalica Minor.
Vena Jugularis Externa, by Communication with the ſmall Cephalica.
Vena Axillaris.
Venæ Muſculares.
Venæ Scapulares.
Vena Brachii Cephalica.
Vena Brachii Baſilica.
Venæ Satellites Arteriæ Brachialis.

Vena Profunda Superior.
Vena Mediana, *viz.* Mediana Cubitalis, Mediana Basilica, Mediana Radialis sive Cephalica, and Mediana Media or Major.
Vena Profunda Cubiti.
Vena Basilica Cubiti sive Cubitalis.
Vena Cephalica Cubiti sive Radialis.
Venæ Cubiti Satellites.
Vena Cephalica Pollicis.
Vena Salvatella sive Auricularis.
Areolæ Venosæ Dorsi Manus.

98. The Nerves of the whole upper Extremity are these:

Nervi Brachiales in general, formed by the last four or five Cervical and first Dorsal Pairs.
Nervus Musculo-Cutaneus.
Nervus Medianus.
Nervus Cubitalis.
Nervus Cutaneus Internus.
Nervus Radialis.
Nervus Axillaris sive Articularis.

Parts of the lower Extremities.

99. The lower Extremities of the whole Body are divided, as those of the Sceleton, into the Thigh, Leg and Foot.

100. The Thigh begins anteriorly on one Side of the Fold of the Groin; and posteriorly, a little above the lower Half of the Buttock. It terminates anteriorly at the Patella on the Knee, and posteriorly at the Poples or Ham. It is formed chiefly by the Muscles which surround the Os Femoris, and are themselves invested by the Fascia Lata, *viz.* the Glutæus Maximus, two Vasti, Crureus, Biceps, Triceps, Semi-Membranosus, Semi-Tendinosus, Gracilis Internus, Gracilis Anterior or Rectus and Sartorius.

101. The Leg has but very few Muscles on the Forepart, but a great many large ones behind; where the Gastrocnemii and Soleus form a Kind of Belly, called the Calf of the Leg. The Leg begins anteriorly at the Knee, below the Patella, and posteriorly at the Poples; and it terminates below, at the Ankles.

102. Besides the Parts of the Foot mentioned in the Description of the Sceleton, that convex Part near its Articulation with the Leg is termed the Neck of the Foot; and the under Part, which is the Basis of the whole lower Extremity, the Sole of the Foot. The fleshy Parts are not more considerable on the Foot than on the Hand.

103. The Arteries of the whole lower Extremity are these:

Arteria Obturatrix, a Branch of the Hypogastrica.
Arteria Glutæa, a Branch of the Hypogastrica.
Arteria Sciatica, by Communication.
Arteria Pudica, by Communication.
Arteria Cruralis.
Arteria Poplitea.

Arteria

Arteria Tibialis Anterior.
Arteria Tibialis Posterior.
Arteria Peronæa.
Arteria Plantaris.

104. The Veins of the whole lower Extremity are these:

Vena Obturatrix.
Vena Glutæa.
Vena Cruralis.
Vena Magna Saphena.
Vena Sciatica.
Vena Parva Saphena sive Saphena Externa.
Vena Poplitea.
Vena Tibialis.
Vena Peronæa.
Vena Plantaris.

105. The Nerves of the whole lower Extremity are these:

Nervus Cruralis, formed by a Complication of the five Lumbares, especially of the first four.
Nervus Sciaticus, formed by the Union of the last two Lumbares, and first three Sacri.
Nervus Sympatheticus Maximus, by Communication with the Nervi Lumbares and Sacri.
Nervus Popliteus.
Nervus Sciaticus Internus sive Popliteus Internus.
Nervus Sciaticus Externus sive Popliteus Externus.
Nervus Plantaris Externus.
Nervus Plantaris Internus.

ART. II.

A Description of the common Integuments of the Body.

106. ALL the Parts of the Human Body are invested by several common and universal Coverings, to which Anatomists give the Name of Integuments. *Introduction.*

107. There have been many Disputes about the Number of these Integuments. The Ancients reckoned up five, *viz.* the Epidermis, Skin, Membrana Adiposa, Panniculus Carnosus, and Membrana Musculorum Communis.

108. The first three of these Coverings are truly common or universal, that is, extended over all Parts of the Body; but properly speaking, they ought to be reduced to two, for I look upon the Epidermis rather as a Part or an Epiphysis of the Skin, than as an Integument.

109. The two other Coverings mentioned by the Ancients, are not universal, but confined to particular Parts of the Body.

§ 1. *The Skin.*

110. The Skin is a Subſtance of very large Extent, made up of ſeveral Kinds of Tendinous, Membranous, Vaſcular and Nervous Fibres, the Intertexture of which is ſo much the more wonderful as it is difficult to unfold; for their Directions are as various as thoſe of the Stuff of which an Hat conſiſts.

111. This Texture is what we commonly call Leather, and it makes, as it were, the Body of the Skin. It is not eaſily torn, may be elongated in all Directions, and afterwards recovers itſelf, as we ſee in fat Perſons, in Women with Child, and in Swellings; and it is thicker and more compact in ſome Places, than in others.

112. Its Thickneſs and Compactneſs are not, however, always proportionable; for on the poſterior Parts of the Body, it is thicker and more lax than on the Foreparts; and on the Palms of the Hands, and Soles of the Feet, it is both very thick, and very ſolid. It is generally more difficult to be pierced by pointed Inſtruments, in the Belly, than in the Back.

113. The outer Surface of this Subſtance is furniſhed with ſmall Eminences, which Anatomiſts have thought fit to call Papillæ, in which the Capillary Filaments of the Cutaneous Nerves terminate by ſmall radiated Pencils.

114. These Papillæ differ very much in Figure and Diſpoſition, in the different Parts of the Body, and they may be diſtinguiſhed into ſeveral Kinds.

115. The greateſt Part of them is flat, of different Breadths, and ſeparated by Sulci, which form a Kind of irregular Lozenges. The Pyramidal Figure aſcribed to them, is not natural, and appears only when they are contracted by Cold, by Diſeaſes, by boiling, or by ſome other artificial Preparation which alters their ordinary Structure.

116. The Papillæ of the Palm of the Hand, of the Sole of the Foot, and of the Fingers and Toes, are higher than on the other Parts of the Body; but they are likewiſe ſmaller, cloſely united together, and placed as it were endwiſe, with Reſpect to each other, in particular Rows, which repreſent on the Skin all Kinds of Lines, ſtraight, crooked, waving, ſpiral, *&c.* Theſe ſeveral Lines are often diſtinctly viſible in thoſe Parts of the Palm of the Hand, which are next the firſt Phalanges of the Fingers.

117. The red Part of the Lips is made up of Papillæ, repreſenting very fine Hairs or Villi cloſely united together.

118. There is another particular Kind under the Nails; the Papillæ being there more pointed, or, in a Manner, conical, and turned obliquely toward the Ends of the Fingers. Thoſe which are found in the hairy Scalp, Scrotum, *&c.* are ſtill of other Kinds.

119. The Papillæ of the firſt and ſecond Kinds appear to be ſurrounded at their Baſes, by a ſoft mucilaginous and pretty viſcid Subſtance, which fills the Interſtices between them, and repreſents a Kind of Net-work or Sieve, the Maſhes or Holes of which ſurround each Papilla. This Subſtance is commonly called Corpus Reticulare or Mucoſum.

120. The

120. The Origin of this reticular or mucous Body has not hitherto been ſufficiently explained, and it has not been determined whether it forms an univerſal Integument, or whether it belongs more properly to the Skin than to the Papillæ and Epidermis.

121. To demonſtrate this reticular Subſtance in public Courſes, the common Method is to take the boiled Tongues of Oxen or Sheep; but this Method is fallacious, and may lead the greateſt Number of the Spectators into Miſtakes, as I ſhall ſhew in another Place.

122. In Inflammations we obſerve a reticular Texture of capillary Veſſels, more or leſs extended on the Surface of the Skin; and curious Anatomiſts demonſtrate the ſame Thing by fine Injections, which may be looked upon as artificial Inflammations. But neither of theſe Methods proves that in the natural State theſe Veſſels are Blood-Veſſels, that is, that they contain the red Portion of the Blood.

123. It is more probable that this Vaſcular Texture is only a Continuation or Production of the very ſmall Capillaries of the Arteries and Veins, which in the natural State tranſmit only the ſerous Part of the Blood, while the red Part continues its Courſe through wider Ramifications, which more properly retain the Name of Blood-Veſſels.

124. This Vaſcular Texture is of various Forms and Figures in the different Parts of the Body. It is not the ſame in the Face with what it is elſewhere, neither is it alike on all the Parts of the Face, as may be diſcovered by the moſt ordinary Microſcopes; and from hence we might perhaps be enabled to give a Reaſon why one Part of the Body turns red more eaſily than another.

125. The inner Surface of the Skin is covered by very ſmall Tubercles, called commonly Cutaneous Glands, and they are likewiſe termed Glandulæ Miliares, becauſe of ſome Reſemblance which they are ſuppoſed to bear to Millet-Seeds.

126. These Tubercles are partly fixed in ſmall Foſſulæ, in the Subſtance of the Skin, which anſwer to the ſame Number of ſmall Cavities, in the Corpus Adipoſum. Their excretory Ducts open on the outer Surface of the Skin, ſometimes in the Papillæ, and ſometimes on one Side of them, as may be ſeen in the Ends of the Fingers, even without a Microſcope.

127. The greateſt Part of them furniſhes Sweat, and others a fatty, oily Matter of different Thickneſſes, as in the hairy Scalp, in the Back, behind the Ears, and at the lower Part of the Noſe, where this Matter may be ſqueezed out in Form of ſmall Worms. On the Head this is called the Dandriff, and Filth or Naſtineſs on the other Parts of the Body.

128. By macerating the Skin in Water, or in any other proper Liquor, theſe Corpuſcles become more viſible, eſpecially in the Skin of the lower Part of the Noſe, and of the Axilla. The late M. *Duvernay* demonſtrated to the Royal Academy, that the Structure of ſome of theſe Cutaneous Glands reſembles the Circumvolutions of ſmall Inteſtines plentifully ſtored with Capillary Veſſels. The illuſtrious M. *Morgagni*, Profeſſor at *Padua*, has given the

the Name of Glandulæ Sebaceæ to thoſe which furniſh the unctuous Matter above mentioned.

129. Besides theſe Corpuſcles, there are other ſmall ſolid Bodies, almoſt of an oval Figure, contained in the Subſtance of the Skin. Theſe are the Roots or Bulbs from whence the Hairs ariſe, and ſome of them are ſituated within the inner Surface of the Skin, as I ſhall ſhew hereafter.

130. The Skin has ſeveral conſiderable Openings, ſome of which have particular Names; ſuch as the Fiſſure of the Palpebræ, the Nares, the Mouth, the external Foramen of the Ears, the Anus and Openings of the Parts of Generation.

131. Besides theſe, it is perforated by an infinite Number of ſmall Holes, called Pores, which are of two Kinds. Some are more or leſs perceivable by the naked Eye; ſuch as the Orifices of the milky Ducts of the Mammæ, the Orifices of the excretory Canals of the Cutaneous Glands, and the Paſſages of the Hairs.

132. The other Pores are imperceptible to the naked Eye, but viſible through a Microſcope; and their Exiſtence is likewiſe proved by the Cutaneous Tranſpiration, and by the Effects of topical Applications; and from theſe two Phænomena, they have been divided into Arterial and Venal Pores.

133. We ought likewiſe to obſerve the Adheſions and Folds of the Skin. It is every where united to the Corpus Adipoſum, as ſhall be ſaid hereafter; but it adheres to it much more cloſely in ſome Parts, than in others, as in the Palm of the Hand, Sole of the Foot, Elbow and Knee.

134. Some Plicæ or Folds in the Skin depend on the Structure of the Membrana Adipoſa or Cellularis, as thoſe in the Neck and Buttocks; others do not depend on that Membrane, ſuch as the Rugæ in the Forehead, Palpebræ, *&c.* which are formed by Cutaneous Muſcles, and diſpoſed more or leſs in a contrary Direction to theſe Muſcles. Theſe Folds increaſe with Age.

135. There is, beſides, a particular Kind of Folds in the Skin of the Elbow, Knee, and Condyles of the Fingers and Toes, which are owing neither to the Conformation of the Membrana Adipoſa, nor to any Muſcle.

136. Lastly, there is a Kind of Plicæ, or rather Lines, which croſs the Palm of the Hand, Sole of the Foot, and correſponding Sides of the Fingers and Toes in different Directions. Theſe ſerve for Employment to Fortune-tellers, whoſe pretended Art is contrary to Religion, and deſpiſed by all Men of Senſe.

§. 2. *The Cuticula or Epidermis.*

137. The Outſide of the Skin is covered by a thin tranſparent Web, cloſely joined to it, which is called Epidermis, Cuticula, or the Scarf-Skin.

138. The Subſtance of the Cuticula appears to be very uniform on the Side next the Skin, and to be compoſed on the other Side, of a great Number of very fine ſmall ſquamous Laminæ, without any Appearance of a fibrous

or vaſcular Texture, except ſome ſmall Filaments by which it is connected to the Papillæ, and which perhaps are detached from thence.

139. This Subſtance is very ſolid and compact, but yet capable of being extended and thickened, as we ſee by ſteeping it in Water, and by the Bliſters raiſed on the Skin by Veſicatories, or any other Means; and from thence it would ſeem, that it is of a ſpungy Texture. It yields very much in Swellings; but not ſo much as the Skin, without breaking or cracking.

140. The Origin of the Epidermis is as obſcure, as its Regeneration is evident, ſudden and ſurpriſing; for let it be deſtroyed ever ſo often, it ſtill grows again. It probably ariſes from a Subſtance that tranſudes from the Papillæ, and therefore the Ancients were in the Right to call it an Efflorescence of the Skin.

141. We muſt not however imagine, that it is the Air which dries this mucilaginous Matter, and gives it the Form of the Epidermis; becauſe it is found equally in the Fœtus, which ſwims continually in Water; and it grows even on the Palate when it has been deſtroyed by too hot Food; and under Plaiſters applied to any Part of the Body.

142. Hard and reiterated Frictions looſen it inſenſibly, and preſently afterward, a new Stratum ariſes, which thruſts the firſt outward, and may itſelf be looſened, and thruſt outward by a third Stratum, and ſo on.

143. It is nearly in this Manner, that Calloſities are formed on the Feet, Hands, and Knees; and the ſeveral Laminæ or Strata obſervable at the ſame Time, on many other Parts of the Body, are owing to the ſame Cauſe, tho' many Anatomiſts have looked upon them to be natural. It muſt be acknowledged, however, that on the Palms of the Hands, and Soles of the Feet, the Epidermis is commonly thicker than on any other Part.

144. The Epidermis adheres very cloſely to the Cutaneous Papillæ, from which it may be ſeparated by boiling; or which is a much better Way, by ſteeping for a long Time in cold Water. It is not impoſſible to ſeparate it with the Knife, but this Management teaches us nothing of its Structure.

145. It adheres ſtill cloſer to the Corpus Reticulare, which is eaſily raiſed along with it; and they ſeem to be true Portions or Continuations of each other.

146. It is generally believed, that the Colour of the Epidermis is naturally white; and that the apparent Colour thereof is owing to that of the Corpus Mucoſum. But when we examine ſeparately the Epidermis of Negroes, we find no other Whiteneſs in it, than in a thin tranſparent Lamina of black Horn.

147. The Epidermis covers the Skin through its whole Extent, except at the Places where the Nails lie. It is marked with the ſame Furrows and Lozenges as the Skin, and has the ſame Openings and Pores; and tho' it may be ſaid to paſs the Bounds of the Skin, where it is continued inward, through the great Openings, yet at theſe Places it loſes the Name of Epidermis.

148. When we examine narrowly the ſmall Pores or Holes, through which the Sweat paſſes, the Epidermis ſeems to enter theſe, in order to compleat the excretory Tubes of the Cutaneous Glands. The Foſſulæ of the Hairs

Hairs have likewiſe the ſame Productions of the Epidermis, and it ſeems to give a Sort of Coat or Bark to the Hairs themſelves. Laſtly, the almoſt imperceptible Ducts of the Cutaneous Pores are lined by it.

149. Having macerated the Skin for a long while in Water, the Epidermis, with all its Elongations, may be ſeparated from it; and in that Caſe theſe Productions carry along with them, the Hairs, the Bulbs, and even the Axillary Glands.

150. By this Obſervation, we may explain, how Bliſters may remain for a long Time on the Skin, without giving Paſſage through theſe Holes, to the Matter which they contain, which Holes ought to be increaſed, one would think, by this Dilatation and Tenſion of the Epidermis.

151. For when the Epidermis is ſeparated from the Skin, it carries along with it ſome Parts of theſe Cutaneous Fibres, which being compreſſed by the Matter contained in the Bliſter, ſhut the Pores of the ſeparated Epidermis, like ſo many Valves; and it is probably theſe ſmall Portions which have been taken for the Valves of the Cutaneous Tubes.

§. 3. *Uſes of the Skin.*

152. It is chiefly and properly the Filamentary Subſtance, called the Body of the Skin, which is the univerſal Integument of the Body, and the Baſis of all the other Cutaneous Parts, each of which has its particular Uſes.

153. The Skin is able to reſiſt external Injuries to a certain Degree, and ſuch Impreſſions, Frictions, Strokes, *&c.* to which the Human Body is often liable, as would hurt, wound and diſorder the Parts of which it is compoſed, if they were not defended by the Skin.

154. The Papillæ are the Organ of Feeling, and contribute to an univerſal Evacuation, called inſenſible Tranſpiration. They likewiſe ſerve to tranſmit from without, inwards, the ſubtle Particles or Impreſſions of ſome Things, applied to the Skin. The firſt of theſe three Uſes depends on the Extremities of the Nerves, the ſecond on the Arterial Productions, and the third on the Productions of the Veins.

155. The Cutaneous Glands ſecrete an oily Humour of different Conſiſtencies, and they are likewiſe the Origin of Sweat. But without the Epidermis, both Papillæ and Glands would be diſturbed in their Functions, on which great Diſorders muſt enſue.

156. In order to explain the Mechaniſm of Feeling, or of the Touch, we ſhould firſt be made acquainted with the Senſes in general, for which this is not a proper Place; and therefore all that I ſhall obſerve here, is, that there are at leaſt two Sorts of Feeling, one general the other particular.

157. Particular Feeling is accompanied with a certain determinate Impreſſion, by which we are enabled to diſcern Objects in a very diſtinct Manner, and this is properly what is called the Touch; the proper Organ of which is at the Inſide of the Ends of the Fingers. General Feeling is indeterminate and indiſtinct, not being accompanied with the ſame Impreſſion as the former.

158. These Differences in the Senſe of Feeling depend on thoſe of the Papillæ, which, in Effect, appear to be more cloſe, and made up of a greater Number of nervous Filaments at the Ends of the Fingers, than any where elſe; for the nervous Ropes that go to the Fingers, are proportionably larger than thoſe that go to any other Part of the Body.

159. The Epidermis ſerves to keep the Pencils or nervous Filaments of the Papillæ in an even Situation, and without Confuſion, and it likewiſe moderates the Impreſſions of external Objects. Particular as well as general Feeling is more or leſs perfect, in Proportion to the Thinneſs of the Epidermis, Calloſities in which, weaken and ſometimes deſtroy both.

160. Another Uſe of the Epidermis is to regulate the Cutaneous Evacuations already mentioned, the moſt conſiderable of which is inſenſible Tranſpiration. By this we underſtand a fine Exhalation, or a Kind of ſubtle Smoke, which flows out of the Body imperceptibly, and in different Quantities. It might be called Cutaneous Tranſpiration, to diſtinguiſh it from Pulmonary Tranſpiration, of which hereafter.

161. This Cutaneous Exhalation becomes ſenſible, by applying the End of the Finger, or Palm of the Hand, to the Surface of a Looking-Glaſs, or of any other poliſhed Body; for it preſently looks dull, and appears to be covered with a condenſed Vapour. It ſeems to me, that the convex Side of the Hand and Fingers do not furniſh ſo great a Quantity of this Exhalation, as the Palm of the Hand and the Inſides of the Fingers, eſpecially the Extremities, which points out one Uſe of this Tranſpiration, *viz.* to keep the nervous Filaments in due Order for particular Feeling.

162. Another Proof of inſenſible Tranſpiration, is the famous Experiment of *Sanctorius*, continued for thirty Years without Interruption, by which he found that this Evacuation in one Day was equal to all the ſenſible Evacuations for fifteen Days.

163. This Calculation is not agreeable to what has been made in other Countries, particularly thoſe from the like Experiments made by M. *Dodart* and *Morin* of the Royal Academy of Sciences, and by Dr. *James Keil*, as publiſhed in his *Statica Britannica*. Neither can the Balance inform us, whether the Cutaneous Tranſpiration is greater or leſs than the Pulmonary.

164. A long Time ago, I diſcovered a Method to render this Tranſpiration viſible, to the Diſtance of about half a Foot from the Body, and I mentioned it in a Theſis printed at *Copenhagen*. If we look at the Shadow of a bare Head on a white Wall, in a bright Sun-ſhiny Day, and in the Summer-Seaſon, we will perceive very diſtinctly the Shadow of a fine Smoke, riſing out of the Head, and mounting upward, tho' we cannot ſee the Smoke itſelf. We may try the ſame Experiment with a Dog or Fowl, *&c.*

165. It is much in the ſame Manner, that the inviſible Exhalations from burning Charcoal throw a very diſtinct Shadow; and that the inviſible Smoke of a Chafing-Diſh, Warming-Pan, Stove, *&c.* make all diſtant Objects appear trembling, when viewed either over or on either Side of thoſe Utenſils.

166. The inſenſible Cutaneous Evacuation is performed ſimply, and without any Artifice, through the ſmall Pores already mentioned, much in the ſame Manner as we obſerve the Smoke to ariſe from the Entrails of an Animal newly killed and opened. It is a particular and continual Diſcharge of the Serum of the Blood through the Capillary Veſſels of the Skin.

167. It is naturally very moderate, and it is more abundant in the Summer, before a good Fire, after ſtrong Exerciſe, and during the Diſtribution of the Chyle; than in the Winter, in cold Places, during Inaction, and before Meals.

168. The tranſpired Matter appears to be in ſome Degree ſaline, as may be obſerved by applying the Tongue to the Palm of the Hand, when it has not been waſhed lately before. This is perhaps the Reaſon why we feel leſs Pain when a Wound is touched with the Finger covered with Silk, than with the naked Finger; but this Inconveniency might eaſily be prevented by waſhing the Hands and Fingers very well, immediately before we begin to dreſs Wounds.

169. The Matter of the other two Cutaneous Evacuations, the Sweat and thick oily Subſtance, comes chiefly from the Glands of the Skin. Each of them differs according to the different Parts of the Body where they are found, as may be obſerved both of the Filth and Sweat of the Head, Armpits, Hands, Feet, *&c.*

170. This Filth or Naſtineſs of the Skin is an unctuous or fatty Matter, collected inſenſibly on the Epidermis, where it thickens and forms a Sor tof Varniſh, which in Time becomes prejudicial, by ſtopping up the Paſſages of Cutaneous Tranſpiration.

171. This Collection is more readily made in Winter, than in Summer; and this is the Reaſon why it is more difficult to keep the Hands clean in cold, than in warm Weather. And while I am diſſecting in Winter, the oftener I waſh my Hands, the leſs ſenſible they are of Cold.

§. 4. *The Membrana Adipoſa, and Fat.*

172. The ſecond univerſal Integument of the Human Body, is the Membrana Adipoſa, or Corpus Adipoſum. This is not, however, a ſingle Membrane, but a Congeries of a great Number of Membranous Laminæ, joined irregularly to each other at different Diſtances, ſo as to form numerous Interſtices of different Capacities, which communicate with each other. Theſe Interſtices have been named Cellulæ, and the Subſtance made up of them, the Cellulous Subſtance.

173. The Thickneſs of the Membrana Adipoſa is not the ſame all over the Body, and depends on the Number of Laminæ of which it is made up. It adheres very cloſely to the Skin, runs in between the Muſcles in general, and between their ſeveral Fibres in particular, and communicates with the Membrane which lines the Inſide of the Thorax and Abdomen.

174. This Structure is demonſtrated every Day by Butchers, in blowing up their Meat, when newly killed; in doing which, they not only ſwell the

Membrana Adipoſa, but the Air inſinuates itſelf likewiſe in the Interſtices of the Muſcles, and penetrates even to the Viſcera, producing a Kind of artificial Emphyſema.

175. These Cellular Interſtices are ſo many little Bags or Satchels, filled with an unctuous or oily Juice, more or leſs liquid, which is called Fat, the different Conſiſtence of which depends not only on that of the oily Subſtance, but on the Size, Extent and Subdiviſion of the Cells.

176. It is generally known, that the illuſtrious *Malpighi* took a great deal of Pains about this Subſtance; that in Birds and Frogs, the Viſcera and Veſſels of which are tranſparent, he thought he ſaw a Kind of Ductus Adipoſi; and that by preſſing theſe Ducts, he obſerved oily Drops to run diſtinctly into the ſmall Ramifications of the Vena Portæ.

177. The Manufacture of Soap, the Compoſition of the Unguentum Nutritum, and the different Mixtures of Oils with ſaline and acid Liquors, give us ſome Idea, at leaſt, of the Formation of the Fat in the Human Body; but the Organ which ſeparates it from the Maſs of Blood, which ought to be the Subject of our preſent Inquiry, is not yet ſufficiently known.

178. Fat is more fluid in living, than in dead Bodies. It melts with the Heat of the Fingers in handling it, and its Fluidity is in Part obſtructed by the Sacculi which contain it. To take it intirely out of the Bags, the Method is to ſet the whole over the Fire, in a proper Veſſel; for then the Bags burſt, and ſwim in Cluſters in the true oily Fluid.

179. This Subſtance increaſes in Quantity in the Body, by Reſt and good Living; and on the contrary, diminiſhes by hard Labour, and a ſpare Diet. Why Nouriſhment ſhould have this Effect, is eaſily conceived, and it is likewiſe eaſy to ſee, that an idle ſedentary Life muſt render the Fat leſs fluid, and conſequently more capable of blocking up the Paſſages of inſenſible Tranſpiration, through which it would otherwiſe run off.

180. Hard Labour diſſolves it, and conſequently fits it for paſſing out of the Body, with the other Matter of inſenſible Tranſpiration. Some are of Opinion, that it returns into the Maſs of Blood, by the Capillary Veins, and that it can, for ſome certain Time, ſupply the Want of Nouriſhment.

181. By this, they think, the long Abſtinence of ſome Animals may be explained; but I am apt to believe, that the mere Decreaſe of Cutaneous Tranſpiration, occaſioned by the continual Reſt and Inaction of theſe Animals, has a great Share in this Effect.

182. The proportional Differences, in the Thickneſs of this Membrana Adipoſa, are determined, and may be obſerved to be regular in ſome Parts of the Body, where either Beauty or Uſe required it.

183. Thus we find it in great Quantities, where the Interſtices of the Muſcles would otherwiſe have left diſagreeable hollow or void Places; but being filled, and as it were padded with Fat, the Skin is raiſed, and an agreeable Form given to the Part.

184. The Appearance of a Perſon moderately fat, of a Perſon extremely lean, and of a dead Carcaſe, from which all the Fat has been removed, proves ſufficiently what I have ſaid.

185. In ſome Parts of the Body the Fat ſerves for a Cuſhion, Pillow or Mattreſs, as on the Buttocks, where the Laminæ and Cells are very numerous. In other Parts, this Membrane has few or no Laminæ, and conſequently little or no Fat, as on the Fore-head, Elbows, *&c.*

186. In ſome Places it ſeems to be braced down by a Kind of natural Contraction in Form of a Fold; as in that Fold which ſeparates the Baſis of the Chin from the Neck. and in that which diſtinguiſhes the Buttocks from the reſt of the Thigh. We obſerve it likewiſe to be intirely ſunk, or as it were perforated by a Kind of Dimple or Foſſula, as in the Navel of fat Perſons.

187. These Depreſſions and Folds are never obliterated, let the Perſon be ever ſo fat, becauſe they are natural, and depend on the particular Conformation of the Membrana Adipoſa, the Laminæ of which are wanting at theſe Places.

188. The Fat is likewiſe of great Uſe to the Muſcles in preſerving the Flexibility neceſſary for their Actions, and in preventing or leſſening their mutual Frictions. This Uſe is of the ſame Kind with that of the unctuous Matter found in the Joints, which was explained in the Deſcription of the freſh Bones.

189. Lastly, the Fat, as a fine oily Subſtance in its natural State, may be ſome Defence againſt the Cold, which we find makes more Impreſſion on lean than on fat Perſons. It is for this Reaſon, that to guard themſelves againſt the exceſſive Colds of hard Winters, and to prevent Chilblains, Travellers rub the Extremities of their Bodies, and eſpecially their Feet, with ſpirituous Oils, ſuch as that of Turpentine, *&c.*

190. This Maſs of Fat, which makes an univerſal Integument of the Body, is different from that which is found in the Abdomen, Thorax, Canal of the Spina Dorſi, Articulations of the Bones, and in the Bones themſelves.

191. But the Difference of all theſe particular Maſſes of Fat conſiſts chiefly, as I have ſaid, in the Thickneſs or Fineneſs of the Pellicles, in the Largeneſs or Smallneſs of the Cells, and in the Conſiſtence, Fluidity and Subtlety of the oily Matter.

§. 5. *The Nails.*

192. The Nails are looked upon by ſome as Productions of the Cutaneous Papillæ, and by others, as a Continuation of the Epidermis. This laſt Opinion agrees with Experiments made by Maceration, by means of which the Epidermis may be ſeparated intire from the Hands and Feet, like a Glove or Sock.

193. In this Experiment we ſee the Nails part from the Papillæ, and go along with the Epidermis, to which they remain united like a Kind of Appendix; and yet their Subſtance and Structure appears to be very different from that of the Epidermis.

194. Their

194. Their Subſtance is like that of Horn, and they are compoſed of ſeveral Planes of longitudinal Fibres ſoddered together. Theſe Strata end at the Extremity of each Finger, and are all nearly of an equal Thickneſs, but of different Lengths.

195. The external Plane or Stratum is the longeſt, and the reſt decreaſe gradually, the innermoſt being the ſhorteſt; ſo that the Nail increaſes in Thickneſs from its Union with the Epidermis where it is thinneſt, to the End of the Finger where it is thickeſt.

196. The graduated Extremities or Roots of all the Fibres of which theſe Planes conſiſt, are hollowed for the Reception of the ſame Number of very ſmall oblique Papillæ, which are Continuations of the true Skin, which having reached to the Root of the Nail, forms a Semilunar Fold in which that Root is lodged.

197. After this Semilunar Fold, the Skin is continued on the whole inner Surface of the Nail, the Papillæ inſinuating themſelves in the Manner already ſaid. The Fold of the Skin is accompanied by the Epidermis, to the Root of the Nail exteriorly, to which it adheres very cloſely.

198. Three Parts are generally diſtinguiſhed in the Nail, the Root, Body and Extremity. The Root is white and in Form of a Creſcent; and the greateſt Part of it is hid under the Semilunar Fold already mentioned.

199. The Creſcent and the Fold lie in contrary Directions to each other. The Body of the Nail is naturally arched, tranſparent, and appears of the Colour of the Cutaneous Papillæ which lie under it. The Extremity of the Nail does not adhere to any Thing, and ſtill continues to grow as often as it is cut.

200. The principal Uſe of the Nails is to ſtrengthen the Ends of the Fingers and Toes, and to hinder them from being inverted towards the convex Side of the Hand or Foot, when we handle or preſs upon any Thing hard. For in the Hand, the ſtrongeſt and moſt frequent Impreſſions are made on the Side of the Palm, and in the Foot, on the Sole; and therefore the Nails ſerve rather for Buttreſſes than for Shields.

§. 6. *The Hairs.*

201. The Hairs belong as much to the Integuments as the Nails. They are a Kind of Reeds or Ruſhes, the Roots or Bulbs of which lie toward that Side of the Skin which is next the Membrana Adipoſa. The Trunk or Beginning of the Stem perforates the Skin, and the reſt of the Stem advances beyond the outer Surface of the Skin, to a certain Diſtance, which is very various in the different Parts of the Body.

202. When the different Hairs are examined by a Microſcope, we find the Roots more or leſs oval, the largeſt Extremity being either turned toward or fixed in the Corpus Adipoſum. The ſmalleſt Extremity is turned toward the Skin, and in ſome Places fixed in the Skin.

203. This oval Root is covered by a whitiſh ſtrong Membrane, in ſome Meaſure elaſtic, and it is connected either to the Skin, to the Corpus Adi-

poſum, or to both, by a great Number of very fine Veſſels and nervous Filaments.

204. WITHIN the Root we obſerve a Kind of Glue, ſome very fine Filaments of which advance toward the ſmall Extremity, where they unite and form the Stem which paſſes through the ſmall Extremity to the Skin. As the Stem paſſes through the Root, the outer Membrane is elongated in Form of a Tube which cloſely inveſts the Stem, and is intirely united to it.

205. THE Stem having reached the Surface of the Skin, pierces the Bottom of a ſmall Foſſula between the Papillæ, or ſometimes a particular Papilla, and there it meets the Epidermis, which ſeems to be inverted round it, and to unite with it entirely. A ſort of unctuous Matter tranſudes through the Sides of the Foſſula, which is beſtowed on the Stem, and accompanies it more or leſs, as it runs out from the Skin, in Form of an Hair.

206. HAIRS differ in Length, Thickneſs, and Solidity, in the different Parts of the Body. Thoſe on the Head are called in *Engliſh* by the general Name of Hairs; thoſe which are diſpoſed archwiſe above the Eyes, Supercilia, or the Eye-Brows; thoſe on the Edges of the Palpebræ, Cilia, or the Eye-Laſhes; and thoſe which ſurround the Mouth, and cover the Chin, the Beard. In other Parts of the Body, they have no particular Names; and their different Lengths, Thickneſſes, *&c.* in all theſe Parts, are ſufficiently known.

207. THEIR natural Figure ſeems to be rather cylindrical, than angular; which is chiefly accidental. Their Colour is probably the ſame with that of the Glue, or medullary Matter of the Root, the different Conſiſtence of which makes the Hairs more or leſs hard, flexible, *&c.* Laſtly, their ſtraight or crooked Direction muſt depend on that of the Holes through which the Stems paſs.

208. THE Uſe of the Hairs, with reſpect to the Human Body in general, is not ſufficiently known to be determined with Certainty. Their Uſes with regard to ſome particular Parts may be diſcovered, as we ſhall ſee in the Deſcription of theſe Parts.

§. 7. *The ſuppoſed Integuments of the Ancients.*

209. BESIDES the Integuments which I have here deſcribed, the Ancients reckoned two others, the Panniculus Carnoſus, and Membrana Communis Muſculorum.

210. THE Panniculus Carnoſus is found in Quadrupeds, but not in Men, whoſe Cutaneous Muſcles are in a very ſmall Number, and moſt of them of a very ſmall Extent, except that which I call Muſculus Cutaneus in particular; but even that Muſcle cannot in any tolerable Senſe be reckoned a common Integument.

211. THERE is no common Membrane of the Muſcles, which covers the Body like an Integument; it being no more than particular Expanſions of the

the Membranes of ſome Muſcles, or Aponeurotic Expanſions from other Muſcles.

212. The Elongations of the Lamina of the Membrana Adipoſa, or Cellularis, may likewiſe have given Riſe to this Miſtake, eſpecially in ſuch Places where this Membrane is cloſely unitedto the proper Membrane of the Muſcles.

SECT.

SECT. VIII.

A Deſcription of the ABDOMEN.

Introduction. 1. IN the compendious View of the Parts of the Human Body, I gave a general Deſcription and Diviſion of the Abdomen, with a particular Enumeration of the external and internal Parts of which it is compoſed, and which it contains or ſupports. Therefore, that I may not be obliged to repeat theſe general Things, I muſt deſire the Reader to reviſe what was there ſaid, before he begins this Section.

External Conformation of the Abdomen. 2. THE whole Forepart of the Abdomen forms an oblong Convexity, like an oval Vault, more or leſs prominent in the natural State, in Proportion to the Quantity of Fat upon it, and of Food contained in it, or to the different Degrees of Pregnancy in Women. The Hypogaſtric and Umbilical Regions are more ſubject to theſe Varieties, than the Epigaſtric Region.

3. ON the Sides, between the Hypochondria, and Oſſa Ilium or Haunch, the Abdomen is commonly a little contracted; and backward, about the Middle of the Regio Lumbaris, it is gently depreſſed, forming a Kind of tranſverſe Cavity, anſwering to the natural Incurvation of the Lumbar Portion of the Spina Dorſi, deſcribed in Sect. I.

4. THIS anterior Convexity, and poſterior Cavity change, as we ſit, ſtand, kneel, lie at our full Length, or with the Thighs bent; and theſe Variations depend on the particular Situation of the Oſſa Innominata, in theſe different Poſtures.

5. IN ſtanding, the Convexity of the Belly, and Cavity of the Loins, are more conſiderable, than in moſt other Situations; for then the lower Extremity of the Os Sacrum is turned very far back, and conſequently the Os Pubis very much down. In this Situation of the Pelvis, the Inteſtines fall naturally forward, and thus increaſe the Convexity of the Abdomen; and as the Vertebræ of the Loins are very much bent at the ſame Time, the Cavity in that Place muſt likewiſe be very conſiderable.

6. IN kneeling, the Oſſa Pubis are ſtill lower than when we ſtand; and this not only increaſes the Hollow of the Loins, and throws the Abdomen and its Viſcera more outward or forward, but alſo in ſome Meaſure ſtrains the Abdominal Muſcles; which is ſo uneaſy to ſome Perſons, as to cauſe them to faint away.

7. THIS Depreſſion of the Os Pubis in kneeling, depends partly on the Tenſion of the two Muſculi Recti Anteriores, the lower Tendons of which are in this Situation drawn with Violence under the Condyloide Pulley of the Os Femoris.

8. WHEN we ſit in the common Manner, that is, with the Thighs ſtretched out in a Plane parallel to that of the Seat, the Convexity of the Belly and Hollow of the Loins diminiſh.

9.

9. For the Pelvis being in this Situation, ſupported on the Tubercula Iſchii, and theſe Tubercles being very near the Forepart of the Pelvis; the Trunk of the Body preſſing on the Os Sacrum, muſt lower the Pelvis behind, and raiſe it before.

10. When we lie upon the Back at full Length, and with the Thighs extended, the Belly is leſs convex, but more ſtretched and hard; whereas, when the Thighs are bent, it is ſoft and lax. In this Situation, the Regio Lumbaris is almoſt flat and very little depreſſed.

11. When we lie on the Back, and raiſe the Head, or endeavour to raiſe it, we feel a Tenſion in the Forepart of the Abdomen, which increaſes in Proportion to the Force we uſe in raiſing the Head.

12. These Varieties of the external Conformation of the Abdomen have a near Relation to ſo great a Number of other Phænomena, in the Animal Œconomy of the Human Body, that it would require a whole Volume to explain all the Particulars thereof; neither are Details of this Kind very proper in a Work deſigned to be purely Anatomical, in which, conſequently, our main Buſineſs is to give a full and accurate Deſcription of the true Structure of the Parts, and only to point out in general their principal Uſes. The reſt I reſolve to make the Subject of another Work, as I have already ſaid.

13. I mentioned the Integuments of the Abdomen in general, in the compendious View of the Parts. Fewer Papillæ appear in the Skin of the Belly than any where elſe. The anterior Portion of it is not only thinner and more compact than the poſterior, as has been already obſerved, but it has this likewiſe peculiar to it, that it may be naturally increaſed very much in Breadth, and ſometimes in a very extraordinary Manner, without loſing any thing of its Thickneſs, in Proportion to what it gains in Breadth. *Integuments of the Abdomen.*

14. This Peculiarity likewiſe belongs to the Epidermis. I here ſpeak only of what is obſervable in the natural State of Corpulency or Pregnancy, but I have not as yet been able to diſcover, what it is in the Texture or Structure of this Skin and Epidermis, on which this Peculiarity depends. All that I have been able to remark about it, was in the dead Body of a Woman, whoſe Belly was contracted and fallen; namely, that on the Surface of the Skin there was a great Number of Lozenges diſpoſed in a reticular Manner.

15. The Marks of theſe ſuperficial Lozenges were in the Epidermis. They were compoſed of ſeveral fine Lines, which all together extended to a ſenſible Breadth. The Areas or Meſhes of theſe Lozenges, which ſeemed to be about the ſixth Part of an Inch in Breadth, were very flat and thin.

16. In the Manner in which *Steno* uſed to open Bodies, by making two longitudinal Inciſions in the Integuments, and ſo leaving a middle Band made up of the Skin and Fat, in their true Places, it is eaſy to demonſtrate the Union of the Aponeurotic or Tendinous Productions with the Arteries, Veins and Nerves, in order to form the Skin of the Abdomen; and the ſame Uſe might be made of this Method, in other Parts of the Skin, as I ſhall ſhow in another Place.

17. The Cells of the Membrana Adipoſa, which covers the convex Part of the Abdomen, are diſpoſed in a very regular Manner, as I diſcovered by that Method of opening Bodies which I have always made Uſe of, both in my publick and private Courſes. This Method is to make two oblique Inciſions in the Integuments, from the Navel to the Groins, and to ſeparate this angular Portion of the Integuments, and throw it down over the Parts of Generation, that they may be covered during the Demonſtration.

18. This triangular Portion being thus inverted, there appears on the inner Surface of the Membrana Adipoſa, a longitudinal Line like a Kind of Raphe, produced by the Meeting of theſe cellular Rows, which form Angles ſucceſſively, one above another, oppoſite to the Linea Alba of the Abdomen. The Cells in theſe Rows are more oblong than the reſt, and in a manner oval, or like a Grain of Wheat.

Cavity of the Abdomen.

19. The Appendix Enſiformis of the Sternum, the Cartilaginous Portions of the laſt Pair of true Ribs, thoſe of the firſt four Pairs of falſe Ribs, all the fifth Pair, the five Lumbar Vertebræ, the Oſſa Innominata, the Os Sacrum, and Os Coccygis, form the bony Sides of the Cavity of the Abdomen.

20. The Diaphragm, the Muſcles called particularly Muſculi Abdominis, the Quadrati Lumborum, Pſoai, Iliaci, the Muſcles of the Coccyx, and of the Inteſtinum Rectum, form the chief Part of the Circumference of this Cavity, and its whole inner Surface is lined by a membranous Expanſion termed Peritonæum; all theſe Parts being covered by the Integuments already ſpoken to. As additional or auxiliary Parts, we might likewiſe add ſome Portions of the Sacro-Lumbares, Longiſſimi Dorſi, Vertebrales, Glutæi, *&c.*

21. The Cavity of the Abdomen is of an irregularly oval Figure, but ſtill ſymmetrical. On the Foreſide it is uniformly arched or oval, and its greateſt Capacity is even with the Navel, and neareſt Part of the Hypogaſtrium. On the upper Side it is bounded by a Portion of a Vault, very much inclined. On the Backſide, it is in a Manner divided into two Cavities by the jutting out of the Vertebræ of the Loins. On the lower Side, it contracts gradually all the Way to what I call the little Edge of the Pelvis, and from thence expands again a little, as far as the Os Coccygis, and Tubercles of the Iſchium, terminating in the void Space between theſe three Parts.

§. 1. *Peritonæum.*

22. Having carefully removed the Muſcles of the Abdomen, the firſt thing we diſcover is a very conſiderable membranous Covering, which adheres immediately to the inner Surface of the Muſculi Tranſverſi, and of all the other Parts of this Cavity; and involves and inveſts all the Viſcera contained therein, as in a Kind of Bag. This Membrane is named Peritonæum, from a *Greek* Word, which ſignifies to be ſpread around.

23. The

23. The Peritonæum in general is a Membrane of a pretty close Texture, and yet very limber and capable of a very great Extension; after which it can recover itself, and be contracted to its ordinary Size; as we see in Pregnancy, Dropsies, Corpulency and Repletion.

24. It seems to be made up at least of two Portions, one internal, the other external; which have been looked upon by many Anatomists, as a Duplicature of two distinct membranous Laminæ. But properly speaking, the internal Portion alone deserves the Name of a membranous Lamina, as being the main Body of the Peritonæum. The external Portion is no more than a Kind of fibrous or follicular Apophysis of the internal; and may properly enough be termed the Cellular Substance of the Peritonæum.

25. The true membranous Lamina, commonly called the internal Lamina, is very smooth, and polished on that Side which is turned to the Cavity and Viscera of the Abdomen, and continually moistened by a serous Fluid discharged through almost imperceptible Pores.

26. These Pores may be seen by spreading a Portion of the Peritonæum on the End of the Finger, and then pulling it very tight on all Sides; for then the Pores are dilated, and small Drops may be observed to run from them, even without a Microscope.

27. The Sources of this Fluid are not as yet sufficiently known. Perhaps it comes out by a Kind of Transudation or Transpiration, like that which we observe in Animals newly killed. The whitish Corpuscles found in diseased Subjects are no Proof of the Glands, which some Anatomists place there in the natural State.

28. The Cellular Substance, or external Portion of the Peritonæum, adheres very closely to the Parts which form the Insides of the Cavity of the Abdomen, and it is not every where of an equal Thickness. In some Places it is in a very small Quantity, and scarcely any appears at the Tendinous or Aponeurotic Portions of the Musculi Transversi, and on the lower Side of the Diaphragm.

29. In all other Places, it is thicker, and forms Cells expanded into very fine Laminæ, which in diseased Subjects become sometimes so broad and thick, as to resemble so many distinct Membranes.

30. In some Places, this Substance is every Way like a Membrana Adiposa, being filled with Fat, as round the Kidneys, and along the fleshy Portions of the transverse Muscles to which it adheres. It intirely surrounds some Parts, as the Bladder, Ureters, Kidneys, Spermatic Vessels, *&c.* and it is in these Places improperly termed the Duplicature of the Peritonæum.

31. Besides these Differences in Thickness, the Cellular Substance has several Elongations, which have been called Productions of the Peritonæum. Two of these Productions accompany and invest the Spermatic Ropes in Males, and the Vascular Ropes, commonly called the round Ligaments, in Women. There are other two, which pass under the Ligamentum Fallopii, with the Crural Vessels, which they involve, and they are gradually lost in their Course downward.

32. To theſe four Productions of the Cellular Subſtance of the Peritonæum, we may add a fifth, which is ſpread on the Neck of the Bladder, and perhaps a ſixth, which accompanies the Inteſtinum Rectum. All theſe Elongations paſs out of the Cavity of the Abdomen, and may be termed external, to diſtinguiſh them from others that remain in the Abdomen, and are called internal, of which hereafter.

33. The great Blood-Veſſels, that is, the Aorta and Vena Cava, are likewiſe involved in this Cellular Subſtance of the Peritonæum. In a Word, it involves immediately and ſeparately all the Parts and Organs which are commonly ſaid to lie in the Duplicature of the Peritonæum.

34. The true Lamina or membranous Portion of the Peritonæum, is connected by the Intervention of the Cellular Subſtance, to the inner Surface of the Cavity of the Abdomen, but it does not naturally accompany the external Elongations of that Subſtance. It only covers the Origin or Baſis of theſe Productions, without any Alteration in its own Surface, at theſe Places.

35. It has, nevertheleſs, Productions of its own, but they are very different from thoſe of the Cellular Subſtance; for they run from without, inward, that is, they advance from the convex Side of the great Bag of the Peritonæum, into the Cavity of that Bag, ſome more, ſome leſs, and alſo in different Manners; as if the Sides of a large Ball or Bladder were thruſt inward into the Cavity of the Ball or Bladder.

36. Of theſe internal Elongations or Intropreſſions of the true Lamina of the Peritonæum, ſome are ſimply folded, like a Duplicature; ſome are expanded like inverted Bags or Sacculi to contain ſome Viſcus; ſome begin by a ſimple Duplicature, and are afterwards expanded into a Cavity which contains ſome Organ; ſome are alternately extended in the Form of ſimple Duplicatures, and of Cavities; and laſtly, ſome form only a ſmall Eminence on the inner Surface of the great Cavity of the Peritonæum.

37. Under the firſt Species of theſe Productions, we may bring the membranous Ligaments of the Abdomen, ſuch as thoſe of the Liver, Colon, *&c.* We ſee the ſecond Species in the external Membrane of the Liver; the third, in the Meſentery; the fourth, in the Meſocolon; and the fifth, at the Kidneys and Ureters.

38. Besides the external Productions of the Cellular Subſtance of the Peritonæum, it has the ſame Number of internal Elongations with the true Lamina; which lie between all the Duplicatures, and line the Inſides of all the Cavities, or that Side next the Viſcera contained in them.

39. The Uſes of the Peritonæum in general ſeem to be very evident from the Deſcription which I have given of it; and the chief of theſe Uſes are, to line the Cavity of the Abdomen, to inveſt the Viſcera contained in that Cavity as in a common Bag, to ſupply them with particular Coats, to form Productions, Ligaments, Connexions, Folds, Vaginæ, *&c.* as we ſhall ſee hereafter.

40. The fine Fluid which tranſudes through the whole internal Surface of the Peritonæum, prevents the Inconveniencies which might ariſe from the continual

continual Frictions and Motions, to which the Viſcera of the Abdomen are expoſed either naturally or by external Impulſes.

41. I muſt here obſerve, that it is the common Cuſtom to demonſtrate four Ligamentary Ropes, termed the Umbilical Veſſels, before the Peritonæum is opened, becauſe they adhere to the Umbilicus, and three of them are really Veſſels in the Fœtus, *viz.* two Umbilical Arteries, and one Vein. We are in a Manner obliged to ſubmit to this Cuſtom, in public Anatomical Demonſtrations, where we have but one Subject for the whole; but as I am here under no ſuch Neceſſity, I refer the Deſcription of theſe Ligaments to other more proper Places of this Work. The Venal Ligament ſhall be deſcribed in the Hiſtory of the Liver; and the two Arterial Ligaments, together with the Urachus, which is the fourth, in the Hiſtory of the Bladder.

42. It is ſufficient to obſerve here in general, that three of theſe Umbilical Ropes or Ligaments are involved ſeparately, and ſuſtained by a Production or Duplicature, which the Peritonæum ſends into the Cavity of the Abdomen, in Form of a Falx. In the publick Diſſections and Demonſtrations which I made at the Phyſic-Schools in 1726, I ſhewed the Manner of demonſtrating theſe Falces, and of diſtinguiſhing them from the Ligamentary Ropes.

§. 2. *Ventriculus.*

43. The Stomach is a great Bag or Reſervoir, ſituated partly in the left Hypochondrium and partly in the Epigaſtrium. *Situation and Figure of the Stomach.*

44. The Figure of the Stomach is like that of a Bag-Pipe, that is, it is oblong, incurvated, large and capacious at one End, and ſmall and contracted at the other. We ſee this Figure moſt evidently, when the Stomach is moderately filled with Air or with any other Fluid.

45. The Curvature of the Stomach gives us Occaſion to diſtinguiſh two Arches in it, one large, which runs along the greateſt Convexity, and one ſmall, directly oppoſite to the former. I name theſe Arches the great and ſmall Curvatures of the Stomach; and by the Sides of the Stomach, I underſtand the two lateral Portions which lie between the two Arches.

46. The Stomach has two Extremities, one large, and one ſmall like a crooked Funnel. It has two Openings, called the Orifices of the Stomach, one between the great Extremity and the ſmall Curvature, the other at the End of the ſmall or contracted Extremity. The firſt Opening is a Continuation of the Œſophagus; the other joins the Inteſtinal Canal, and is called by the Name of the Pylorus.

47. The Stomach is not ſituated in the left Hypochondrium, and Epigaſtric Region in the Manner repreſented in moſt of the Figures. It lies tranſverſely, obliquely, and almoſt laterally, in ſuch a Manner, as that the great Extremity and the Orifice next it, are on the left Hand, and the ſmall Extremity with its Orifice or the Pylorus, on the right Hand, and lower and more inclined than the former. Therefore we ought with the ancient Anatomiſts to call one of theſe Orifices ſuperior, the other inferior.

48. The

48. The great Extremity of the Stomach is in the left Hypochondrium, and for the moſt Part immediately under the Diaphragm. Yet the ſuperior Orifice is not in the left Hypochondrium, but almoſt oppoſite to, and very near the Middle of the Bodies of the loweſt Vertebræ of the Back.

49. The ſmall Extremity of the Stomach does not reach to the right Hypochondrium. It bends obliquely backward toward the upper Orifice, ſo that the Pylorus lies about two Fingers Breadth from the Body of the Vertebræ, immediately under the ſmall Portion of the Liver, and conſequently lower down, and more forward than the other Orifice, by almoſt the ſame Diſtance. This Extremity of the Stomach has ſometimes a particular Dilatation on the Side next the great Curvature.

50. According to this natural Situation, the Stomach, eſpecially when full, lies ſo as that the great Curvature is turned more forward than downward, and the ſmall Curvature more backward than upward.

51. One of the lateral convex Sides is turned upward, the other downward; and not forward and backward, as they appear in dead Bodies, where the Inteſtines do not ſupport them in their natural Situation.

52. If we divide the Stomach along the two Curvatures into two equal Parts, we ſhall ſee that the two Orifices do not both adhere to the ſame Half of this Diviſion, as we would be apt to imagine according to the common Notion; but that the Diaphragmatic Orifice is intirely in the upper Half, and the Inteſtinal Orifice in the lower Half.

53. Therefore the Body of the Stomach is ſo far from lying in the ſame Plane with the Œſophagus, as it is commonly repreſented in Figures drawn from a Stomach taken out of the Body and laid upon a Table; that it forms an Angle or Fold, immediately at the Paſſage of the Œſophagus through the ſmall Muſcle of the Diaphragm; and it is on account of this Angle that the ſuperior Orifice is turned backward.

Structure of the Stomach.

54. The Stomach is compoſed of ſeveral Parts, the chief of which are the different Strata which form its Subſtance, to which Anatomiſts give the Name of Tunicæ or Coats. Theſe Coats are commonly reckoned to be four in Number, the outer or common, the fleſhy or muſcular, the nervous or aponeurotic, and the villous or inner Coat; and they are afterwards ſubdivided ſeveral Ways.

55. The firſt or outermoſt Coat is ſimply membranous, being one of the internal Productions of the Peritonæum. This appears evidently at the Connexion of the ſuperior Orifice with the Diaphragm, where the external Membrane of the Stomach is really continuous with the Membrane which lines the inferior Surface of the Diaphragm; and it is from this that it has been named the common Coat.

56. The ſecond or Muſcular Coat is made up of ſeveral Planes of Fibres, which may all be reduced to two, one external, the other internal. The external Coat is longitudinal, tho' in different Reſpects, following nearly the Direction of the Curvatures and Convexities of the Stomach; and the internal Plane is tranſverſely circular.

57.

57. The Fibres of the external Plane run ſlanting in ſeveral Places, and are interſected by ſmall oblique whitiſh Lines, which ſeem to be in ſome Meaſure tendinous. This Plane is ſtrengthened by a particular Faſciculus which runs along the ſmall Curvature, its Fibres appearing to be leſs oblique than thoſe of the great Plane.

58. The Fibres of the inner or circular Plane of this Muſcular Coat are ſtronger than thoſe of the outer Plane. They are rather Segments which unite at different Diſtances, than entire Circles; and they are likewiſe interſected by great Numbers of ſmall white Lines, in ſome Meaſure tendinous, and very oblique, which all together repreſent a Kind of Net-work, the Areolæ or Meſhes of which are very narrow.

59. As theſe Circles or Segments advance on the great Extremity of the Stomach, they diminiſh gradually, and form a Kind of muſcular Vortex, the Center of which is in the Middle of that Extremity.

60. Between the outer and inner Planes, round the ſuperior Orifice, there are two diſtinct Planes, about the Breadth of a Finger, and very oblique, which ſurround this Orifice in oppoſite Directions, and interſect each other where they meet on the two lateral Sides.

61. Along the Middle of each lateral Side of the ſmall Extremity, there runs a tendinous or ligamentary flat Portion, above a Quarter of an Inch in Breadth, which terminates in the Pylorus. Theſe two Portions lie between the common and muſcular Coats, and adhere very ſtrongly to the firſt.

62. Between the ſame two Coats, there is a Cellular Subſtance which adheres very cloſely to the external Coat, and inſinuates itſelf between the fleſhy Fibres of the ſecond, all the Way to the third, as may be perceived by blowing it up. Some make it a diſtinct Coat, and call it Tunica Celluloſa, but it is no more than the Cellular Portion of the Membranous Coat, like the Cellullar Portion of the Peritonæum.

63. The third Coat, called commonly Tunica Nervoſa, ſuſtains on its convex Side, a very large reticular Diſtribution of Capillary Veſſels and Nerves. On the concave Side it ſeems to be of a very looſe Texture, and as it were ſpungy or filamentary, containing a great Number of ſmall Glandular Bodies, eſpecially near the ſmall Curvature and ſmall Extremity of the Stomach.

64. This ſpungy Texture reſembles fine Cotton, as may be ſeen by macerating it a little in clear Water, which ſwells it conſiderably in a very ſhort Space of Time. It is ſupported by a Kind of Ground-work of very fine Ligamentary or Aponeurotic Filaments which interſect each other obliquely, much in the ſame Manner as the third Coat of the Inteſtines, of which hereafter; and it adheres to the convex Side of the Villous Coat.

65. The fourth Coat of the Stomach is termed Villoſa, becauſe when it ſwims in clear Water, ſome have imagined they ſaw ſomething in it like the Pile of Velvet. The Ancients called it Tunica Fungoſa, and perhaps this Name agrees beſt with its true Structure. We obſerve in it a great Number of ſmall Holes anſwering to the ſmall Glands already mentioned.

66. These two Coats are of a larger Extent than the two former, and they join in forming large Rugæ on the concave Surface of the Stomach,

the greateſt Part of which are tranſverſe, tho' irregular and waving. There are likewiſe ſome longitudinal ones, which interſect the others, but at the Pylorus they all become longitudinal, and terminate there.

67. At the ſuperior Orifice of the Stomach, theſe Rugæ are in a Manner radiated, and ſeem to be a Continuation of the Plicæ or Folds of the Œſophagus; only they are thicker, and where theſe Rugæ and Plicæ meet, they form a Sort of Crown, which diſtinguiſhes the ſuperior Orifice of the Stomach from the inferior Extremity of the Œſophagus.

68. In the Interſtices of theſe Rugæ, there is often found a Sort of ſlimy Mucus, with which the whole Cavity of the Stomach ſeems likewiſe to be moiſtened. This Mucus is much more fluid in living Bodies, and is ſupplied by the Glands of the Stomach. It may be termed Succus Gaſtricus or Stomachicus.

69. On the inner Surface of the ſmall Extremity of the Stomach, at the Place where it ends in the Inteſtinal Canal, we obſerve a broad, thin, circular Border, with a roundiſh Hole in the Middle. This Hole is the inferior Orifice of the Stomach, called by the *Greeks* Pylorus, which ſignifies a Porter.

70. This Border is a Fold or Duplicature of the two inner Coats of the Stomach, the Nervoſa and Villoſa; and it is formed in Part by a Faſciculus of fleſhy Fibres, fixed in the Duplicature of the Tunica Nervoſa, and diſtinguiſhed not only from the other fleſhy Fibres of the Extremity of the Stomach, but alſo from thoſe of the Inteſtines, by a thin, whitiſh Circle, which appears even through the external or common Coat, round the Union of the Stomach and Inteſtines.

71. The Figure of the Pylorus is that of a Ring, tranſverſely flatted, the inner Edge of which, or that next the Center, is turned obliquely toward the Inteſtines, like a broad Portion of a Funnel. This inner Edge runs naturally more or leſs into little Plaits or Gathers, like the Mouth of a Purſe almoſt ſhut; all which Particulars are very different from what Figures and dried Preparations would make us believe. It is therefore a Kind of Sphincter, which can contract the inferior Orifice of the Stomach, but ſeems not capable of ſhutting it quite cloſe.

Arteries of the Stomach.

72. The principal Arteries of the Stomach are the Coronaria Ventriculi, which runs along the ſmall Curvature, and the two Gaſtricæ, that is, the Siniſtra or Major, and Dextra or Minor, both which form one common Artery, which runs along the great Curvature. The Coronaria Ventriculi becomes united in the ſame Manner with the Pylorica, and both make one common Veſſel.

73. These two Arterial Arches ſend a great Number of Branches toward each other on both Sides of the Stomach; and theſe Branches are gradually ramified in different Directions, by very frequent Diviſions and Subdiviſions, the greateſt Part of which communicate with thoſe from the other Artery.

74. From theſe frequent Ramifications and Communications of the Arterial Arches of the Stomach, two different reticular Textures ariſe, whereof one

one which is the largeſt, lies between the common and Muſcular Coats in the Cellular Subſtance found there; the other, which is very fine, lies on the Surface of the Tunica Nervoſa. This latter is a Production of the firſt, being formed by Means of a great Number of very ſhort Rami, which go out from the other, and paſs through the ſmall Interſtices between the Fibres of the Muſcular Coat.

75. By artificial Injections we can ſhew a third extremely fine reticular Texture of Capillary Veſſels, which run between the Glandular Bodies and Papillæ of the Tunica Villoſa. Theſe do not ſeem in the natural State to be purely Blood-Veſſels, as Inflammations and Injections may incline us to think.

76. The Arteries of the Stomach come originally from the Cæliaca by Means of the Hepatica, Splenica, and Coronaria. The Pylorica and Meſenterica Superior likewiſe contribute to them by Communications, more or leſs immediate. They communicate alſo with the Mammariæ Internæ, and Diaphragmaticæ, and by Means of the Epigaſtrica Siniſtra with the Meſenterica Inferior.

77. The Veins of the Stomach are Ramifications of the Vena Portæ in general, and in particular of the Meſaraica Major, Splenica, and Hæmorrhoidalis Interna, the Diſtribution of which may be ſeen in the Deſcription of the Veins. They accompany the Arteries more or leſs, and form nearly the ſame Kinds of Arches and Reticular Textures, with this Difference, that they are proportionably greater, their Reticular Areolæ larger, and their external Communications more frequent. *Veins of the Stomach.*

78. Between the common and Muſcular Coats of the Stomach, we find a greater Number of Nerves of different Sizes. Many of them accompany each other, in Form of a broad flat Faſciculus, along the ſmall Curvature of the Stomach, from the ſuperior to the inferior Orifice. The reſt are ſpread in different Directions on the Sides, Extremities, and great Curvature, forming at different Diſtances a Kind of Reticular Plexus, from which a great Number of Filaments are detached to the inner Coats. *Nerves of the Stomach.*

79. They ariſe chiefly from the Nervi Sympathetici Medii, or eighth Pair, by Means of the Plexus Coronarius Stomachicus formed round the ſuperior Orifice of the Stomach by the Expanſion of the Extremities of two large Ropes, which run down upon the Œſophagus, by the Name of Nervi Stomachici. The great Sympathetic Nerve, commonly called Intercoſtalis, contributes likewiſe to them by communicating Filaments, which the Plexus Stomachicus receives from the Semilunar Ganglions of the Plexus Hepaticus, and particularly from the Plexus Splenicus.

80. The Stomach receives in general whatever the Mouth and Tongue ſend thither, through the Canal of the Œſophagus, but its particular Uſe is to receive the Aliments, to contain them for a longer or ſhorter Time, in Proportion as they are more ſolid or fluid, and to digeſt them, that is, to put them in a Condition to be turned into that nutritious Fluid called Chyle. *Uſes of the Stomach.*

81. This Operation, which goes by the general Name of Digeſtion, and by which Chylification begins, is performed partly by the Succus Gaſtricus, which flows continually from the Tunica Villoſa, and partly by the continual Contraction and Relaxation of the Muſcular Coat. Theſe Motions in Men are but very weak, and no Ways ſufficient for Digeſtion, without the Aſſiſtance of the alternate Motions of the Diaphragm and Muſcles of the Abdomen.

82. The Pylorus, or fleſhy Circle of the inferior Orifice of the Stomach, ſerves to retain the Aliments in it, till they have acquired a ſufficient Degree of Fluidity to paſs eaſily through that Opening. I ſay eaſily, for by a particular Irritation of the Muſcular Coat of the Stomach, and ſtill more by a violent Contraction of the Diaphragm and Muſcles of the Abdomen, the Contents of the Stomach may be very ſoon forced towards the ſmall Extremity, and puſhed through the Pylorus.

83. The gentle and alternate Motions of the Orbicular Fibres of the Muſcular Coat, may aſſiſt in ſending through the Pylorus, in the natural Way, the Aliment that is ſufficiently digeſted. This was called the Periſtaltic or Vermicular Motion, by thoſe who believed that it is ſucceſſively reiterated, like that of Earth-Worms when they creep.

84. Trituration might be a proper enough Term for this Operation, provided it be made to ſignify only a gentle Agitation or Action of the fleſhy Fibres, in a Subſtance continually moiſtened by the Gaſtric Liquor, and not a violent grinding of a dry Subſtance.

85. The Situation of the Stomach, which is nearly tranſverſe, is likewiſe of Uſe in making the Aliment remain long enough in that Cavity, and may ſerve to make the Length of this Stay in ſome Meaſure arbitrary, by Means of the different Poſtures of the Body; for when we lie on the left Side, the Aliment muſt remain longer than when we lie on the right, *&c.*

86. The Obliquity of the Stomach may ſerve to clear up a Difficulty that very much torments thoſe who believe that both Orifices of the Stomach lie in the ſame Level; which is, how any heavy Subſtance once got into the Stomach, can ever riſe again to this Level to paſs into the Inteſtines.

§. 3. *The Inteſtines in general, and Inteſtinum Duodenum in particular.*

Situation, Size, and Diviſion of the Inteſtines.

87. Between the Pylorus and the very loweſt Part of the Abdomen, lies a long Canal, bent in a great many different Directions by numerous Convolutions or Turnings, called the Inteſtines.

88. This Canal, thus folded and turned, forms a conſiderable Bulk, which fills the greateſt Part of the Cavity of the Abdomen; and it is connected through its whole Extent to Membranous Productions or Continuations of the Peritonæum, principally to thoſe called the Meſentery and Meſocolon, of which hereafter.

89. The Incurvations of the Inteſtinal Canal form two Arches, a ſmall one, by which it is connected to the Meſentery and Meſocolon, and a great one on the oppoſite Side, which lies looſe. The whole Canal is generally about ſeven or eight Times as long as the Subject.

90. The

90. The Inteſtinal Canal is neither of an equal Size nor Thickneſs through its whole Length, from whence Anatomiſts have taken Occaſion to conſider its different Portions as ſo many particular Inteſtines, and to divide them all into ſmall and great.

91. And as they ſtill found ſome Differences in each Claſs taken all together, they divided each into three Portions, which they diſtinguiſhed by particular Names. In the ſmall Inteſtines the three Portions are named Duodenum, Jejunum, and Ileum; and in the great Inteſtines, Cæcum, Colon and Rectum.

92. The Inteſtines in general are compoſed of ſeveral Coats, much in the ſame Manner with the Stomach. The firſt and outermoſt is a Continuation of the Meſentery, or of ſome other Elongation or Duplicature of the Peritonæum. *Structure of the Inteſtines.*

93. This is commonly termed the common Coat, and it has a Cellular Subſtance on its inner Surface, like that of the Stomach, which M. *Ruyſch* thought fit to call a diſtinct Coat, by the Name of Tunica Celluloſa.

94. The ſecond Coat of the Inteſtines is fleſhy or muſcular, and made up of two Planes, one external, the other internal. The external Plane is very thin, and its Fibres longitudinal; the internal Plane is thicker, and its Fibres run tranſverſely round the Circumference of the Inteſtinal Cylinder.

95. I am not of Opinion that theſe Fibres are ſpiral, nor that they are perfect Circles or Rings, but they ſeem rather to be Segments of Circles, diſpoſed much in the ſame Manner as in the Stomach, and thus ſurrounding entirely the Inteſtinal Canal.

96. These two Planes adhere cloſely together, and are ſeparated with great Difficulty. They adhere likewiſe to the common Coat by the Intervention of the Cellular Subſtance, which is in greater Quantities on the Side next the Meſentery than on the other.

97. The third Coat is called Nervoſa, and is ſomething like that of the Stomach. It has a particular Plane, which ſerves as a Baſis to ſuſtain it, made up of very fine, ſtrong, oblique Fibres, which ſeem to be of the ligamentary or tendinous Kind.

98. To ſee this Plane diſtinctly, a Portion of the Inteſtines muſt be inflated, the common Coat removed, and the fleſhy Fibres ſcraped off.

99. This Coat ſuſtains two Reticular Subſtances, which are both vaſcular, one arterial, the other venal, accompanied by a great Number of nervous Filaments. Theſe Veſſels and Nerves are Productions of the Meſenteric Veſſels and Nerves; and as they ſurround the whole Canal of the Inteſtines, ſome Anatomiſts have formed them into a diſtinct Coat, by the Name of Tunica Vaſculoſa.

100. The nervous Coat ſends off from its inner Surface a great Number of Portions of Septa, more or leſs circular, which contribute to the Formation of what are called Valvulæ Conniventes, of which hereafter. It likewiſe ſeems to ſuſtain ſeveral different Glandular Bodies, which we diſcover in the Cavity of the Inteſtines.

101. The fourth or innermoſt Coat is very ſoft, and is named Tunica Villoſa. It has the ſame Extent with the third Coat, which ſupports it, and it lines all the Septa of that third Coat; but it is not uniform through the whole Canal, as we ſhall ſhew in the particular Deſcription.

Inteſtina Tenuia.

102. The ſmall Inteſtines form one continued uniform Canal; and tho' three Portions of it have three different Names, yet we have no ſufficient Marks whereby to diſtinguiſh them, to fix the preciſe Extent or Length of each Portion, or to ſettle its juſt Limits.

103. The firſt and ſmalleſt Portion of the whole Canal is called Duodenum; the ſecond, which is much longer, Jejunum; and the third, which is ſtill longer than the ſecond, Ileum.

Situation and Connection of the Duodenum.

104. The firſt Portion of the ſmall Inteſtines was called Duodenum, from the Length aſcribed to it by the Ancients, *viz.* the Breadth of twelve Fingers; and the Moderns need not cavil much about this Length, if it is meaſured with the Ends of the Fingers of the Subject.

105. This Inteſtine having ariſen from the Pylorus, is immediately bent a little backward, and obliquely downward; then it bends a ſecond Time toward the right Kidney, to which it is a little connected, and from thence paſſes before the Renal Artery and Vein, aſcending inſenſibly from right to left, till it gets before the Aorta and laſt Vertebræ of the Back. It continues its Courſe obliquely forward by a gentle Turn, which may be reckoned a third Incurvation, and alſo the Extremity of the Duodenum.

106. Through this whole Courſe the Duodenum is firmly bound down by Folds of the Peritonæum, eſpecially by a tranſverſe Duplicature, which gives Origin to the Meſocolon. The two Laminæ of this Duplicature being at firſt ſeparate, and ſoon after uniting, muſt leave a triangular Space between them, which is lined with a Cellular Subſtance.

107. It is in this Space that the Duodenum adheres, by Means of the Cellular Subſtance, to the Parts already named; and the Inteſtine is contained therein, as in a Caſe, ſo that without Diſſection we can ſee nothing but its two Extremities, and even theſe are hid by the Colon, and by the firſt Convolutions of the Jejunum.

Structure of the Duodenum.

108. The firſt Coat of the Duodenum is conſequently different from that of the other ſmall Inteſtines, having this peculiar to it, that it does not inveſt the whole Circumference of the Inteſtine, becauſe through the greateſt Part of its Length it lies in the triangular Space already mentioned; and for the ſame Reaſon there is a greater Quantity of Cellular Subſtance belongs to the outer Coat of the Duodenum, than to that of the other Inteſtines.

109. The Muſcular Coat of the Duodenum is thicker than in the Jejunum and Ileum.

110. The Tunica Nervoſa and Villoſa form conjointly on the Inſides of this Inteſtine a great Number of ſmall Duplicatures, which advance into the Cavity more or leſs directly, like Portions of circular Planes, with one Edge fixed to the Inteſtines, and the other looſe. Theſe are what Anatomiſts call Valvulæ Conniventes.

111. The

111. The looſe or floating Edge of theſe Valves, is formed into ſmall Gathers or Waves in the natural State. I ſay deſignedly, in the natural State, to rectify the falſe Ideas which dry Preparations of the Inteſtines are apt to beget. The whole Surface of theſe Duplicatures or Valves is villous, as well as that of the Interſtices between them.

112. The Villi of this Inteſtine are thicker than in the Stomach; but the Texture of them in Man, is not like Hairs, as they are commonly repreſented in Figures; but rather like that of a fungous, granulated Subſtance, compoſed of an infinite Number of very fine Papillæ of different Figures, in which we ſee, through a Microſcope, a Multitude of depreſſed Points or Pores, by which their whole Surface ſeems to be pierced.

113. By the ſame Help, we obſerve on different Places of the inner Surface of this Inteſtine, ſeveral round villous Tubercles, riſing like ſmall Verrucæ at different Diſtances from each other.

114. This Subſtance ſuſtains an infinite Number of Capillary Veſſels, of different Kinds; for beſides the Blood-Veſſels, we ſometimes obſerve a great Number of white Filaments which run through it, and end at its inner Surface, like ſo many Capillary Roots of the Veſſels, called Venæ Lacteæ.

115. The Fungous Subſtance which binds the Capillary Filaments together, and ſurrounds them, is very tender, and the Capillary Extremities of the ſmall Blood-Veſſels diſtributed through it, ſeem to be turned toward the Pores of the Papillæ. Through theſe Pores, a mucous Fluid, more or leſs tranſparent, is diſcharged, which continually moiſtens the Cavity of the Inteſtine.

Glands of the Duodenum.

116. The internal Surface of the Duodenum is furniſhed with a great Number of ſmall flat Glandular Tubercles, raiſed on the Sides, and depreſſed in the Middle by a Kind of Foſſula; and they are more numerous near the Beginning of this Inteſtine than any where elſe. About the Pylorus, they lie in a Manner in Heaps and Cluſters, and from thence the Diſtance between them increaſes gradually all the Way to the other Extremity, where they are ſingle.

117. These Glands, when examined carefully, appear like little Bladders, with the Orifices turned toward the Cavity of the Inteſtine, and the Bodies fixed in the ſpungy Subſtance next the Nervous Coat. They furniſh a particular Fluid, which is often found to be viſcid.

The Biliary Orifice of the Duodenum.

118. In the inner Surface of the Duodenum, almoſt at the lower Part of the firſt Incurvation, and on the ſhorteſt Side, there is a longitudinal Eminence, in the Point or Apex of which lies a particular Opening, which is the Orifice of the Ductus Bilarius, within which the Ductus Pancreaticus likewiſe opens.

119. This Inteſtine is commonly the wideſt, tho' the ſhorteſt of the Inteſtina Tenuia, and is inveſted by more Cellular Subſtance, eſpecially while within its triangular Caſe, where it wants the outer Coat, which the others have; and conſequently it is more eaſily dilatable, by Subſtances which might otherwiſe ſtick within it.

§. 4.

§. 4. *Inteſtinum Jejunum.*

Situation and Size of the Jejunum.

120. The Jejunum, ſo called, becauſe it is oftener found empty than the Ileum, begins at the laſt Incurvation of the Duodenum, and is there connected to the Beginning of the Meſocolon.

121. From thence it bends downward from left to right, and obliquely forward, or from the Vertebræ, and makes ſeveral Convolutions, which lie chiefly in the upper Part of the Umbilical Region. Through all this Courſe, it is connected to the Meſentery in the Manner that ſhall be explained hereafter.

122. It is a pretty difficult Matter to fix the exact Bounds between this Inteſtine and the Ileum. The external Marks of a redder Colour in the one than in the other, tho' pretty common, are not conſtant; and the internal Marks fixed from the Plurality of Valvulæ Conniventes are indeterminate, and oftentimes appear only from Diſſection.

123. These two Inteſtines may be better diſtinguiſhed by their different Situations, which are pretty regular; but as even this Mark is not particular enough, the moſt eaſy Way that I have been able to contrive, and which will in moſt Caſes be found ſufficiently exact, is to divide both Inteſtines into five Parts; and to allow nearly two Fifths to the Jejunum, and three Fifths and a little more to the Ileum.

Structure of the Jejunum.

124. The Coats of the Jejunum are nearly of the ſame Structure with thoſe of the Duodenum, but thinner. The common Coat is a Continuation of the Meſentery; and the Cellular Subſtance is in leſs Quantity than in the Duodenum; and indeed ſeems to be altogether wanting along the great Curvature of the Convolutions, where the longitudinal Fibres of the Muſcular Coat adhere very cloſely to the external Membrane.

125. This Muſcular Coat is not ſo ſtrong as that of the Duodenum. The longitudinal Plane of Fibres is very thin, and almoſt imperceptible, except along the great Curvature, oppoſite to the Connexion of the Meſentery, where we ſee through the Membranous Coat, a Kind of whitiſh Ligamentary Band, about the third Part of an Inch in Breadth, which is continued along the great Curvature of all the Convolutions of this Inteſtine, and of the Ileum.

126. This Ligamentary Band is like thoſe which we obſerve on the Sides of the ſmall Extremity of the Stomach. It adheres perfectly to the Membranous Coat and to the longitudinal Fibres of the Muſcular Coat, which are here more viſible, and appear to be ſtronger than in any other Place.

127. The Tunica Nervoſa, which I chooſe rather to call Reticularis, and its proper Cellular or Lanuginous Subſtance, have nothing peculiar to them more than has been already ſaid about the Inteſtines in general. By blowing artfully into this Subſtance, it may be made to ſwell ſo much, round the whole Cavity of the Inteſtine, as to deſtroy all the Duplicatures or Valvulæ Conniventes.

128. THESE Valves in this Inteſtine are very broad, very numerous, and very near each other. On the Side of the great Curvature, their Circumference is continuous and uniform; but next the ſmall Curvature, there are ſeveral Breaks in them, the Extremities of ſome advancing beyond the reſt, and terminating in Points. Some of theſe Valves go quite round, others only ſome Part of the Way, and ſome of them are very ſmall, which go obliquely between two large ones, forming a Kind of Communication.

129. THE Papillæ of the Tunica Villoſa are here more raiſed, more looſe and floating than in the Duodenum, and each of them ſeems to be divided into ſeveral others, by Inciſures of a very ſingular Kind. In other Reſpects they agree pretty much with what was ſaid in the Deſcription of the Inteſtines in general. The Obſervations and Figures publiſhed by *M. Helvetius*, firſt Phyſician to the *French* Queen, in the Memoirs of the Royal Academy, expreſs theſe Papillæ, and the whole Tunica Reticularis very juſtly.

130. THE Glandular Lacunæ of the Jejunum are of the ſame Structure with the Glandulæ Brunneri or Duodenales; but they are diſpoſed in a different Manner. They are partly ſingle at different Diſtances from each other, and partly in ſeveral Cluſters, like flat oblong Bunches of Grapes, called Plexus Glanduloſi Peyeri. Theſe are in the largeſt Quantity near the great Curvature, and they croſs through ſeveral Valvulæ Conniventes at once.

131. THE Veſſels, Nerves, Connexions, *&c.* muſt be referred till the Meſentery has been deſcribed.

§. 5. *Inteſtinum Ileum.*

132. THE Convolutions of the Inteſtinum Ileum ſurround thoſe of the Jejunum on the two lateral and lower Sides, and it paſſes in a winding Courſe from the left Side, by the Hypogaſtrium, to the right Side, where it terminates a little below the right Kidney, joining the Inteſtina Craſſa, in the Manner that I ſhall relate hereafter. The lateral Convolutions are ſupported by the Oſſa Ilium, ſo called, not from this Inteſtine, but from the Region of the Abdomen, termed Ilia. *Situation of the Ileum.*

133. THE Structure of the Ileum is much the ſame with that of the Jejunum; only the internal Duplicatures or Valvulæ Conniventes decreaſe gradually, both in Number and Size. Near the Extremity of the Ileum their Direction is changed, and inſtead of being tranſverſe or circular, they become longitudinal, and terminate in a Kind of Pylorus which advances into the Cavity of the great Inteſtines, as we ſhall ſee preſently. *Structure of the Ileum.*

134. WE obſerve likewiſe in this Inteſtine, as in the Jejunum, ſingle or ſolitary Glands or Lacunæ, and alſo Reticular Glands, or Glands in Cluſters, the laſt of which, at the Extremity of this Inteſtine, is oftentimes of a great Extent; but the greateſt Part of theſe Glands appear to be flatter here than in the Jejunum. The Cellular Subſtance of the external Coat is in leſs Quantities than in the foregoing Inteſtines, and the Ileum appears commonly more pale, or not ſo red as the Jejunum.

135. The Veſſels, Nerves, Connexions, &c. muſt be referred to the Hiſtory of the Meſentery.

§. 6. *The Inteſtina Craſſa in general, and Inteſtinum Cæcum in particular.*

136. The great Inteſtines are one continued Canal, divided into three Portions, like the ſmall ones. This Canal begins by a Kind of Sacculus or Bag, which is reckoned the firſt of the three Portions, and called Cæcum. The ſecond Portion, called Colon, is the longeſt of the three, and is diſtinguiſhed from them by a great Number of particular Eminences or Convexities, which appear on its outer Surface through its whole Length. The laſt Portion is named Rectum, being more uniform, narrower, thicker, and much ſhorter than the Colon.

137. The Structure of the great Inteſtines is nearly the ſame with that of the ſmall ones, in Regard both to the Number and Diſpoſition of their Coats. They are ſhorter, and have fewer Convolutions, but are much more capacious. The Coats in general are ſtronger, but eſpecially the Muſcular Coat. The Villi and Mucilaginous Glands are different, and there are ſeveral other Things relating to them, which will come in better in the particular Hiſtory.

Situation and Structure of the Cæcum.

138. The Inteſtinum Cæcum is only a round, ſhort, broad Bag, the Bottom of which is turned downward, and the Mouth or Opening upward. It lies under the right Kidney, and is hid by the laſt Convolution of the Ileum. It is about three Fingers Breadth in Length, and its Diameter is more than double that of the ſmall Inteſtines.

Appendicula Vermiformis.

139. On one Side of the Bottom of the Cæcum lies an Appendix, reſembling a ſmall Inteſtine, nearly of the ſame Length with the Cæcum, but very ſlender. It is termed Appendicula Vermiformis, from its ſuppoſed Reſemblance to an Earth-worm. Its common Diameter is not above a Quarter of an Inch. By one Extremity, it opens laterally, and a little obliquely into the Bottom of the Cæcum; and the other Extremity is cloſed, being ſometimes greater, ſometimes ſmaller than the reſt of the Appendix.

140. It has ſome Contorſions, like thoſe of the Worm when it is touched, from whence comes the Epithet of Vermicularis or Vermiformis; and it may likewiſe be compared to the Gills or Pendants of a Turky-Cock. Its Structure reſembles nearly that of the other Inteſtines.

141. The internal Coat of this Appendix is folliculous, like that of the Duodenum; and it is likewiſe reticular, the Maſhes being the Glandular Lacunæ, which continually diſcharge a Fluid into its Cavity.

142. It has often been diſputed whether this Appendix or the large Portion, which is, as it were, the Head of the Colon, ought to be called the Cæcum; but the general Diviſion of the Inteſtines into great and ſmall, leave no Room to doubt of its being only an Appendix in Man; whatever Reaſon there may be for talking differently with Reſpect to Brutes and Birds.

143. Through the Membranous or common Coat of the Cæcum, we ſee three white Ligamentary Bands, which adhere very cloſely, both to the outer and

and Muſcular Coat. One of them is hid by the Adheſion of the Meſocolon; and all the three divide the Cæcum longitudinally into three Parts more or leſs equal.

144. They all unite on the Appendicula Vermiformis, and cover its whole outer Side immediately under the common Coat. Tho' they appear exteriorly on the Cæcum to be ligamentary, they are made up interiorly of fleſhy Fibres, which accompany and ſtrengthen the longitudinal Fibres of the Muſcular Coat.

145. The Villous Subſtance of the inner Coat of the Cæcum is very ſhort, and furniſhed in ſeveral Places with Glandular Lacunæ or Solitary Glands, broader than thoſe of the ſmall Inteſtines.

146. These Glandular Lacunæ, or Folliculi, are flattened and depreſſed in the Middle like Small-pox. When we blow through a Pipe into theſe Lacunæ without touching them, the Folliculi are inflated, and repreſent little Caps with a Hole in the Middle of their convex Side.

§. 7. *Inteſtinum Colon.*

147. The Colon is the moſt conſiderable of all the Inteſtines. From the Cæcum, of which it is a Continuation, it reaches in Form of an Arch above the Umbilical Region, and to the lower Part of the left Hypochondrium. Its Continuity is however a little interrupted by the Ileum, which advances into the Cavity of the Colon, and, together with a certain Fold of that Inteſtine, forms what is called Valvula Coli. *Situation and Structure of the Colon.*

148. The whole convex Side of the Colon is divided longitudinally into three Parts, by three Ligamentary Bands, continued from thoſe of the Cæcum, and of the ſame Structure with theſe. Two of theſe Bands run on each Side, along the great Curvature of the Colon; and the third along the ſmall Curvature.

149. The uppermoſt Band of the two that belong to the great Curvature, is the broadeſt of the three; that which belongs to the ſmall Curvature is the narroweſt, and lay hid by the Connexion of the Meſocolon, till it was brought to Light by M. *Morgagni.*

150. These three Longitudinal Bands do the Office of Longitudinal Fræna, between which this Inteſtine is through its whole Length alternately depreſſed into tranſverſe Folds, and raiſed into conſiderable Eminences. All the Folds are Duplicatures, which form Portions of Valvulæ Conniventes in the Cavity of the Inteſtine; and the Eminences form Receptacles, called the Cells of the Colon.

151. All the Coats of the Colon concur equally to the Formation of theſe Duplicatures and Cells, the Depth of which decreaſes gradually toward the Extremity of the Inteſtine; and neither of them go any further than the Ligamentary Bands.

152. These Portions of the Colon, which are immediately covered by the Ligamentary Bands, are ſmooth and without Rugæ, and therefore if

theſe Bands are alone cut acroſs, the Inteſtine is not elongated ſufficiently to deſtroy all the Folds and Cells.

153. The common Coat on one Side is a Continuation of the Meſocolon, and on the other Side it contributes by the ſame Continuation to form the Omentum. The longitudinal Fibres of the Muſcular Coat are very ſlender; and thoſe which anſwer to the annular or circular Fibres of the ſmall Inteſtines, are only Segments ſtretched over the Eminences and Folds. The other Coats are nearly as in the Cæcum, only the Glandular Lacunæ or Solitary Glands are broader and more numerous.

154. The Arch of the Colon begins under the right Kidney, near the Haunch. It runs up on the Foreſide of that Kidney to which it is connected, paſſes under the Veſicula Fellis, which tinges it with a yellow Colour at that Place, and continues its Courſe before the firſt Incurvation of the Duodenum, to which it adheres, and partly hides it. In this Part of its Courſe therefore there is a remarkable Connexion between the Colon, Duodenum, right Kidney, and Veſicula Fellis.

155. From thence the Arch of the Colon runs before the great Convexity of the Stomach, and ſometimes a little lower, then turns backward under the Spleen in the left Hypochondrium, runs down on the Foreſide of the left Kidney to which it is connected; below this Kidney turns toward the Vertebræ, and terminates there by a double Incurvation, or by two oppoſite Convolutions, which repreſent in ſome Meaſure an inverted Roman S.

156. These laſt Convolutions of the Colon are ſometimes multiplied, and even advance to the right Side of the Pelvis; and along the great Arch, and the two laſt Incurvations, there are a Kind of Fringes, called Appendices Coli Adipoſæ, which I ſhall afterwards explain, as alſo the Connexions of the Colon with the Meſocolon and Omentum.

Valvula Coli. 157. At the Place where the Cæcum joins the Colon, one Portion of the Circumference of both is depreſſed, and forms a large Fold on the Inſide, which advances into the Cavity of the Inteſtine. It is a little open in the Middle, and its Extremities are very thick, by Reaſon of the mutual Duplicature of the Coats of the Cæcum and Colon.

158. The Extremity of the Ileum is as it were grafted in the Opening of this Fold, and ſtrongly united to its Sides by the Adheſion of its tranſverſe Fibres to the tranſverſe Fibres of the Cæcum and Colon.

159. This Union forms a pretty thick Ring, which likewiſe advances into the common Cavity of the Cæcum and Colon, where it is wrinkled or formed into Gathers, almoſt like the lower Extremity of the Œſophagus, the Pylorus or Inſide of the Anus. Its Circumference is more or leſs oval, and by a Kind of Continuity with the common Fold of the Cæcum and Colon, it forms two Productions, which M. *Morgagni* calls the Fræna of the Valvula Coli.

160. The Membranous Coat of the Extremity of the Ileum is continued on the Cæcum and Colon, without ſinking into any Fold, at the Place where the Ileum enters the Colon. The longitudinal Fibres of the Muſcular

cular Coat ſeem here to be confounded with the neareſt circular Fibres of the Cæcum and Colon.

161. The inner Portion of the Muſcular Coat of the Ileum runs in between the circular Fibres of the Ileum and Colon, as into a common Fold of theſe two Inteſtines, from all which a pretty thick ſhort Portion of a fleſhy Tube is formed, which is the circular Riſing already mentioned.

162. The Tunica Nervoſa and Villoſa of the Extremity of the Ileum likewiſe enter the common Cavity of the Cæcum and Colon, and on the Edge of the circular Riſing join the like Coats of theſe two Inteſtines, ſo that the circular Riſing, or ſhort Muſcular Tube, is covered both on the outer and inner Sides by a nervous and villous Coat; that on the Inſide being ſupplied by the Ileum, and the other by the two great Inteſtines.

163. The beſt Method to demonſtrate the Structure and Compoſition of this Valve is in clear Water, and by a particular Section, while the Inteſtine is freſh, and has not been altered by any Diſeaſe, in the Manner that I demonſtrated publickly in the Phyſic-Schools in 1726. In another Work I ſhall explain particularly the Way of managing this and other ſuch Diſſections, the greateſt Part of which Method I have already communicated both in my public and private Courſes.

164. The Situation of this Extremity of the Ileum is moſt commonly tranſverſe, and is inſerted almoſt in the ſame Direction in the common Cavity of the two Inteſtines already mentioned, but it is often a little more inclined toward the Cæcum than to the Colon; and whereas in all other Places the Ileum is wide and eaſily dilatable, it is very narrow at its Inſertion, and its Sides more ſolid and firm.

165. It is chiefly in this Structure that the Mechaniſm of the Inſertion of the Ileum in the Cæcum and Colon conſiſts; about which Inſertion or Opening Authors are very much divided, ſome reckoning it a Valve, others only a Sphincter.

166. It is very evident from what I have ſaid, that it is a double Machine contrived to hinder the Return of the Excrements into the Ileum, becauſe it can produce this Effect partly as a Valve, and partly as a Kind of Sphincter. The dried Preparations of this Part give a very falſe Idea of its Structure and Conformation; and the ſame Thing is to be ſaid of the Opening of the Appendicula Vermiformis into the Cæcum.

167. The capacious Arch of the Colon is connected by both Extremities to the Regio Lumbaris, near the Kidneys, by two particular Ligaments, one on the right Side, the other on the left, which are only ſmall Duplicatures of the Peritonæum more or leſs tranſverſe.

168. The remaining Portion, which forms the two Convolutions in Form of the Roman S, contracts below the left Kidney, being narrower there than lower down. The Coats of this Portion become gradually thicker and ſtronger, and likewiſe the Ligamentary Bands, which approach each other by Degrees, and ſeem to increaſe in Breadth.

169. The Veſſels, Nerves, &c. will be found in the Deſcription of the Meſentery.

§. 8. *Inteſtinum Rectum and Anus.*

Situation, Figure, and Size of the Rectum.

170. The laſt of all the Inteſtines is named Rectum, or the ſtraight Gut, from its Situation, for when viewed directly forward, it appears to run down in a ſtraight Courſe from the laſt Vertebra of the Loins on the Foreſide of the Os Sacrum, all the Way to the Os Coccygis, where it ends in what is called the Anus.

171. This Inteſtine, properly ſpeaking, is a true Continuation of the laſt Convolution of the Colon, and it is the Repoſitory, Sink and Common Sewer of the whole Inteſtinal Canal. It has likewiſe a ſpecial Relation to the Bladder, and to the Parts of Generation in both Sexes.

172. The Rectum having paſſed below the laſt Vertebra of the Loins to the Inſide of the Os Sacrum, is bent backward on that concave Side, to which it is connected, in the Manner that ſhall be afterwards explained; and having reached the Os Coccygis, it runs likewiſe in the Direction of that Bone, and bends a little forward, terminating beyond the Extremity of the Coccyx.

173. The Figure of this Inteſtine varies according as it is full or empty. When empty it is irregularly cylindrical, and ſinks in by a Kind of tranſverſe Folds, and in that State it is about three Fingers Breadth in Diameter, more or leſs. When full it is wider in Proportion to the Quantity of Fæces, Wind, or whatever elſe is contained in it; and it may be extended to the Size of a large Bladder, ſo as to repreſent a Kind of Stomach.

Structure of the Rectum.

174. The Membranous Coat often contains a great Quantity of Fat, ſpread between it and the Muſcular Coat, and forming round the Inteſtine numerous Eminences, in the Room of the Appendices Adipoſæ of the Colon, which ſhall be explained in the Hiſtory of the Omentum.

175. The muſcular or fleſhy Coat is very thick; the longitudinal Fibres, which in the other Inteſtines are very thin, are in this ſtronger than the circular Fibres of the reſt. The Ligamentary Bands continue to increaſe in Breadth, and to approach each other, as has been ſaid, and it is to the fleſhy Fibres of theſe Bands that the Thickneſs of the longitudinal Fibres ſeems to be owing.

176. The nervous or filamentous and internal Coats, are larger here than in the other Inteſtines; and when the Rectum is empty, they form a great Number of waving Rugæ in its Cavity, which diſappear in Proportion as that Cavity is filled.

177. The innermoſt Coat is very improperly termed Villoſa, and ſcarce deſerves the Name of Papillaris, becauſe of the Smallneſs of the little Corpuſcles ſpread on its Surface. It contains a great Number of ſingle or ſolitary Glands, and it is always moiſtened by a Mucus of different Conſiſtences, diſcharged by theſe Glands or Folliculi, and perhaps by the Corpuſcles alſo.

178. Near the Extremity of this Inteſtine the Rugæ or Folds become in a Manner longitudinal, and at laſt, towards the Circumference of the inner Margin of the Anus, they form little Bags or Semilunar Lacunæ, the Openings of

of which are turned upward, toward the Cavity of the Inteſtine. Theſe Lacunæ are ſomething like thoſe at the lower Extremity of the Œſophagus, or upper Orifice of the Stomach.

179. At length the Extremity of the Rectum contracts and terminates by a narrow Orifice called the Anus, the Sides of which are diſpoſed in cloſe Folds or Gathers. This Extremity of the Inteſtine has ſeveral Muſcles belonging to it, ſome of which ſurround it like Sphincters, the reſt are broad fleſhy Planes inſerted in it, and which being likewiſe fixed to other Parts, ſuſtain it in its natural Situation, and reſtore it to that Situation, when diſturbed by the Force neceſſary for the Excluſion of the Fæces. Theſe latter Muſcles are termed Levatores Ani, the firſt go by the general Name of Sphincters. *Muſcles of the Anus.*

180. These Sphincters are three in Number, one inteſtinal or orbicular, and two cutaneous or oval; whereof one is large, ſuperior, and internal; the other ſmall, inferior and external.

181. The Inteſtinal or Orbicular Sphincter of the Anus conſiſts meerly in an Augmentation of the inferior Portion of the fleſhy Fibres of the Extremity of the Rectum.

182. In the Deſcription of the freſh Bones, I omitted two Ligaments, one called Ligamentum Cutaneum Oſſis Coccygis, the other Ligamentum Pubis Interoſſeum. This laſt I demonſtrated in my publick Diſſections in the Year 1726, and the other about four Years before. Theſe two Ligaments muſt be here deſcribed, before I proceed to the Cutaneous Sphincters.

183. The Cutaneous Ligament goes out anteriorly, from the Extremity of the Os Coccygis. It is very ſlender, and divides into two Portions at the Orifice of the Anus, which run into the Membrana Adipoſa, and are inſerted in the Skin on each Side of the Anus, by a Kind of Expanſion, and continuing to divaricate, they are loſt on the two Sides of the Perinæum.

184. The Interoſſeous Ligament of the Oſſa Pubis is a very ſtrong triangular Membrane, fixed by two of its Edges in the inferior Rami of theſe Bones, all the Way up to their common Symphyſis. The third Edge, which is the loweſt, is looſe; and this whole Membrane, the Middle of which is perforated by a particular Hole, is ſtretched very tight between the two Bones, and under their Cartilaginous Arch, to which it adheres very cloſely.

185. At the lower Part of this Interoſſeous Ligament, along its whole lower or looſe Edge, lies a Digaſtric Muſcle, fixed by its two Extremities in the Rami of the Oſſa Pubis, its middle Tendon lying on the Middle of the Edge of the Ligament. The Deſcription of that Muſcle does not belong to this Place; and I mention it here, only becauſe of the Relation it bears to the Cutaneous Sphincters of the Anus. It is called by ſome, Muſculus Tranſverſalis Urethræ; by others, Muſculus Triangularis.

186. The Cutaneous Sphincters have each an anterior and poſterior Inſertion, ending both Ways in a Kind of Point, and comprehending the Orifice of the Anus, between their middle Portions.

187. They are diſtinguiſhed from each other by their Situation, by their Size, and by a Kind of white Cellular Line. The greateſt of the two appears

to

to be double, and the ſmalleſt lies neareſt the Skin, and adheres moſt cloſe to it.

188. They are inſerted backward, partly in the Apex of the Os Coccygis; and partly in the contiguous Portion of the Cutaneous Ligament of that Bone. Forward their chief Inſertion is in the middle Tendon of the Tranſverſalis Urethræ; and they have likewiſe ſome Connexions to other Muſcles of the Urethra, of which hereafter.

189. The Levatores Ani are broad, thin, Muſcular Portions, fixed by one Extremity of their fleſhy Fibres round the concave Side of the inferior Portion of the Pelvis, from the Symphyſis of the Oſſa Pubis, beyond the Spine of the Iſchium. The other Extremity of theſe Fibres runs down on each Side behind, and under the Curvature of the End of the Rectum, where they meet together, and unite from the Baſis of the Os Coccygis all the Way to the Margin of the Anus.

190. By their ſuperior Inſertions, theſe Portions are on each Side of the Pelvis divided into three Claſſes, an anterior, middle and poſterior Claſs. The two anterior Claſſes reach from about the Middle of the Symphyſis of the Oſſa Pubis, to the upper Border of the Foramina Ovalia of the Pelvis. The middle Claſſes continue the ſame Courſe immediately above the Inſertion of the Obturator Internus, on the Oſſa Iſchium, and a little on the Oſſa Ilium. The poſterior Claſſes are ſpread on the inner Sides of the Oſſa Iſchium to the Spinal Apophyſes of theſe Bones, and even a little beyond theſe, on the Ligamenta Sacro-Sciatica.

191. The anterior Portions are in their Paſſage connected to the proſtate Glands, to the Neck of the Bladder, to the Bulb of the Urethra, as ſhall be ſhown in the Deſcription of theſe Parts; and they ſometimes ſends Fibres to the Muſculus Tranſverſalis Urethræ above-mentioned.

192. The Fibres of all theſe Portions, having by their ſuperior Inſertions formed this large and ample Circumference, run down obliquely from before backward, contracting in Breadth, and approaching each other in the Manner of truncated Radii; and behind, and under the Extremity of the Rectum, they form a Digaſtric Muſcle, ſomething like the Mylo-Hyoidæus; which terminates the bony Pelvis below; and forms the Bottom of the Cavity of the Abdomen, as the Diaphragm forms the upper Part.

193. It is here neceſſary to obſerve, that the Muſcles of the Os Coccygis, deſcribed §. 3. may be looked upon as Aſſiſtants to the Levatores.

194. We ought likewiſe to remark, that the Margin or Edge of the Anus is formed by the Union of the Skin and Epidermis with the internal Coat of the Rectum; ſo that the moſt ſuperficial Portion of that Coat ſeems to be a Continuation of the Epidermis.

195. I refer the Arteries, Veins, Nerves, Connexions, Uſes, &c. to the Place already mentioned in the Deſcription of the other Inteſtines.

§. 9. *Meſenterium & Meſocolon.*

196. This great Bundle of Inteſtines is not left to move at random in the Cavity of the Abdomen; but artfully bound down, by a Membranous Web, which prevents the Inteſtinal Convolutions from being intangled in each other, and from being twiſted or compreſſed in all their different Ways of meeting; and yet allows them a gentle floating, but limited Motion. *Diviſion of the Meſentery, &c.*

197. This Web goes ſtill by the ancient *Greek* Name of Meſentery, as being in ſome Meaſure in the Middle of the Inteſtines. It is diſtinguiſhed into two Portions, one of which being very broad and very much plaited, connects the ſmall Inteſtines; the other, which is long and incurvated, does the ſame Office to the great Inteſtines.

198. These two Portions are in reality only one and the ſame Continuation of the Membranous Lamina of the Peritonæum doubled back upon itſelf, and they are diſtinguiſhed only by their Breadth. Taken both together, they form a Kind of Spiral Roll, more or leſs plaited in its Circumference. The firſt Portion has retained the Name of Meſentery, the other is termed Meſocolon.

199. The Meſentery begins at the laſt Incurvation of the Duodenum, and runs obliquely from left to right, along the Vertebræ of the Loins. In this Space, the Membranous Portion of the Peritonæum is detached on both Hands, produces a Duplicature by two Elongations or particular Laminæ applied to each other, and thus forms the Meſentery. *Structure of the Meſentery, &c.*

200. It is narrow at its upper and lower Parts, but chiefly at the upper. The middle Portion is very broad, and the Edge of it next the Inteſtines is every where very much plaited. Theſe Plaits or Folds are only waving Inflections, ſuch as may be obſerved in the Edge of a Piece of Shamoy, which has been often drawn through the Fingers. They make this Edge of the Meſentery very long, and they run through about one Third of its Breadth.

201. The two Laminæ are joined together by a Cellular Subſtance, which contains Glands, Veſſels and Nerves, that ſhall be deſcribed hereafter; and in ſome Subjects it has a great Quantity of Fat, which keeps the two Laminæ at a good Diſtance from each other.

202. Along the whole Circumference of the Meſentery, the two Laminæ are naturally ſeparated, and applied to the two Sides of the ſmall Inteſtines, which they inveſt by their Union, or rather reciprocal Continuation on the great Curvature of that Canal, and carry it as in a Scarf or Sling. This is what forms the external or Membranous Coat of the Inteſtines.

203. The Meſocolon is the Continuation of the Meſentery, which having reached the Extremity of the Ileum, contracts and changes its Name. At this Place the particular Lamina which is turned to the right Side, forms a ſmall tranſverſe Fold, called Ligamentum Coli Dextrum.

204. Afterwards the Meſocolon aſcends toward the right Kidney, where it ſeems to be loſt by the immediate Adheſion of the Colon to that Kidney, and to the firſt Incurvation of the Duodenum. Then it appears again,

again, and increaſing in Breadth, it continues its Courſe almoſt tranſverſely under the Liver, Stomach and Spleen, where it begins to turn downward, under the left Hypochondrium toward the Kidney on the ſame Side.

205. THROUGH this whole Courſe, the Meſocolon extends in Breadth, and forms nearly a tranſverſe ſemicircular Plane, very little plaited at its great Circumference. By this Circumference or Edge, it is connected to the Colon; and hides that ligamentary Band of this Inteſtine, which runs along its ſmall Curvature. By its ſhort or ſmall Edge, it forms the triangular Caſe of the Duodenum, and by its great Edge, the external Coat of the Colon, in the ſame Manner as the Meſentery does that of the ſmall Inteſtines. As it paſſes under the large Extremity of the Stomach, it adheres a little to the lower Portion of that Extremity, as the Diaphragm does to the upper.

206. HAVING got below the left Kidney, it contracts and forms another tranſverſe Fold, called Ligamentum Coli Siniſtrum. Afterwards it expands again, but not ſo much as in the upper Part, and runs down on the left Pſoas Muſcle, toward the laſt Vertebræ of the Loins. This deſcending Portion is fixed to the Convolutions of the Colon in the ſame Manner as the ſuperior Portion is to the Arch of that Inteſtine.

207. THE Inteſtinum Rectum is likewiſe inveſted by a particular Production of the Peritonæum, called commonly by the barbarous Name of Meſo-Rectum. This Production is very narrow, and about the Middle of the Foreſide of the Rectum, it forms a tranſverſe ſemicircular Fold, which appears when the Inteſtine is empty; but is loſt, when it is filled.

§. 10. *Glandulæ Meſentericæ, Vaſa Lymphatica & Lactea.*

Glands of the Meſentery.

208. BETWEEN the Laminæ of the Meſentery, a great Number of Glands lies ſcattered through the Cellular Subſtance. In the natural State, theſe Glands are ſomething of the Figure of Lentils or little round Beans; ſome of them being orbicular, others oval, but all of them a little flatted, and in corpulent Subjects we find them ſurrounded with Fat.

209. THESE Glands are of the Number of thoſe that Anatomiſts call Glandulæ Conglobatæ, the Structure of which is not as yet ſufficiently known. They ſeem to be of a Cellular Subſtance, ſurrounded by a very fine Membrane or Coat, on which, by the Help of Microſcopes, we diſcover an Intertexture of particular Filaments, which *Malpighi* believed to be fleſhy Fibres.

210. THE niceſt Anatomical Injections have not hitherto given us any Satisfaction about theſe Particulars; for tho' they be made with all poſſible Care, they always fill the follicolous Texture of theſe Glands. And tho' by means of theſe Injections, we may diſcover a great many Veſſels, which were before inviſible, we are not a whit the nearer our Purpoſe, becauſe we cannot by this Method diſtinguiſh the Secretory, Excretory, and Blood-Veſſels from each other.

Lymphatic Veſſels.

211. BESIDES the Blood-Veſſels, which are diſtributed in a reticular Manner in the Meſenteric Glands, and beſides many Nervous Filaments ſpread through

through them; we discover an infinite Number of small Vessels of another Kind running from Gland to Gland.

212. These Vessels are extremely thin and transparent, and furnished on the Inside with numerous Valves, which appear on the Outside like little small Knots very near each other. They go out from each Gland by Ramifications, as by so many Roots, and having formed a small Trunk, they are again divided, and enter some neighbouring Gland by the same Kind of Ramifications by which they went out from the former.

213. They are termed Lymphatic Vessels, because for the most Part they contain a very clear, limpid, though mucilaginous Serum, called Lympha by Anatomists. But as they have likewise been observed to be filled with a white milky Fluid, called Chyle, they have been called Vasa Chylifera, or Venæ Lacteæ. They have the Name of Veins, because their Valves are disposed as those of the ordinary Blood-Veins, and because the Fluid which they contain runs from smaller into larger Tubes. *Lacteal Vessels.*

214. I have always divided the Lacteal Vessels into three Classes in the Human Body, and sometimes into four.

215. They derive their first Origin from the Tunica Villosa of the Intestines, and chiefly from that of the small Intestines, by a great Number of small Capillary Roots, as has been already said. From these Roots there arises between the Coats of the Intestines a Kind of Rete Mirabile, which surrounds almost the whole Circumference of the Intestinal Canal, between the muscular and external Coat.

216. This reticular Texture of Lacteal Vessels keeps close to the external Coat, and leaves the Canal along with it, on the Side of the Mesentery, where it forms two Planes of Ramifications, plainly distinguished from each other by the Cellular Substance, and adhering closely to the Inside of the two Membranes of the Mesentery. In this separate State they run on the Laminæ of the Mesentery as far as the first Mesenteric Glands, where they unite again into one Plane. All this I reckon the first Class of Lacteals.

217. After this Union the Lacteal Vessels are distributed almost uniformly through the whole Extent of the Mesentery from its Circumference to its Origin or Adhesion to the Vertebræ of the Back, between the Mesenteric Glands, which they join in the Manner already said, and form frequent Anastomoses or Communications. This is the second Class.

218. Having passed through the Mesentery in this Manner, the Ramifications begin to unite as they approach the Spina Dorsi, and consequently their Number is lessened, and their Size increased; and having passed the last Mesenteric Glands, they terminate about the Middle of the Adhesion of the Mesocolon in small common Trunks, which receive a great Number of Lymphatic Vessels from the Glandulæ Lumbares, and others below these. This is the third Class.

219. A fourth Class may be made of the Lacteal Vessels of the great Intestines, of which I demonstrated several very full of Chyle, to the Royal Academy, in an Human Colon. The late M. *Mery*, a Member of the same Academy, who was not easily convinced of any Thing, from Observations made

by others, having ſeen that with the End of my Finger, I could puſh the white Liquor uniformly into the Colon in ſeveral Places, ſeemed at firſt to be ſatisfied; but for his farther Conviction, he deſired me to open one of theſe Veſſels before him with the Point of a Lancet, and to take out a Drop of the Liquor, which having laid upon the Nail of my Thumb, he was entirely convinced.

220. The Lacteal Veſſels are not always apparent in human Subjects; but we may ſee them in thoſe who die either a violent or ſudden Death ſoon after a Meal; and they remain viſible even in the Inteſtines for a long Time after Death, when a great Number of the Meſenteric Glands have become ſchirrous, eſpecially in Children.

221. It is the common Cuſtom to demonſtrate the Lacteals in living Animals, opened about three Hours after a full Meal, eſpecially of Milk. This is a very troubleſome Way, and very often hinders us from ſeeing a great Part of this beautiful Phænomenon. It is much eaſier and better to kill the Animal about an Hour after it has filled its Belly, or ſooner, if the Food be liquid; and this is the Method which I have always uſed with Succeſs in my private Courſes.

Receptaculum Chyli.

222. The Lacteal Veſſels of the third Claſs, or thoſe that lie between the Meſenteric Glands and middle Adheſion of the Meſocolon to the Spina Dorſi, run down on the Body of the inferior Aorta, between the Extremities of the ſmall Muſcle of the Diaphragm, and terminate in a Kind of Ciſtern, called by ſome Receptaculum Chyli, by others Receptaculum Pecqueti, from M. *Pecquet*, a Phyſician at *Dieppe* in *Normandy*, who firſt demonſtrated, by inconteſtable Experiments, this Receptacle, which had been long before diſcovered by *Euſtachius*.

223. The greateſt Part of the Receptaculum Chyli lies behind the right Portion of the inferior Muſcle of the Diaphragm, on the right Side of the Aorta, at the Union of the laſt Vertebra of the Back with the firſt of the Loins. It is a Kind of membranous Veſicle, the Conformation of which is various in human Subjects. Sometimes it is of an uniform long oval Figure, like the Veſicula Fellis; ſometimes it is divided by Strictures into ſeveral ſmall roundiſh Bags, more or leſs flatted; and ſometimes it ſurrounds the Trunk of the Aorta like a Collar.

224. It is compoſed of very thin Coats, and its Cavity is divided by ſmall Pelliculæ or Membranous Septa, the Diſpoſition of which is irregular. It is chiefly round the lower Part of this Receptacle that the laſt Lacteal Veſſels are inſerted, ſome on the Sides, and ſome behind the Aorta; and they are accompanied by numerous Lymphatic Veſſels, of which in another Place. The upper Portion is contracted between the Aorta and Vena Azygos, and forms a particular Canal, which runs up through the Thorax, by the Name of Ductus Thoracicus, which ſhall be deſcribed in the next Section.

§. 11. *The Blood-Veſſels and Nerves of the Inteſtines.*

Blood-Veſſels of the Inteſtines.

225. The Duodenum has commonly a particular Artery, called Duodenalis or Inteſtinalis, which comes indifferently from the Stomachic Coronaria, Pylorica, Gaſtrica Major or Hepatica. It has likewiſe ſeveral diſtinct Ramifications from theſe Trunks, and from the Meſenterica Superior and Splenica, which Ramifications communicate with each other.

226. The Arteria Duodenalis, and the other additional ſmall Arteries, form a vaſcular Network round the Muſcular Coat of the Inteſtine, which ſends out a great Number of Capillaries towards both the outer and inner Sides, that make the whole Inteſtine look of a red Colour.

227. The Veins of the Duodenum are Rami of the Vena Portæ, and the Diſtribution and Denomination thereof is pretty much the ſame with that of the Arteries, only they communicate more with each other than the Arteries, and alſo with the great Hæmorrhoidal Vein.

228. The Venal Ramifications form round the Duodenum a Network like that of the Arteries; and the ſame Kind of Vaſcular Texture is more or leſs to be found on all the other Inteſtines.

229. The Arteries of the Jejunum come chiefly from the Meſenterica Superior, and ſome from the aſcending Branch of the Meſenterica Inferior. The Veins are for the moſt Part Branches of the great Meſaraica, and the reſt come from the Splenica and ſmall Meſaraica or Hæmorrhoidalis Interna.

230. The principal ſubaltern Trunks of theſe Arteries and Veins accompany each other through the Cellular Subſtance, between the Laminæ of the Meſentery, are diſtributed by Branches and Rami, and form the Maſhes, Lozenges and Arches mentioned in the Deſcription of the Arteries and Veins. The laſt of theſe Arches and Lozenges, or thoſe next to the Inteſtine, produce two ſmall Vaſcular Planes, which ſeparate from each other very diſtinctly, and ſurround the Inteſtinal Canal in a reticular Manner.

231. The Blood-Veſſels of the Ileum come from the ſame Sources with thoſe of the Jejunum, as has been ſaid in the Hiſtory of the Arteries and Veins; and it ought to be obſerved concerning both theſe Veſſels, and thoſe of the Jejunum, that in their whole Courſe through the Meſentery, they give Ramifications to the Glands, Laminæ and Cellular Subſtance of the Meſentery; and alſo that there is a Kind of Communication between ſeveral ſmall Meſeraic Veins, and the Capillary Rami of the Venæ Lumbares and Spermaticæ.

232. The Arteries of the Cæcum and Appendicula Vermiformis are Ramifications of the laſt Branch from the convex Side of the Meſenterica Superior, and they have likewiſe ſome ſmall ones from the ſecond and third Branches, when both are found. The Veins of theſe two Parts are Ramifications of the great Meſaraica, and one of theſe Rami is by *Riolan* termed Vena Cæcalis.

233. The ſtraight Portion of the Arch of the Colon, or that which is an immediate Continuation of the Cæcum, is ſupplied with Arteries by the ſecond

Branch that comes from the concave Side of the Meſenterica Superior, and likewiſe a little by the third, when there is a third.

234. The ſuperior or middle Portion of the Arch of the Colon is furniſhed by the firſt Branch from the ſame Side of the Meſenterica Superior, which by a Bifurcation communicates on both Hands with the other Portions of the Arch of the Colon.

235. The left Portion of this Arch derives its Arteries partly from the firſt Branch of the ſame Meſenterica, and partly from that of the Meſenterica Inferior, which two Branches form the celebrated Communication or common Arch of the two Meſentericæ.

236. By Means of this Communication or Continuation, in Caſe one Artery ſhould be obſtructed or compreſſed, the other would furniſh Blood to all the Branches below the Place of the Obſtruction. The ſecond Branch of the Meſenterica Inferior gives likewiſe ſmall Arteries to the left Extremity of the Colon.

237. The deſcending Convolutions of the Colon, which repreſent a Roman S, are ſupplied by the other Branches of the Meſenterica Inferior, the laſt of which forms the Hæmorrhoidalis Interna.

238. The Veins of all theſe Portions of the Colon are Branches and Ramifications of the Vena Portæ Ventralis, and principally of the ſubaltern Trunks, the Meſaraica Major, and Meſaraica Minor, or Hæmorrhoidalis Interna. The Diſtribution of theſe Branches and Ramifications is in ſome Meaſure the ſame with that of the Arteries, as may be ſeen in the Deſcription of the Veins.

239. The Arteries of the Rectum are furniſhed by the Hæmorrhoidalis Interna, the laſt Branch of the Meſenterica Inferior, which communicates with the Hypogaſtrica, and particularly with the Hæmorrhoidalis Externa, a Production of one of theſe Arteries.

240. The Veins of the Rectum are Ramifications of the laſt Branches of the Meſaraica Minor, or Hæmorrhoidalis Interna, and they communicate with the Hæmorrhoidales Externæ, which are Rami of one of the Hypogaſtricæ. They communicate likewiſe with the Capillary Ramifications of the other Hypogaſtric Veins, which go to the internal Parts of Generation of both Sexes.

241. It is here to be obſerved in general, that there is a ſucceſſive Continuation, more or leſs ſimple or multiplied, between all the Arteries of the Inteſtinal Canal, and likewiſe between all the Veins; and alſo that the Veins are here thinner and more capacious than the Arteries in a greater Proportion than in the other Parts of the Body.

Nerves of the Inteſtines.

242. The Nerves of the Duodenum are the middle Plexus of the Semilunar Ganglion, and ſome Filaments of the Plexus Stomachicus and Hepaticus.

243. The Nerves of the Jejunum, Ileum, and Meſenteric Glands, are the Plexus Meſentericus Superior, the poſterior Meſenteric Faſciculi, and the Plexus Meſentericus Inferior.

244. The Nerves of the Cæcum are the poſterior Meſenteric Faſciculi or Plexus, and the Plexus Meſentericus Inferior.

245. The

245. The Nerves of the Arch of the Colon are the ſame Faſciculi, and the two Plexus Meſenterici.

246. The Nerves of the laſt Convolutions of the Colon are the poſterior Meſenteric Faſciculi, and the Plexus Meſentericus Inferior, and Sub-Meſentericus.

247. The Nerves of the Rectum are the Plexus Meſentericus Inferior, Plexus Sub-Meſentericus or Hypogaſtricus, and the two Ganglions of that Plexus.

248. The Nerves of the Anus, and of its Muſcles, are the Ganglions of the Plexus Sub-Meſentericus, the inferior Rope of both Sympathetici Maximi, and the common Arch of the Extremities of both Ropes.

249. Before I proceed to the Liver, it muſt be remarked that the Omentum and Appendices Adipoſæ have ſo near a Relation to the Liver and Spleen, that it is impoſſible to deſcribe them without mentioning ſeveral Things belonging to theſe two Viſcera; and therefore I think it more proper to give the Hiſtory of theſe after that of the other two, and even of the Pancreas, than to begin the Hiſtory of the Parts contained in the Cavity of the Abdomen by that of the Omentum, as is commonly done.

250. For the ſame Reaſon, I ſhall not give the Uſes of theſe Parts, till after they have been all explained; and together with theſe Uſes, I ſhall ſpeak to thoſe of the Inteſtinal Canal, Meſentery, Vaſa Lactea, Meſenteric Glands, Muſcles of the Anus, *&c.*

§. 12. *Hepar & Veſicula Fellis.*

Situation, Figure, and Diviſion of the Liver.

251. The Liver is a large and pretty ſolid Maſs, of a dark red Colour, a little inclined to yellow, ſituated immediately under the Arch of the Diaphragm, partly in the right Hypochondrium, which it fills almoſt intirely, and partly in the Epigaſtrium, between the Appendix Enſiformis and Spina Dorſi, and terminating commonly in the left Hypochondrium, into which it ſometimes runs a conſiderable Way.

252. The Figure of the Liver is irregular, it being arched or convex on the upper Part, unequally concave on the lower, and very thick on the right and Backſides. Towards the left and anterior Sides its Thickneſs decreaſes very much, and terminates there by a Kind of Edge; and it is broader from right to left, than from before backwards.

253. The Liver may be divided into two Extremities, one great, the other ſmall; two Edges, one anterior, and one poſterior; two Sides, one ſuperior and convex, which is ſmooth, poliſhed and proportioned to the Arch of the Diaphragm, and one inferior, concave and uneven, with ſeveral Eminences and Depreſſions, of which hereafter.

254. It may likewiſe be divided into two lateral Parts called Lobes; one of which is termed the great or right Lobe, the other, the ſmall or left Lobe. Theſe two Lobes are diſtinguiſhed above, by a Membranous Ligament; and below very plainly, by a conſiderable Sciſſure lying in the ſame Direction with the ſuperior Ligament.

255. The

255. The Eminences on the concave Side of the Liver belong to the great Lobe. The principal Eminence is a Sort of triangular or pyramidal Apophyſis, ſituated backward near the great Sciſſure which diſtinguiſhes the two Lobes.

256. This triangular Eminence is termed Lobulus Spigelii, or ſimply the ſmall Lobe of the Liver. One of its Angles advances a conſiderable Way toward the Middle of the lower Side of the great Lobe, and is loſt there. This Angle I call the Root of the Lobulus. Toward the Foreſide, there is another Eminence leſs prominent but broader; and to this Eminence and the former, the Ancients gave the general Name of Portæ.

257. The Depreſſions on the concave or lower Side of the Liver, which deſerve our Attention, are four in Number. The firſt is the Sciſſure that ſeparates the two Lobes, which run a-croſs the concave Side, from the Eminences already mentioned to the anterior Edge, where it terminates by a Notch of different Depths in different Subjects. This is termed the great Sciſſure of the Liver, and in ſome Subjects Part of it is an intire Tube.

258. The ſecond Depreſſion is ſituated tranſverſely between the two Eminences of the great Lobe, and filled by the Sinus of the Vena Portæ, ſo called by the Ancients, becauſe it lies between the Eminences of the ſame Name. The third Depreſſion is backward, between the great Lobe and Lobulus Spigelii, and the Vena Cava paſſes through it. The fourth is a Kind of Sulcus between the Lobulus and ſmall Lobe of the Liver, which in the Fœtus ſerved to receive a Venal Canal loſt in Adults, in whom it appears only as a Kind of Ligament. This Sulcus is in ſome Meaſure a Continuation of the great Sciſſure, and joins the Vena Cava by an acute Angle.

259. Beſides theſe four Depreſſions, there is one on the Fore-part of the great Lobe, in which the Veſicula Fellis is lodged, and it ſometimes runs as far as the Edge, where it forms a ſmall Notch. We may likewiſe reckon among theſe Depreſſions, a ſmall ſuperficial Cavity in the poſterior and lateral Part of the lower Side of the great Lobe, by which it reſts on the right Kidney; and likewiſe a ſuperficial Cavity in the left Lobe, where it runs over the Stomach.

260. Lastly, on the poſterior Edge of the Liver, there is a great Sinus common to both Lobes, which gives Paſſage to the Spina Dorſi and Œſophagus, near the Place where the Vena Cava deſcends; and we ſometimes meet with Sciſſures on both Sides of the Liver, which are not ordinary.

Ligaments of the Liver.

261. The convex Side of the Liver is commonly connected to the Diaphragm by three Ligaments, which are only Continuations of the Membranous Lamina of the Peritonæum. One lies near the Edge of the Extremity of each Lobe, and one in the Middle, and they are accordingly termed the right, middle, and left Ligaments. There is a Cellular Subſtance in the Duplicature of each, in which the Blood-Veſſels and Lymphatics run, and which ſends off a Kind of Lamina into the Subſtance of the Liver.

262. The right Ligament ſometimes connects the great Lobe to the Cartilages of the falſe Ribs, and the left Ligament, or that of the ſmall Lobe, is often double, and advances toward the middle Ligament. This

middle Ligament begins low, in the great Sciſſure of the Liver, near the Eminences called Portæ, and from thence paſſes through the anterior Notch and over the convex Side of the Liver at the Union of the two Lobes, and is fixed obliquely in the Diaphragm.

263. It is likewiſe fixed along the upper and inner Part of the Vagina of the right Muſculus Rectus of the Abdomen, in ſuch an oblique Manner as to be nearer the Linea Alba below than above.

264. Besides theſe Ligaments the great Lobe of the Liver is likewiſe connected to the right Ala of the Tendinous Portion of the Diaphragm, not by a Ligament, but by a broad and immediate Adheſion, without the Intervention of the Membrane of the Peritonæum, which is only folded quite round this Adheſion, to form the external Membrane of all the reſt of the Body of the Liver.

265. This broad Adheſion is commonly, tho' improperly, called Ligamentum Coronarium; but in the firſt Place it is not a Ligament, as has been already obſerved, and ſecondly it is not circular, but oval and very oblong.

266. It is not on the upper Part of the convex Side of the Liver, but along the poſterior Part of the great Lobe, the broad Extremity of the Adheſion lying nearer the Notch, and the pointed Extremity towards the right Hypochondrium.

267. The middle Ligament, called improperly Ligamentum Hepatis Suſpenſorium, contains in its Duplicature a thick white Rope, like a round Ligament, which was the Umbilical Vein in the Fœtus. Thus the lower Part repreſents a Falx, the convex Edge of which is ſharp, and the other rounded.

268. All theſe Ligaments ſerve to keep the Liver in its proper Situation, and to hinder it from inclining too much towards either Side: But we muſt not imagine that any of them ſerve to ſuſpend it; becauſe it is ſufficiently ſupported by the Stomach and Inteſtines, eſpecially when they are filled.

269. When the Stomach is empty, or when we faſt longer than ordinary, it is a common Expreſſion to ſay the Stomach pinches us. As the Liver is not then ſuſtained by the Stomach and Inteſtines, it deſcends by its own Weight, and chiefly by Means of the middle Ligament pulls the Diaphragm along with it. It is in that Place therefore that we have this uneaſy Senſation, and not at the ſuperior Orifice of the Stomach, as is commonly believed.

270. The right or great Lobe of the Liver, which lies in the right Hypochondrium, reſts on the right Kidney, by a ſmall ſuperficial Depreſſion above-mentioned; and it likewiſe covers a Portion of the Arch of the Colon and the Pylorus. About two third Parts of the ſmall or left Lobe lie in the Middle of the Epigaſtrium, and the remaining third Part advances over the Stomach, towards the left Hypochondrium.

271. This ſmall Lobe is ſituated almoſt horizontally; the great Lobe is very much inclined, and its thick Extremity runs down almoſt in a perpendicular Direction to the right Kidney, on which it lies, in the Manner already

ready ſaid. This Obſervation is of Uſe to diſtinguiſh the different Parts of the Liver in Wounds and Chirurgical Operations.

272. It may likewiſe ſerve to direct us in examining a Liver taken out of the Body; the Situation of which may be otherwiſe very eaſily miſtaken, eſpecially that of the Parts of the concave Side. The Paſſage of the Vena Cava, between the Body of the great Lobe and the Lobulus Spigelii, may likewiſe ſerve for a Rule in placing a detached Liver in its true Situation.

Structure of the Liver.

273. The Liver is compoſed of ſeveral Kinds of Veſſels, the Ramifications of which are multiplied in an aſtoniſhing Manner, and form, by the Intertexture of their Capillary Extremities, an innumerable Collection of ſmall pulpy, friable Corpuſcles, which are looked upon to be ſo many Organs deſigned to ſeparate from the Maſs of Blood, a particular Fluid termed the Bile.

274. The greateſt Part of theſe Veſſels from one End to the other is included in a Membranous Vagina, called Capſula Venæ Portæ, or Capſula Gliſſoni, from an *Engliſh* Author, who firſt deſcribed it particularly.

275. The Veſſel which carries the Blood to the Liver is called Vena Portæ, for the Reaſon already given. In the Deſcription of the Veins, I obſerved that the Vena Portæ might be conſidered as two large Veins, the Trunks of which are joined endwiſe, and ſend out Branches and Ramifications in oppoſite Directions to each other; that one of theſe Veins is ramified in the Liver, the other lying without the Liver, and ſending its Branches and Ramifications to the Viſcera of the Abdomen; and laſtly, that the firſt of theſe large Veins may be termed Vena Portæ Hepatica, the other Vena Portæ Ventralis.

Vena Portæ Hepatica.

276. The particular Trunk of the Vena Portæ Hepatica is ſituated tranſverſely between the broad anterior Eminence of the great Lobe of the Liver, and the Root of the Lobulus, in a particular Sciſſure, and forms what is called the Sinus of the Vena Portæ. From this Sinus five principal Branches go out, which are afterwards divided into Millions of Ramifications through the whole Subſtance of the Liver.

277. At this Place, the Vena Portæ lays down the common Office of a Vein, and becomes a Kind of Artery as it enters and is again ramified in the Liver. The Extremities of all theſe Ramifications of the Trunk of the Vena Portæ Hepatica, end in the pulpy friable Corpuſcles, which ſeem to be thick Villous Folliculi, when examined through a Microſcope in clear Water.

Pori Bilarii & Ductus Hepaticus.

278. It is in theſe Folliculi that the Bile is ſecreted, and it is immediately collected in the ſame Number of Extremities of another Kind of Veſſels, which unite by numerous Ramifications into one common Trunk. Theſe Ramifications are termed Pori Bilarii, and the Trunk, Ductus Hepaticus; and the Ramifications of theſe two Kinds of Veſſels are inveſted together by the Capſula of the Vena Portæ.

Hepatic Veins.

279. The Blood deprived of this Bilious Fluid is re-conveyed to the Heart, by a great Number of Venal Ramifications, which afterwards unite into three principal Branches, beſides others that are leſs conſiderable, that terminate

terminate in the Vena Cava, and are all called by the Name of Vena Hepatica.

280. The Capillary Extremities of the Ramifications of the Vena Cava join thoſe of the Vena Portæ, and accompany them through the Liver, and yet the great Branches of both Veins interſect each other in ſeveral Places.

281. When we cut the Liver in Slices it is eaſy to diſtinguiſh in each Slice the Ramifications of the Vena Cava from thoſe of the Vena Portæ; the firſt being thinneſt and largeſt, and adhering cloſeſt to the Subſtance of the Liver; whereas thoſe of the Vena Portæ, which are inveſted by the Cellular Capſula, appear to be a little ruffled when empty, becauſe the Cellular Capſula ſubſides when it is cut, but the other Veins remain uniformly open, their Sides adhering to the Subſtance of the Liver.

Hepatic Artery and Nerves.

282. The Liver receives from the Arteria Cæliaca a particular Branch, termed Arteria Hepatica, which being very ſmall when compared with the Bulk of that Viſcus, ſeems deſigned only for the Nouriſhment thereof, and not for the Secretion of the Bile. The Plexus Hepaticus, formed by the Nervi Sympathetici Maximi & Medii, furniſhes a great Number of Nerves to the Subſtance of the Liver. The Ramifications of the Artery and Nervous Plexus are included in the Cellular Capſula, together with thoſe of the Vena Portæ and Pori Bilarii.

283. The Pulſation of this Artery has been by ſome Anatomiſts taken for that of the Capſula, and by this they have endeavoured to explain the Arterial Function of the Vena Portæ; but they have not conſidered that the Blood in this Vein does not require to be pumped forward, becauſe ſo ſwift a Motion would have been prejudicial to the Secretion of the fine Oil of the Bile, for which a ſlow and almoſt inſenſible Motion is neceſſary.

284. The Liver is covered exteriorly by a particular Membrane or Coat, which is a Continuation of the Peritonæum. There is likewiſe a membranous or filamentary Subſtance that runs through this whole Viſcus, and connects the Ramifications and Extremities of all its Veſſels to each other. This Subſtance ſeems to be a complicated Production of the Capſula of the Vena Portæ, and of the external Membrane of the Liver.

285. The outer Surface of this Coat is very ſmooth, but its inner Surface is uneven, being made up of a great Number of thin membranous Laminæ, between which we obſerve very diſtinctly numerous Lymphatic Veſſels on both the convex and concave Sides of the Liver; but it is more difficult to trace thoſe which accompany the filamentary Subſtance through that Viſcus.

286. I have already obſerved that the Subſtance of the Liver is chiefly made up of an infinite Number of pulpy, friable Corpuſcles, each of which is bounded and in a Manner ſurrounded by a particular Expanſion of the Capſula Gliſſona, and all the Expanſions are connected by common Septa, in ſome Meaſure reſembling a Bee-hive.

287. These Corpuſcles have ſeveral Angles, eſpecially in the inner Surface of the Liver, but near the Surface they are raiſed in the Form of ſmall Tubercles. Their pulpy Texture appears like radiated Villi, a ſmall void Space being left in the Middle of each.

288. If we blow through a Pipe into the Vena Portæ, Vena Cava, Arteria Hepatica, or Trunk of the Pori Bilarii, but eſpecially through the two Veins, we obſerve the Liver to ſwell, and the Corpuſcles near the Surface are raiſed, and become more ſenſible. If we blow with much Force we burſt theſe Corpuſcles, and the Air getting between them and the external Membrane, raiſes it from the Subſtance of the Liver in Bliſters.

Ductus Cholidochus.

289. The Ductus Hepaticus, or Trunk of the Pori Bilarii, having run a little Way, joins another Canal, called Ductus Cyſticus or Veſicularis, becauſe it comes from the Veſicula Fellis, as we ſhall ſee in the Deſcription of that Organ. Theſe two united Ducts form a common Trunk named Ductus Cholidochus, becauſe it conveys the Bile. This Duct having reached the Incurvation of the Duodenum, inſinuates itſelf through the Coats of that Inteſtine, and opens into the Cavity thereof, not by a round Papilla, but by an oblong Orifice rounded at the upper Part, and contracted at the lower, like the Spout of an Ewer, or like a common Tooth-picker.

290. The Edges of this Orifice are raiſed, broad and plaited, as we may ſee by making this Portion of the Duodenum ſwim in clear Water. At the Entry of this Orifice we ſee another ſmaller Opening diſtinct from it, which is the Orifice of the Ductus Pancreaticus, of which hereafter.

Veſicula Fellis.

291. The Gall-Bladder is a Kind of ſmall Bag ſhaped like a Pear, that is, narrow at one End and wide at the other. The wide Extremity is termed the Fundus or Bottom, the narrow Extremity the Neck, and the middle Portion the Body. About one third of the Body of the Veſicula lies in a Depreſſion on the concave Side of the Liver, from the Trunk or Sinus of the Vena Portæ, where the Neck is ſituated, to the anterior Edge of the great Lobe, a little toward the right Side, where the Bottom is placed, and in ſome Subjects it advances beyond the Edge.

292. Therefore when we ſtand the Veſicula Fellis lies in a Plane inclined a little from behind forward. When we lie upon the Back it is almoſt inverted. When we lie on the right Side the Bottom is turned downward; and it is turned upward when we lie on the left Side; and theſe Situations vary according to the different Degrees of each Poſture.

293. The Gall-Bladder is compoſed of ſeveral Coats, the outermoſt of which is a Continuation of that which inveſts the Liver, and conſequently of the Peritonæum.

294. The ſecond Coat is fleſhy, and made up of two Strata, one longitudinal, the other tranſverſe, the Fibres of which have nearly the ſame irregular Direction with thoſe of the Stomach; and this Diſpoſition of the Fibres in theſe Viſcera is owing to the different Diameters in the ſeveral Portions of them, and to their Incurvation.

295. These two Coats are connected by a Cellular Subſtance, continued between the Body of the Veſicula and the Liver, all the Way to a whitiſh Stratum, which is looked upon as the third Coat of the Gall-Bladder, anſwering to the Tunica Nervoſa of the Inteſtines.

296. The innermoſt, or fourth Coat, has on the Inſide a great Number of Reticular Folds, filled with ſmall Lacunæ, like perforated Papillæ, eſpe-

cially near the Neck of the Veſicula, where theſe Folds are longitudinal, and afterwards form a Kind of ſmall Pylorus, with Plaits of the ſame Nature with thoſe in the great one. Theſe Lacunæ are looked upon to be Glands.

297. That Side of the Body of the Veſicula which lies next the Liver is connected to that Viſcus by a vaſt Number of Filaments, which run a great Way into the Subſtance of the Liver; and among theſe Filaments there are ſome Ducts, which form a Communication between the Pori Bilarii and Veſicula. Theſe Ducts have been obſerved in Brutes a long Time ago, and they have been very lately diſcovered in Men likewiſe. They are moſt numerous near the Neck of the Veſicula, and they are named Ductus Cyſt-Hepatici, or Hepatico-Cyſtici.

298. The Neck of the Veſicula is formed by the Contraction of the ſmall Extremity, and this Neck bending afterwards in a particular Manner, produces a narrow Canal, named Ductus Cyſticus. This Incurvation repreſents in ſome Meaſure the Head of a Bird, of which the Cyſtic Duct, by the gradual Diminution of its Diameter, expreſſes the Beak. This cannot be ſeen when the Liver is extra Situm; and even in Situ it is but very imperfectly ſeen, when, in order to view the concave Side, the Liver is raiſed and thruſt too much againſt the Diaphragm, for by thus inverting the Liver, the Curvature is diſordered, and we ſee two in the Place of one.

299. To ſee this Curvature in its true natural Situation, the Liver is to be raiſed but very little, and the Duodenum left untouched; then we muſt ſtoop and look under the Liver without diſordering any Thing. This Incurvation may be of Uſe to hinder too precipitate a Diſcharge of the Bile contained in the Veſicula, which ſome Situations of the Body might occaſion.

300. The Neck of the Veſicula is nearly of the ſame Structure with the other Parts. It has on the Inſide ſeveral Reticular Rugæ, and ſome Folds, which appear like Fragments of Valvulæ Conniventes, ſituated very near each other, from the Neck to the Contraction of the Cyſtic Duct. The firſt of theſe Folds is pretty broad and large, and almoſt circular; the next is more oblique and ſmaller in Size, and the reſt diminiſh in the ſame Manner. Taken all together they form a Kind of ſpiral Flight, which may be ſeen through the Neck on the Outſide, where it ſometimes appears like a Screw, eſpecially when the Neck is filled with any Fluid. This Obſervation is owing to M. *Heiſter*.

301. By ſlitting the Neck and Duct we ſee all theſe Folds very diſtinctly, eſpecially when we examine them in clear Water. When they are viewed in any other Manner they eaſily deceive us, being miſtaken for true Valves, becauſe of their tranſverſe Situation. They may, however, in ſome Meaſure ſupply the Place of Valves by hindering the Bile from running too faſt into the Duodenum, and the Contents of the Duodenum from entering this Duct.

302. The internal Surface of all theſe Biliary Ducts, that is, of the Ductus Hepaticus, Cyſticus and Cholidochus, being examined through a Microſcope in clear Water, appears to be nearly of the ſame Structure through their whole Extent.

303. The Cystic and Hepatic Ducts do not in their ordinary and natural Situation represent the Capital Y of the *Greeks*, where they form the Ductus Cholidochus. After the Incurvation of the Neck of the Vesicula, these two Ducts run very near each other, and they appear to be separated, only by raising up the Liver to view them. The same Disorder happens in an inverted Liver extra Situm, for then the Body of the Liver subsides and is flattened, and thereby separates the Ducts, whereas in its true Situation it is very much incurvated, and the Ducts very near each other.

304. The Ductus Cholidochus appears rather to be a Continuation of the Ductus Cysticus, than the common Trunk of that and of the Ductus Hepaticus; for I have observed that this last Duct runs for some Space within the Sides of the former, before it opens into the Cavity, much in the same Manner as the Ductus Cholidochus passes into the Duodenum. I have likewise observed at the Opening of the Hepatic into the Cystic Duct, a small loose Valvular Membrane, which may hinder the Bile from returning out of the Ductus Cholidochus into the Hepaticus.

305. The Bile which passes through the Ductus Hepaticus into the Cholidochus, may be called Hepatic; and that which is collected in the Vesicula Fellis may be termed Cystic. The Hepatic Bile flows continually through the Ductus Cholidochus into the Duodenum, whereas the Cystic Bile flows only by Reason of Plenitude, or by Compression.

Remarks on the Vessels, &c. of the Liver.

306. The Trunk of the Vena Portæ Ventralis terminates between the Lobulus and the opposite Part of the great Lobe, and there joins the Trunk of the Vena Portæ Hepatica in the transverse Sinus of the Liver, between the right Extremity and the Middle of that Sinus.

307. The Umbilical Ligament, and consequently the Umbilical Vein in the Fœtus, joins the Trunk of the Vena Portæ Hepatica toward the left Extremity of the transverse Sinus of the Liver. The Canalis Venosus in Man is not exactly opposite to the Vena Umbilicalis, but a little to the right Hand, and therefore these three Vessels lie in such a Direction as to form two opposite Angles, resembling those of the Handle of a Wheel, or of a Spit.

308. In the Fœtus therefore, the Blood which comes from the Umbilical Vein does not run directly through that contained in the Vena Portæ Hepatica in the Sinus and from thence into the Canalis Venosus; but is obliged to turn from left to right, and so to mix with the Blood in the Vena Portæ, before it enters that Canal which opens into the Trunk of one of the great Hepatic Veins of the Vena Cava near the Diaphragm.

309. The Hepatic Vena Portæ gives off commonly five large Branches into the Liver, viz. three from its right Extremity into the great Lobe, and two from its left Extremity into the small Lobe; and from the Interstice between these, a small Branch goes directly to the Middle of the convex Side of the Liver.

310. The Hepatic Veins are commonly three large Branches of the Trunk of the Vena Cava Inferior, which go out from it by one common Opening, especially two of them, and then separating, they enter the Substance of the Liver, intersecting the Branches of the Hepatic Vena Portæ, and are ramified in all Directions in the Manner already explained. The inferior Portion

tion of the Opening of these Veins into the Vena Cava, forms a Kind of semilunar Valve.

311. Below these Hepatic Veins, the Vena Cava Inferior sends off, in its Passage by the Liver, several other small Hepatic Veins immediately from the Trunk, which seem to have the same Relation to the Hepatic Artery as the great Veins to the Vena Portæ.

312. The Passage of the Vena Cava is through the right Portion of the posterior Sinus of the Liver, and consequently on the Side of the great Lobe, which is hollowed at this Place sufficiently to give Passage to the Vein, of which it surrounds about three Fourths, sometimes more, and sometimes the whole.

313. This Passage answers to the Interstice between the Lobulus and the rest of the great Lobe; and its Direction is in the natural State, from above downward, and a little from right to left: but when the Liver is viewed extra Situm, and inverted, it appears very oblique; but still it serves as a Guide to Beginners, who are very apt to be mistaken in examining an inverted Liver, as I have already observed.

314. The Trunk of the great Vena Portæ, the Hepatic Arteries, the Ductus Hepaticus, or Trunk of the Pori Bilarii, and the Nerves of the Plexus Hepaticus, form all together a large Bundle, before they enter the Liver. The Trunk of the Hepatic Vena Portæ is in the Middle of this Bundle, the Hepatic Arteries lie on the right and left Sides of this Trunk, the Nerves surround it on all Sides, and they communicate with the Plexus Mesentericus Superior.

315. Afterwards the first Branches of the Arteries, Nerves and Pori Bilarii, leave the Trunk of the great Vein, and join in the same Manner, the Trunk of the small or Hepatic Vena Portæ, and its Ramifications in the Capsula Glissoni explained above.

316. All these Branches of the Vena Portæ, and of the Arteries, Nerves and Pori Bilarii, accompany each other by Ramifications through the whole Substance of the Liver, forming every where small Fasciculi in the same Manner as the large Bundle is formed by their Trunks. Each Ramus of the Vena Portæ, Artery, Nerve, and Porus Bilarius has a proper Vagina, and all the four have a common Vagina distinguished from the former by Cellular Septa, which are only Continuations of the Vaginæ of both Kinds.

317. The convex Side of the common Cellular Vagina is connected quite round to the Substance of the Liver by numerous Filaments which arise from it, and which form the Cellular Substance found between the Glandular Corpuscles. The concave Side produces the Cellular Septa above-mentioned.

318. In this common Vagina, the Vessels, Ducts and Nerves are disposed in such a Manner, as that the Rami of the Vena Portæ chiefly fill the Cavity of it, and is in a lateral Situation; the arterial Ramus and Porus Bilarius lie together on the Side of the Vein, and the Nerve is divided into several Filaments, which run in between the Vessels and Ducts, and chiefly accompany the Artery and Porus Bilarius; the Vena Portæ having by much the fewest.

319. The

319. The Uſes of the Liver ſhall be explained after the Deſcription of the Pancreas, Spleen and Omentum, all theſe Viſcera having a great Relation to the Liver.

§. 13. *Pancreas.*

Figure, Diviſion and Situation of the Pancreas.

320. The Pancreas is a long flat Gland, of that Kind which Anatomiſts call Conglomerate, ſituated under the Stomach, between the Liver and the Spleen. Its Figure reſembles that of a Dog's Tongue, and it is divided into two Sides, one ſuperior, the other inferior; two Edges, one anterior, the other poſterior; and two Extremities, one large, which repreſents the Baſis of a Tongue, and one ſmall and a little rounded like the Point of a Tongue.

321. The Pancreas is ſituated tranſverſely under the Stomach, in the Duplicature of the poſterior Portion of the Meſocolon. The large Extremity is connected to the firſt Incurvation of the Duodenum, and from thence it paſſes before the reſt of that Inteſtine, all the Way to its laſt Incurvation; ſo that a great Part of the Duodenum lies between the Pancreas, and the Vertebræ of the Back. The ſmall Extremity is fixed to the Omentum near the Spleen.

Structure of the Pancreas.

322. The Pancreas is compoſed of a great Number of ſoft Glandular Moleculæ, combined in ſuch a Manner, as to exhibit the Appearance of one uniform Maſs on the Outſide, the Surface of which is rendered uneven, only by numerous ſmall Convexities, more or leſs flatted. When theſe Moleculæ are ſeparated a little from each other, we find along the Middle of the Breadth of the Pancreas, a particular Duct, in which ſeveral ſmaller Ducts terminate laterally on each Side, like ſmall Rami in a Stem.

323. This Canal, named Ductus Pancreaticus, or Ductus Virſungi, from the Diſcoverer of it in the Human Body, is very thin, white, and almoſt tranſparent, and the Extremity of the Trunk opens commonly into the Extremity of the Ductus Cholidochus. From thence it diminiſhes gradually, and terminates in a Point, next the Spleen. The ſmall lateral Branches are likewiſe pretty large near the Trunk, and very ſmall toward the Edges of the Pancreas, all of them lying in the ſame Plane like the Branches of the common Filix or Fern.

324. The Pancreatic Duct is ſometimes double in Man, one lying above the other. It is not always of an equal Length, and ſometimes runs in a winding Courſe, but always in the ſame Plane; and it is nearer the lower than the upper Side of the Pancreas. It pierces the Coats of the Duodenum, and opens into the Ductus Cholidochus, commonly a little above the prominent Point of the Orifice of that Canal; and ſometimes it opens immediately into the Duodenum.

The ſmall Pancreas.

325. In Man, I obſerved ſeveral Years ago, that where the great Extremity of the Pancreas is connected to the Curvature of the Duodenum, it ſends down an Elongation, which adheres very cloſely to the following Portion of the Inteſtine; and upon a careful Examination, I found a particular Pancreatic

Pancreatic Duct, ramified like the large one, which ran toward and interfected this great Duct, into the Extremity of which it opened, after having perforated the Duodenum. This Portion I term Pancreas Minus, and it ſometimes opens ſeparately into the Duodenum, in which we likewiſe obſerve ſeveral ſmall Holes round the Ductus Cholidochus, which anſwer to the Pancreas.

Blood-Veſſels, and Nerves of the Pancreas.

326. The Arteries of the Pancreas come from the Pylorica, Duodenalis, and chiefly from the Splenica, which adheres very cloſely to the whole lower Side of the Pancreas near the poſterior Edge; and it ſends off in its Paſſage a great many Rami, named Arteriæ Pancreaticæ; which go off from each Side, more or leſs tranſverſely. It receives alſo ſome ſmall Ramifications from the Gaſtrica Major, and Meſenterica Superior.

327. The Pancreatic Veins are Rami of the Splenica, one of the principal Branches of the Vena Portæ Major or Ventralis. This Vena Splenica runs likewiſe along the lower Side of the Pancreas near the Edge, in a ſhallow Depreſſion, formed in the Subſtance of the Gland. Theſe Veins anſwer to the Arteries of the ſame Name, and there are likewiſe other ſmall Veins correſponding to the ſmall Arteries, which are Productions of the great Meſaraica, *&c.*

328. The Nerves of the Pancreas come partly from the Plexus Hepaticus, partly from the Plexus Splenicus, and partly from the Plexus Meſentericus Superior, and it likewiſe receives ſome from the flat Ganglion or Plexiform Intertexture, ſpoken to in the Deſcription of the Nerves, N° 413. and mentioned by the Name of the tranſverſe Rope, N° 140.

329. The Pancreatic Duct is not only double in ſome Subjects, as has been ſaid, but the collateral Branches have Communications in Form of Iſlands in ſeveral Places, within the Body of the Pancreas. The Uſes of this Viſcus ſhall be explained hereafter.

§. 14. *Lien.*

Situation, Diviſion and Figure of the Spleen.

330. The Spleen is a bluiſh Maſs, ſomething inclining to red, and of a long oval Figure, being about ſeven or eight Fingers Breadth in Length, and about four or five in Breadth. It is of a ſoftiſh Subſtance, and is ſituated in the left Hypochondrium, between the great Extremity of the Stomach, and the neighbouring falſe Ribs, under the Edge of the Diaphragm, and above the left Kidney.

331. It may be naturally divided into Sides, Edges and Extremities, as I have always done in my ordinary Courſes, for theſe many Years paſt. It has two Sides, one external and gently convex, and one internal, which is irregularly concave; two Extremities, one poſterior, which is pretty large, and one anterior, which is ſmaller and more depreſſed; two Edges, one ſuperior, and one inferior, on both which there are, in ſome Subjects, ſeveral Inequalities.

332. The inner or concave Side is divided by a longitudinal Groove or Sciſſure, into two Planes or Half-Sides, one upper, the other lower; and by this

this Groove, the Veſſels and Nerves enter in Human Subjects. The ſuperior Half-ſide is broader and more concave than the inferior, being proportioned to the Convexity of the great Extremity of the Stomach. The inferior Half-ſide lies backward on the left Kidney, and forward on the Colon; and ſometimes this Side of the Spleen appears to have two ſuperficial Cavities, one anſwering to the Convexity of the Stomach, the other to that of the Colon. The convex Side of the Spleen is turned to the left Ribs.

333. It is connected to the Stomach by the Veſſels called Vaſa Brevia; to the Extremity of the Pancreas by Ramifications of the Splenic Artery and Vein, and to the Omentum by Ramifications which the ſame Artery and Vein ſend to the Spleen, and which run in the longitudinal Groove.

334. It is connected to the Edge of the Diaphragm by a particular Membranous Ligament of different Breadths in different Subjects, fixed in its convex Side, ſometimes near the upper Edge, and ſometimes near the lower. This Ligament is ſituated tranſverſely with Reſpect to the whole Body, and longitudinally with Reſpect to the Size of the Spleen. In ſome Subjects it is connected by other Ligaments to the Stomach and Colon, but in all this there are conſiderable Varieties.

335. The Figure of the Spleen is not always regular, and is as various as the Size. Sometimes it has conſiderable Sciſſures both in the Sides and Edges, and ſometimes it has Appendices. I have ſometimes found a Kind of ſmall diſtinct Spleens, more or leſs round, and connected ſeparately to the Omentum, at ſome Diſtance from the anterior Extremity of the ordinary Spleen.

Structure of the Spleen.

336. The Structure of the Spleen is not eaſy to be unfolded in Man, and it is very different from that of the Spleens of Brutes, from which both public and private Demonſtrations are commonly made.

337. Its Coverings adhere to it ſo cloſely in Man, that it is difficult to diſtinguiſh the common from the proper Coat; whereas in ſome Brutes, ſuch as Oxen, Sheep, *&c.* nothing is more eaſy; for in ſuch Animals we find two Coats ſeparated by a Cellular Subſtance. This Covering ſeems to be no otherwiſe a Continuation of the Peritonæum than by the Intervention of the Omentum and Meſocolon; and even in Man the two Coats may be diſtinguiſhed, where the Veſſels enter by the longitudinal Sciſſure.

338. In Man the Subſtance of the Spleen is almoſt wholly vaſcular, that is, compoſed of the Ramifications of all Kinds of Veſſels. In Oxen the Subſtance of the Spleen is chiefly reticular, and in Sheep it is cellular. In Oxen and Sheep there are no venal Ramifications, but inſtead thereof, only open Sinuſes diſpoſed like Branches, except a ſmall Portion of a venal Trunk perforated on all Sides, at the Extremity of the Spleen.

339. In the Human Spleen we ſee ſomething like GlandularCorpuſcles, as in thoſe of other Animals; and there are numerous Venal Ramifications through its whole Extent. Between theſe Ramifications we every where obſerve an Appearance of extravaſated Blood, lying in a Kind of filamentary, tranſparent and very delicate Subſtance expanded through the whole Spleen.

340. This

340. This filamentary Subſtance having ſurrounded all the Ramifications, terminates in almoſt imperceptible Cells, which communicate with each other; ſo that if we blow through a ſmall Hole made in the membranous Covering, the whole Spleen will immediately be inflated.

341. The Surface of the Spleen of Oxen and Calves is viſibly full of a great Number of Lymphatic Veſſels, which may at any Time be eaſily demonſtrated; but in Man it is a very difficult Matter either to diſcover or demonſtrate them.

Blood-Veſſels and Nerves of the Spleen.

342. The Splenic Artery, which is one of the principal Branches of the Cæliaca, runs along the lower Side of the Pancreas, as has been already ſaid, and paſſes from thence in a winding Courſe to the Spleen. The Splenic Vein, which is larger than the Artery, is but little inflected in this Part of its Courſe.

343. This Artery and Vein having got beyond the Extremity of the Pancreas, ſend out ſeveral Rami together, which immediately afterwards divaricate in the ſame Plane, run in the membranous Duplicature of the neighbouring Portion of the Omentum, and laſtly interſect each other in their common Plane, all the Way to the Sciſſure of the inner or concave Side of the Spleen.

344. These Arterial and Venal Rami enter the Subſtance of the Spleen together by the ſame Sciſſure, being accompanied by the Cellular Subſtance belonging to the membranous Duplicature of the Omentum. We may likewiſe obſerve, that at this Place the Coat of the Spleen ſends from its concave Side a Portion of Lamina, which is incurvated in the Sciſſure, and penetrates into the Subſtance of the Spleen.

345. The Nerves of the Spleen are very numerous, and come from the Plexus Splenicus already deſcribed. Theſe Nerves ſend out at different Diſtances round all the Arterial Ramifications of the Subſtance of the Spleen, a great Number of Filaments in Form of an irregular Network.

346. The Arteries, Veins, and Nerves having entered the Spleen, are there divided and ſubdivided into a great Number of Ramifications, and accompany each other to the very laſt Extremities of their Diviſions. They are contained in a Kind of common Cellular Capſula or Vagina, which firſt ſurrounds all the three, and then ſends off particular Septa between them. This Capſula ſeems to be formed by a Continuation of the Cellular Subſtance of the Omentum, and of that particular Lamina of the Coat of the Spleen which I mentioned above.

347. The Capillary Extremities of all theſe Vaſcular Ramifications, both Arterial and Venal, end in the Filamentary Cells already mentioned. *Malpighi* conſidered them as diſtinct Capſulæ or Folliculi, containing the ſame Number of ſmall Glands. They all communicate together, ſo that wherever we pierce the Coat of the Spleen, we may through that Hole inflate the whole Viſcus.

348. In Oxen and Sheep there are no Venal Ramifications, as I have ſaid. The Vena Splenica having entered the great Extremity of theſe Spleens, runs firſt of all for about half an Inch or an Inch, and afterwards, inſtead of an ordinary Vein, we find a Canal perforated on all Sides. The Beginning of this Canal has ſtill ſome Remains of the Coats of a Vein; but the

Form of it is ſoon loſt, and then we find nothing but Sinuſes or Sulci in the Reticular Subſtance in Oxen, and in the Cellular Subſtance in Sheep.

349. The Splenic Artery and Nerves are there ramified in a particular Vagina, as in Men; and the Extremities of theſe Arterial Ramifications ſeem to ſwim or float in the Cells, and to fill their filamentary Subſtance with Blood. At the Ends of ſeveral of theſe Capillaries I have obſerved ſmall Corpuſcles diſpoſed like Bunches of Grapes; and I have ſeen two ſmall Tubes going out from each Corpuſcle, one long and open, the other ſmall and ſhort, which was loſt in the Sides of the Spleen.

350. I imagine that the long Tube, the Extremity of which I was not able to find, may be the Origin of a Lymphatic Veſſel, eſpecially becauſe theſe Veſſels are ſo very numerous and viſible in an Ox's Spleen, as has been already ſaid. Theſe ſmall Corpuſcles may eaſily be diſcovered in an Ox's Spleen when boiled, by a particular Adminiſtration, of which I ſhall ſay more in another Place. They are indeed much larger before than after boiling, but they are not ſo ſolid, and ſubſide more eaſily when cut. The ſame Sort of Corpuſcles may be diſcovered in the human Spleen, but they are ſo extremely ſmall as not to be viſible without a Microſcope.

351. The Uſes of the Spleen ſhall be explained after the Deſcription of the Omentum.

§. 15. *Omentum & Appendices Epiploicæ.*

Situation, Diviſion, and Connexion of the Omentum.

352. The Omentum is a large, thin, and fine membranous Bag, ſurrounded on all Sides by numerous Portions of Fat, which accompany and even inveſt the ſame Number of Arteries and Veins adhering cloſely to each other.

353. The greateſt Part of it reſembles a Kind of flat Purſe, or a Sportſman's empty Pouch, and is ſpread more or leſs on all the ſmall Inteſtines from the Stomach to the lower Part of the Regio Umbilicalis. Sometimes it goes down to the lower Part of the Hypogaſtrium, and ſometimes it does not reach beyond the Regio Epigaſtrica. It is commonly plaited or folded in ſeveral Places, eſpecially between the Bands of Fat.

354. It is divided into a ſuperior and inferior, an anterior and poſterior, and a right and left Portion. The ſuperior Portion is in a Manner divided into two Borders, one of which is fixed along the great Curvature or convex Side of the Arch of the Colon, and the other along the great Curvature of the Stomach. The Commiſſure or Union of theſe two Borders on the right Side is fixed to the common Ligament or Adheſion of the Duodenum and Colon, and to the contiguous Parts of theſe two Inteſtines. That on the left Side is fixed to the longitudinal Sciſſure of the Spleen, to the Extremity of the Pancreas, and to the convex Side of the great Extremity of the Stomach. It is likewiſe fixed to the membranous Ligament, which ſuſtains the Ductus Cholidochus, and connects it to the Vena Portæ Ventralis.

355. Below theſe Adheſions the other Portions, that is, the anterior, poſterior, two lateral and inferior Portions, which laſt is the Bottom of the Sacculus Epiploicus, have commonly no fixed Connexions, but lie looſe

looſe between the Foreſide of the Cavity of the Abdomen and the Inteſtines. The anterior and poſterior Portions are generally called the Laminæ of the Omentum, but as that Term is ordinarily employed to expreſs the Duplicature of ſome compound Membrane, it would be more convenient to call them Folia, Alæ, or ſome ſuch Name.

Structure of the Omentum.

356. The Membrane of the Omentum is, through its whole Extent, made up of two extremely thin Laminæ joined by a Cellular Subſtance; the Quantity of which is very conſiderable along the Blood Veſſels, which it every where accompanies in broad Bands, proportioned to the Branches and Ramifications of theſe Veſſels. Theſe Cellular Bands are more or leſs filled with Fat according to the Corpulency of the Subject, and for that Reaſon I have called them Bands or Portions of Fat.

Little Omentum.

357. Besides this large membranous Bag, which I name the great Omentum, there is another much ſmaller, which differs from the large one, not only in Size, but alſo in Figure, Situation and Connexion; and this I name the little Omentum. This ſmall Bag is fixed by its whole Circumference, partly to the ſmall Curvature of the Stomach, and partly to the concave Side of the Liver before the Sinus of the Vena Portæ, ſo as to ſurround and contain the prominent Portion of the Lobulus.

358. The little Omentum is thinner and more tranſparent than the other, and its Cavity diminiſhes gradually from the Circumference to the Bottom, which in ſome Subjects terminates in ſeveral ſmall Cavities or Foſſulæ more or leſs pointed. Its Structure is pretty much the ſame with that of the great Omentum, it being compoſed of two Laminæ, with a Mixture of the ſame Portions of Fat, which are conſiderably finer than the other.

359. We ſee from this Situation of the two Omenta, that in the Space left between the lower Side of the Stomach and upper Side of the Meſocolon, they have a very broad Communication with each other; ſo that if either of them contained in its Cavity any Fluid, that Fluid might readily get between the Stomach and Meſocolon, and ſo paſs into the other Bag; eſpecially when the Stomach is empty and conſequently its Situation eaſily changed.

360. Therefore by Means of this Interſtice between the Stomach and Meſocolon, the two Omenta form one Cavity, which opens into the Cavity of the Abdomen by one common Orifice, ſituated near the Commiſſure on the right Side of the great Omentum. This Orifice is ſemilunar or ſemicircular, and formed by the Union of two membranous Ligaments, whereof one connects the Beginning of the Duodenum and Neck of the Veſicula Fellis to the Liver; the other connects the contiguous Portion of the Colon to the ſame Viſcus, and extends to the Pancreas. From thence ariſes an incurvated Border, which ſurrounds the Root of the Lobulus, leaving an Opening wide enough to admit the End of the Finger.

361. To diſcover this Orifice of the Omentum, we need only raiſe a little the great Lobe of the Liver, and find out the Root of the Lobulus, and apply to it a large Pipe wrapt round with Cotton, Wool, or Tow, to hinder the Regreſs of the Air. Then if we blow gradually, the Air will inflate the Sides of the great Omentum, and give it the Appearance of a large

Bladder irregularly divided into ſeveral Lobes or Tubercles by the Bands of Fat, which appear, in this State, like ſo many Fræna between the Lobes.

362. To be ſure of ſucceeding in this Experiment, the two Omenta muſt be in their natural State, and they muſt be handled very gently with the Fingers firſt dipt in Oil. It ſucceeds better in young, lean Subjects, than in old or fat Subjects.

363. When we touch theſe Membranes with dry Fingers, they ſtick to them ſo cloſely as hardly to be ſeparated without being torn, as we ſee by the reticular Holes which appear in thoſe Portions of the Membranes that have been thus handled. In that Caſe it is to no Purpoſe, to blow through the natural Orifice already mentioned; and it is owing to theſe ſmall Holes that the Membranes of the Omentum have been ſuppoſed to be naturally reticular.

364. The membranous Laminæ of the little Omentum are contiguous partly with the external Membrane of the Liver, partly with that of the Stomach, and a little with the Membrane that lines the neighbouring Portion of the Diaphragm. Thoſe of the great Omentum are continued partly with the ſame Coat of the Stomach, and partly with the external Covering of the Colon, and conſequently with the Meſocolon; and they likewiſe communicate with the Covering of the Spleen.

365. We may ſatisfy ourſelves concerning theſe Continuations, by making a ſmall Hole in one of the Laminæ of the Omentum near the Stomach, Colon, *&c.* and by blowing into that Hole, through a Pipe well fitted to it; for the Air will gradually inſinuate itſelf under the common Coats of theſe Viſcera: But if the Parts be dry, they muſt be moiſtened a little, before the Experiment is made.

Appendices Epiploicæ.

366. The fatty Appendices of the Colon and Rectum have always appeared to me to be a Kind of ſmall Omenta or Appendices Epiploicæ. They are ſituated at different Diſtances along theſe Inteſtines, being particular Elongations of their common or external Coat. They are of the ſame Structure with the great Omenta, and there is a Cellular Subſtance contained in their Duplicature, more or leſs filled with Fat, according as the Subject is fat or lean.

367. Next the Inteſtine, each of them forms a broad, thin Baſis, and they terminate by irregular Papillæ, thicker than their Baſes. Theſe Baſes are at firſt diſpoſed longitudinally, then obliquely, and laſtly, more or leſs tranſverſely, eſpecially near the Rectum, and upon that Inteſtine.

368. These Appendices are for the moſt Part ſeparated from each other, but ſome of theſe which have longitudinal Baſes communicate together, the Veſtiges of theſe Communications being very narrow, and not very prominent. By blowing through a ſmall Hole made in one of theſe Appendices, it is inflated like a ſmall irregular Bladder, and the Air paſſes under the external Coat of the Colon or Rectum.

369. Besides theſe Appendices Epiploicæ, we obſerve at different Diſtances along the Colon, between the Ligamentary Band which lies hid, and one of the other two, that is, on both Sides of the Adheſion of the Meſocolon,

ſeveral

ſeveral adipoſe Strata, which may likewiſe be looked upon as Appendices of the ſame Nature with the former; but theſe Strata are very ſeldom obſerved between the two apparent Ligamentary Bands of the Colon.

370. The Arteries and Veins of the great Omentum are Branches of the Gaſtricæ, and for that Reaſon go by the Name of Gaſtro-Epiploicæ, Dextræ and Siniſtræ. The Arteries on the right Side anſwer to the Hepatic Artery, and thoſe on the left Side to the Splenic, and both communicate with the Arteria Ventriculi Coronaria, and reſpectively with the Arteriæ Meſentericæ. The Gaſtro-Epiploic Veins anſwer in the ſame Manner of Diſtribution to the Vena Portæ. *Veſſels of the Omentum.*

371. The Veſſels of the little Omentum come chiefly from the Coronariæ Ventriculi, and thoſe of the Appendices and Strata are Ramifications from the Reticular Texture of the Arteries and Veins of the Colon and Rectum.

§. 16. *Uſes of the Abdominal Viſcera deſcribed in the thirteen foregoing Paragraphs.*

372. The Inteſtines in general finiſh what the Stomach had begun. The Alimentary Pulp having been ſufficiently prepared by the Succus Gaſtricus, or Lymph of the Stomach, undergoes a farther Change by the Inteſtinal Lymph, Bile, and Pancreatic Juice, by which the milky Liquor called Chyle is produced, and this Liquor rendered fluid enough to enter the Lacteal Veſſels through the Tunica Villoſa of the ſmall Inteſtines, while the groſſer Portion of the Aliment continues its Courſe, and becoming gradually thicker as it advances toward the great Inteſtines, is there collected by the Name of Fæces.

373. The Dilatation of the Inteſtines is bounded by their common Coat. The undulating, ſucceſſive and periodical Contraction of the fleſhy Fibres, eſpecially of the Orbicular Fibres of the Muſcular Coat, expreſſes the Inteſtinal Lymph, beats it up into an Emulſion with the Alimentary Paſte, ſtrains that Emulſion through the Lacteal Veſſels, and propels the Reſiduum in the Manner already ſaid.

374. The Nervous Coat ſerves to ſuſtain the Tunica Villoſa, and by the oblique Diſpoſition of its Fibres, yields to the periodical Motions of the Muſcular Coat, without compreſſing the Chyliferous Ducts which paſs through the Meſhes of this Coat in the ſmall Inteſtines. The Uſes of the villous or internal Coat are ſufficiently apparent from the Deſcription given of it.

375. The Length of the ſmall Inteſtines gives a great Extent to what may be called the Strainer of the Chyle, and this Extent is very much enlarged by the numerous Folds termed Valvulæ Conniventes. By Means of this large Extent there is a great Quantity of Chyle ſtrained through theſe Inteſtines, and the Valves hinder the Alimentary Pulp from paſſing through them too faſt, that is, before all the milky Juice has been expreſſed; and this

this may be obſerved chiefly in the Beginning of the Inteſtines, where theſe Valves are moſt numerous and broadeſt, and the Aliment moſt fluid.

376. The Cavity of the great Inteſtines ſerves to receive the Fæces of the Aliment, and to contain a conſiderable Quantity thereof for a certain Space of Time, without any Inconveniency, and without being obliged to diſcharge them continually, which would be as great an Inconveniency as any. The Incurvation of the Colon, its Cells and Contraction of its laſt Convolutions, contribute to this Retention of the Fæces; but the Cæcum ſeems to be the firſt Organ thereof, becauſe the Fæces being firſt collected there are obliged afterwards to move in a contrary Direction as they aſcend into the Colon.

377. The Valve of the Colon, which might more properly be termed the Sphincter or Pylorus of the Ileum, hinders the Fæces from returning into the ſmall Inteſtines: I ſay the Fæces or groſs Matter, becauſe it is not certain that this Valve entirely ſtops that Paſſage, or that it always hinders any fluid Matter forced downward by the Colon from entering the Ileum, even in a natural State.

378. The Glandular Lacunæ of the great Inteſtines furniſh continually a Kind of Mucilage, which not only defends the internal Coat from the Acrimony of the Fæces, but ſerves alſo to lubricate theſe Fæces in Proportion to their different Degrees of Solidity.

379. The Appendicula Vermiformis is ſo very ſmall in Adults, that its Uſe cannot be determined with Certainty. Perhaps the mucilaginous Matter in its Cavity, furniſhed by the numerous Glandular Lacunæ of its internal Coat, which can only be evacuated by Plenitude, may, during its Stay there, contract an Acrimony, which may vellicate or ſtimulate the Cæcum, in order to throw its Contents into the Colon.

380. The Inteſtinum Rectum is the laſt Reſervatory of the Fæces. The great Thickneſs of its Muſcular Coat, and the great Number of longitudinal Fibres by which this Thickneſs is chiefly formed, enable it to yield to the collected Fæces to ſo great a Degree as to repreſent a large Bladder or Stomach. The Muſculi Levatores Ani ſerve to ſuſpend the lower Portion of this Inteſtine, eſpecially when full; and it is partly by the Contraction of theſe Muſcles which overcome the Sphincter of the Anus, that the Fæces are diſcharged out of the Body. The Sphincters form the third Pylorus of the whole Alimentary Canal.

381. The Meſentery and Meſocolon connect the Inteſtines in ſuch a Manner as that they cannot be twiſted or run into Knots, without hindering them from ſliding and yielding to each other according to the different Poſtures of the Body, or according as they are more or leſs empty or full.

382. The Adheſions of the Meſentery form the Convolutions of all the ſmall Inteſtines into a large Bundle irregularly round, which fills a great Part of the Cavity of the Abdomen from the Epigaſtrium downward.

383. The Meſocolon, by its Adheſion to the Colon, forms a Kind of Septum Tranſverſum between the ſmall Inteſtines and the Viſcera contained in the Epigaſtrium; and this Septum ſupports the Liver and Stomach under the

the Arch of the Diaphragm, juſt as much as it is ſuſtained by the Inteſtines. This natural Situation of theſe Viſcera is moſt commonly altered in dead Bodies opened after the common Method, and without the neceſſary Precautions.

384. The Breadth of the Meſentery and Meſocolon affords a large Extent to the Ramifications of the Arteries, Veins and Nerves diſtributed through them by innumerable Communications and Anaſtomoſes, by Means of which any Portion of the Inteſtines may be ſupplied, though the principal Branch which leads to it ſhould happen to be compreſſed or obſtructed.

385. The Cellular Subſtance in the Duplicature of the Meſentery and Meſocolon, ſerves not only for a ſoft Bed to all theſe Ramifications, but alſo to contain thoſe Collections of Fat, neceſſary for the Formation of the Bile, as I ſhall obſerve hereafter; and the Cellular Subſtance of the Meſentery has likewiſe one Uſe peculiar to it, which is to inveſt the Lymphatic Glands and Lacteal Veſſels, and upon this Account it is thicker than that of the Meſocolon.

386. The Lacteal Veſſels being firſt formed by a copious reticular Texture round the Circumference of the Inteſtines, reſembling the Vaſcular Net-work of that Canal, and afterwards uniting every where through the Duplicature of the Meſentery, with the Arterial Ramifications, which they likewiſe accompany in many Places; it is eaſy to conceive that the Pulſation of the Meſenteric Arteries muſt propel the Chyle in the Lacteal Veſſels from the Inteſtines to the Receptaculum Chyli, that Motion being ſuitable to the Direction of their Valves.

387. The Liver is the principal Organ for the Secretion of the Bile. The Villi of that immenſe Number of Glandular Cells of which it is compoſed, filtrate continually from the Blood of the Vena Portæ, ſmall Drops of Bile which afterwards inſinuate themſelves into the Pori Bilarii, and are in Part lodged in the Veſicula Fellis, and in Part run directly into the Duodenum, in the Manner already explained in deſcribing the Biliary Ducts.

388. The Spleen, Omentum, Appendices Epiploicæ, adipoſe Strata of the Meſentery, and thoſe of the great Inteſtines, and even the Pancreas, with the whole Series of Glands in the Inteſtinal Canal, ſeem to contribute to the Formation of the Bile, as ſo many auxiliary or rather preparatory Organs; but each of them in a different Way.

389. It appears (1.) That the Venal Blood that returns from all the Inteſtinal Glands, and from the Pancreas, has left a great Portion of its Serum. (2.) That the Blood which returns from the Spleen has undergone a certain Change, by its Courſe being mechanically retarded, and likewiſe that its Texture is altered by the Action of the numerous Nerves ſent thither by the Plexus Splenicus. (3.) That the Blood which returns from the Omenta, Appendices Epiploicæ, and from the Strata and other Collections of Fat, is loaded with Oil.

390. These three Kinds of Venal Blood meet in the Trunk of the Vena Portæ Ventralis, where they are mixed together, and from thence they enter the tranſverſe Sinus or Trunk of the Vena Portæ Hepatica. In this Sinus they are ſtill more intimately mixed, as in a Kind of Lake, and become

come one uniform Maſs of Blood, which being forced into the Branches of the Vena Portæ Hepatica, only by the ſupervening Blood from the other Vena Portæ, and by the lateral Pulſations of the Ramifications of the Hepatic Artery, its Courſe muſt be very ſlow. The Secretion of the Bile depends partly on this ſlow Motion, and partly on theſe external Impulſes, as I ſhall ſhew in another Place.

391. The Veſicular Bile appears to be more exalted than that in the Hepatic Duct; and by meeting in the Ductus Cholidochus, they ſeem to compoſe a third Kind of Bile, which without the Cyſtic or Veſicular Bile would perhaps be too mild; and too acrid without the Hepatic. This Bile mixes in the Duodenum with the Pancreatic Juice, and with that of the inteſtinal Glands, and from this Mixture a Fluid reſults, which is proper to ſeparate the chylous Matter from the groſs and uſeleſs Part of the alimentary Pulp, as it comes from the Stomach.

§. 17. *Renes & Ureteres.*

Situation, Figure, and Diviſion of the Kidneys.

392. The Kidneys are two pretty ſolid, glandular Bodies, ſituated in the poſterior Part of the Cavity of the Abdomen, on each Side of the Lumbar Vertebræ, between the laſt falſe Ribs, and Oſſa Ilium. The right Kidney lies under the great Lobe of the Liver, and is conſequently lower than the left, which lies under the Spleen.

393. The Figure of the Kidneys reſembles that of a large Bean, their Circumference being convex on one Side, and concave on the other. The concave Side is turned to the Vertebræ, and the convex Side the oppoſite Way. Their Length anſwers to the Diſtance between the laſt falſe Rib and Os Ilium; they are about half as broad as long, and half as thick as broad.

394. In each Kidney we obſerve a fore and Backſide; an upper and lower Extremity; a great and ſmall Curvature, and a Convexity and Concavity.

395. The Backſide is broader than the Foreſide; and the upper Extremity is a little broader and more incurvated than the lower. The Depreſſion in the ſmall Curvature is oblong and uneven, reſembling a Sinus, ſurrounded by ſeveral Tubercles; and as it is turned a little toward the Foreſide, this Side is ſomething narrower than the other.

Blood-Veſſels of the Kidneys.

396. The deſcending Aorta and inferior Vena Cava lie between the Kidneys, pretty cloſe to the Bodies of the Vertebræ, and to each other; the Artery being on the left Hand, the Vein on the right. Each of theſe large Veſſels ſends out tranſverſely toward each Side, commonly one capital Branch, which goes to the Kidney, and enters the Sinus or Depreſſion thereof, by ſeveral Rami, of which hereafter.

397. Theſe Veſſels were by the Ancients termed the emulgent Arteries and Veins, but I chuſe rather to call them Arteriæ Venæ Renales. Sometimes there are more than one of each Kind, which is oftenеſt found in the Arteries, ſometimes on one Side only, and ſometimes in both.

398. The Artery and Vein are not of an equal Length, and the Difference depends on the Situation of the Aorta and Vena Cava; for the left Renal Artery is ſhorter than the right, becauſe the Aorta lies neareſt the left Kidney; and the left Renal Vein is longer than the right, becauſe the Vena Cava lies furtheſt from the left Kidney.

399. These Veſſels are likewiſe diſpoſed in ſuch a Manner, as that the Veins lie more anteriorly than the Arteries; becauſe the Aorta lies cloſe to the Spina Dorſi; whereas the Vena Cava, which perforates the Diaphragm at ſome Diſtance from the Vertebræ, does not join them, till after it has given off the Renal Veins.

Nerves of the Kidneys.

400. Each Renal Artery is ſurrounded by a nervous Net-work, called Plexus Renalis, which furniſhes a great Number of Filaments to the Kidneys, that come partly from the Semilunar Ganglions of the two great Sympathetic Nerves, and partly from the Plexus Hepaticus and Splenicus. This Renal Plexus ſends likewiſe ſome Filaments round the Renal Veins.

Coats of the Kidneys.

401. The Kidneys are ſurrounded by a very looſe membranous and cellular Covering, called Membrana Adipoſa, becauſe in fat Perſons the Cells of this Subſtance are filled with Fat. This was for a long Time impertinently taken for a Duplicature of the Peritonæum, the true Membranous Lamina of which covers only the Foreſide of the Kidneys; and conſequently they lie without the Peritonæum, becauſe the Portion of that Membrane that covers them cannot be looked upon as an intire Coat; ſo that the only common Coat they have is the Cellular Subſtance, which likewiſe inveſts the Renal Arteries and Veins in Form of a Vagina.

402. The proper Coat or Membrane of the Kidneys is compoſed of two Laminæ, between which there is likewiſe a very fine Cellular Subſtance, which may be made ſenſible by blowing through a Pipe between the two Laminæ.

403. The external Lamina is very thin, and adheres cloſely to the internal Lamina, by means of the Cellular Subſtance. The internal Lamina penetrates every where by numerous Elongations, into the Subſtance of the Kidney, from which it cannot be ſeparated without tearing.

404. The Surface of the external Lamina is very ſmooth, poliſhed and gliſtening, and it renders the whole Surface of the Kidney very even and uniform in Adults. In Children, this convex Surface is in a Manner divided into ſeveral Lobes or Tubercles, almoſt as in Oxen and Calves; and in grown Perſons we ſometimes obſerve the ſame Inequalities.

405. The Blood-Veſſels having entered the Kidneys, are ramified every Way, and theſe Ramifications ſend out other Capillary Rami, which go all the Way to the Surface, where they appear like irregular Stars and furniſh the proper Membrane of the Kidneys. Sometimes theſe two Ramifications penetrate to the Membrana Adipoſa, and communicate there with the Arteriæ and Venæ Adipoſæ.

406. The proper Membrane having ſurrounded the Kidney, all the Way to the Sinus, joins the Veſſels at that Place, and accompanies all their Ramifications through the Body of the Kidney, in Form of a Vagina or Capſula,

ſula, and likewiſe contributes in Part to form the Pelvis and Calices or Infundibula, of which hereafter.

407. We ſometimes obſerve a conſiderable Veſſel to go in or come out from the convex Surface of the Kidney, but this is not common; and in that Caſe there is a Depreſſion by which the proper Membrane enters, and communicates with that Portion which goes in by the Sinus.

408. The Tunica Adipoſa or common Coat, which likewiſe inveſts the great Veſſels to their Entry into the Kidneys, does not ſeem to accompany them any further; but terminates at the Sinus, in the Interſtices between the Ramifications.

Structure of the Kidneys.

409. We may diſtinguiſh three Kinds of Subſtances in the Kidney; an exterior Subſtance, which is thick, granulated, and in a Manner Cortical; a middle Subſtance, which is medullary and radiated, called Striata, Sulcata or Tubularis, becauſe it ſeems to be made up of radiated Tubes; and an inner Subſtance, which is only a Continuation of the Second, and terminates on the Inſide by Papillæ; for which Reaſon I have given it the Name of Papillaris.

410. These three Subſtances may be ſeen diſtinctly in a Kidney cut into two equal Parts, through the great Curvature. The Cortical Subſtance may be obſerved round the whole Circumference; and by the Microſcope, we perceive it to be of a ſpungy, granulated, and waving Texture, all its Parts adhering together in a radiated Manner. Its Colour is a bright whitiſh grey.

411. By fine anatomical Injections and in Inflammations, we diſcover an Infinity of ſmall Capillary Veſſels, which run in various Directions, between and round the different Portions of this Subſtance, and by the Help of a Microſcope, we ſee likewiſe great Numbers of ſmall red Corpuſcles more or leſs round, and diſpoſed almoſt like Bunches of Currants. Theſe ſmall Corpuſcles are perhaps only the Extremities of the cut Veſſels, filled either with Blood or with a coloured Injection.

412. The other two Subſtances, that is, the Medullary or Striated and Papillary, are really but one and the ſame Maſs, of a more reddiſh Colour, the convex Side of which riſes at ſeveral Places into narrow Tubercles, lodged in the ſame Number of Cavities or Depreſſions. The radiated Striæ are afterwards continued to the Capillary Portion; and the Papillæ form in ſome Meaſure ſo many Centers of theſe Radii, oppoſite to the Tubercles.

413. The Medullary Subſtance is likewiſe diſtinguiſhed from the Cortical, by the Arterial and Venal Arches, which ſend Capillary Ramifications on all Hands; and its Colour is more or leſs red.

414. The Papillæ, which are only a Continuation of the Medullary Subſtance, as has been ſaid, are often a little paler than that Subſtance. They are ten or twelve in Number, very diſtinct from each other, reſembling the ſame Number of Cones, with very broad Baſes and obtuſe Apices.

415. At

415. At the Point of each Papilla we ſee, even without a Microſcope, in a ſmall Depreſſion, ſeveral very ſmall Holes, through which little Drops may be perceived to run when the Papillæ are compreſſed. Theſe are little Drops of Urine, which being filtred, partly in the Cortical, partly in the Medullary or Tubular Subſtance, do afterwards paſs through the Subſtance of the Papillæ, and are diſcharged by theſe Orifices.

The Pelvis of the Kidneys.

416. Each Papilla lies in a Kind of membranous Calix or Infundibulum, which opens into a common Cavity, called the Pelvis. This Pelvis is membranous, being in the ſame Structure with the Calices, of which it is a Continuation; and its Cavity in Man is not uniform, but diſtinguiſhed into three Portions, each of which contains a certain Number of Infundibula or Calices, together with the Papillæ which lie therein; and ſometimes we find two or three Papillæ in the ſame Infundibulum.

Ureters.

417. At the Place where theſe Infundibula ſurround the Baſes of the Papillæ, they ſend Productions into the Medullary or radiated Subſtance of the Kidney, which accompany the Blood-Veſſels, and ſerve for Capſulæ or Vaginæ to all the Vaſcular Arches, both Arterial and Venal, and to their different Ramifications, quite through the Cortical Subſtance, and as far as the Surface of the Kidney.

418. After the Infundibula have contracted in a conical Form round the Apices of the Papillæ, each of them forms a ſmall ſhort Tube or Gullet, which uniting at different Diſtances along the Bottom of the Sinus of the Kidney, form three large Tubes which go out from the Sinus, in an oblique Direction from above downwards, and immediately afterwards unite into one Trunk.

419. This Trunk becomes a very long Canal, called the Ureter. In Men, the three Tubes ſupply the Place of what is called the Pelvis in Brutes, and might more properly be called the Roots or Branches of the Ureters than the Pelvis; which Name would agree beſt to the Trunk, as being larger than the reſt of the Ureter. The Ureters are commonly two in Number, one for each Kidney, but ſometimes there are more than two.

420. The Situation of the Trunk, and of the Roots and Branches of each Ureter, with reſpect to the Renal Artery and Vein, is in the following Manner: The Artery is in the upper Part of the Sinus, and partly before the Vein. The Vein is about the Middle, and between the Artery and Ureter. The Ureter is in the lower Part, a little behind the Vein, and it is partly ſurrounded by one Branch of the Artery.

421. This Diſpoſition appears plainer near the anterior than near the poſterior Side of the Kidney, becauſe this laſt is broader than the former; and we likewiſe ſee there the three Branches of the Ureter, of which the uppermoſt is the longeſt, and the loweſt is the ſhorteſt, becauſe of their oblique Direction downward.

422. From this Deſcription, we ſee that in the Human Kidney there is no other common or uniform Pelvis, but the Trunk or Head of the Ureter, and the three great Branches. To have a true Idea of their Diſpoſition, we

muſt imagine that the Ureter enters the Kidney by the lower Part of the oblong Sinus; that it increaſes gradually in Breadth as it advances, and that it is divided into three Branches, before it enters the Subſtance of the Kidney.

423. One of theſe Branches may be reckoned a direct Continuation of the Ureter, and it is longer than the reſt; being extended from the lower to the upper Part of the Sinus, and it may be found without much Preparation. The other two Branches are ſhorter, and cannot be well diſcovered without an artificial Separation. The Angles between theſe Branches at their Baſes, or at the Head of the Ureter, are not pointed as thoſe of other Ramifications, but formed by a round Incurvation, which is generally ſurrounded by Fat.

424. These firſt Branches of the Ureters produce other ſmall Branches at the Bottom of the Sinus, which are diſpoſed in Pairs. Theſe ſmall collateral Branches extend in Breadth, and form the Infundibula or Calices, in which the Papillæ are lodged; the great Circumference of which produces in the Subſtance of the Kidney, the different Vaginæ of the Vaſcular Arches and of their Ramifications. The internal Lamina of the Kidney is continued round theſe Vaginæ, and the external Lamina is expanded round the firſt Branches, round the Trunk, and round all the reſt of the Ureter.

425. If the Trunk of the Ureter be ſplit on that Side which is next the Vertebræ, and this Section be continued to the Extremity of the ſuperior Branch, we may obſerve immediately above the Trunk, two Holes lying near each other, which are the Orifices of the ſmall collateral Branches, and Gullets of the Infundibula. A little above theſe Holes, there are other two very much like them, and ſo on all the Way to the Extremity of the ſuperior Branch, which terminates likewiſe by theſe Gullets of the Infundibula; and in each of theſe Gullets we may obſerve at leaſt the Apex of one Papilla.

426. A Section begun on the convex Surface of the Kidney, and carried from thence to the Trunk of the Ureter, diſcovers the Extent of the Papillæ very plainly, and likewiſe the Infundibula, their Gullets, *&c.* but it will be difficult to give Beginners a juſt Idea of the Structure of theſe Parts, without the other Section.

427. The Ureters run down obliquely, and with a very ſmall Degree of Inflexion, from the Kidneys to the lateral Parts of the inner or anterior Side of the Os Sacrum, and paſſing between the Rectum and Bladder they terminate in the laſt of theſe Viſcera in the Manner that ſhall be explained hereafter.

428. They are compoſed of three proper Coats; the firſt of which, that ſurrounds the reſt, is of a whitiſh Colour, and of a very compact filamentary Texture, being ſtretched with Difficulty, and appearing like a filamentary Subſtance degenerated. The next Coat is of a reddiſh Colour, ſtronger than the firſt, and made up of different Strata of Fibres, which interſect each other; but it is very hard to determine, whether they are muſcular or ſimply membranous.

429. The innermoſt Coat is in ſome Meaſure ligamentary, and lined by a very fine Membrane, which covers a very delicate Reticular Texture of Veſſels. It is ſlightly granulated like ſhorn Velvet, and moiſtened all over by a mucilaginous Liquor. It has ſeveral longitudinal Rugæ, which are interſected by a great Number of ſmall tranſverſe Rugæ.

430. Besides theſe proper Coats the Ureters are inveſted by the Cellular Subſtance of the Peritonæum, the Membranous Lamina of which covers likewiſe about two Thirds of their Circumference, ſometimes more, ſometimes leſs, but never ſurrounds them entirely; ſo that when they are examined in their natural Situation, they appear like Ropes lying behind the Peritonæum, and jutting out more or leſs toward the Cavity of the Abdomen, together with that Portion of the Peritonæum which covers them.

431. All that has been ſaid about the Structure of the Ureters, Pelvis, Arches, Striæ, Foſſulæ, and Holes at the Apex of the Papillæ, appears moſt diſtinctly when theſe Parts are examined in clear Water, as I have already often obſerved.

§. 18. *Glandulæ Renales, Vulgò Capſulæ Atrabilariæ.*

Situation, Figure and Size of the Renal Glands.

432. Immediately above each Kidney lies a glandular Body, called by the Ancients Capſulæ Atrabilariæ, by others Capſulæ Renales, Renes Succenturiati, and Glandulæ Renales; and they might be properly enough termed Glandulæ Supra-Renales. They are ſituated on the upper Extremity of each Kidney a little obliquely, that is, more toward the inner Edge and Sinus of the Kidney, than toward the outer convex Edge.

433. Each Gland is an oblong Body with three Sides, three Edges, and two Points, like an irregular Creſcent, with its great or convex Edge ſharp, and the ſmall concave Edge broad. Its Length is about two Thirds of the greateſt Breadth of the Kidney, and the Breath of its middle Portion is about one Third of its Extent between the two Extremities, ſometimes more, ſometimes leſs. Its Colour is a dark yellow.

434. It has one anterior, one poſterior, and one lower Side, which laſt may be termed the Baſis; and it has one upper, and two lower Edges, whereof one is anterior, the other poſterior. The upper Edge may be called the Criſta, and the two lower Edges the Labia. One of its Extremities is internal, or turned inward toward the Sinus of the Kidney; the other is external, or turned outward toward the gibbous Part of the Kidney. The Figure of this glandular Body may likewiſe be compared to that of a ſingle Cock's Comb, or to the Top of an Helmet.

Structure of the Renal Glands.

435. The Surface of theſe Glands is uneven; the Foreſide is the broadeſt, and the lower Side or Baſis the narroweſt. Along the Middle of the anterior Side a Ridge runs from the Edge of the inner Extremity, a little above the Baſis, to the Point of the other Extremity, and divides this Side into two equal Parts, like the middle Rib of the Leaf of a Tree, and on the lower Side under the Baſis there is a Kind of Raphe or Suture.

436. The

436. The Blood-Veſſels of theſe Glands come from the Arteriæ and Venæ Renales, and Diaphragmaticæ, and likewiſe from the Aorta and Vena Cava, from the Arteria Cæliaca, *&c.* Theſe Veſſels are termed the Capſular Arteries and Veins, and as they enter the Glands they ſeem to be inveſted by a Vagina. They are not always derived from the ſame Sources, neither is their Number the ſame in all Subjects, and there is commonly a pretty large Vein which runs along the Ridge. The Nerves on each Side are furniſhed by the neighbouring Semilunar Ganglion, and by the Renal Plexus, which depends on it.

437. In the Inſide of theſe Capſulæ there is a narrow triangular Cavity, the Surface of which is full of ſhort, ſtrong Villi of a yellowiſh Colour; but in Children it is reddiſh, and of a dark brown in aged People. The Sides of this Cavity are connected by a great Number of Filaments, and they appear to be wholly glandular, that is, to be filled with very fine ſmall Folliculous Corpuſcles. Along the Top of the Gland theſe Sides touch each other immediately.

438. In opening this Cavity we find a granulated or follicular Subſtance, which fills it almoſt intirely, and the Blood-Veſſels are diſtributed on this Subſtance, as well as on the Sides of the Cavity. If the Section be begun at the great Extremity of the Capſula, and be continued through the upper Edge, and if the lateral Portions be afterwards ſeparated, the Glandular Body appears like a Kind of Criſta raiſed from the Middle of the Bottom of the Cavity.

439. This Glandular Body, or Nucleus, adheres more cloſely to the Bottom or Baſis of the Cavity, than to the two Sides, eſpecially near the great Extremity; but yet it may be ſeparated both from the Baſis and Sides, being connected to them by a great Number of ſmall Filaments. It adheres leaſt to the Baſis near the ſmall Extremity.

440. The Capſular Vein, which comes ordinarily from the Vena Renalis, is much larger than the Arteries, and it communicates with the Inſide of the Capſula, much in the ſame Manner as the Vena Splenica with the Cells of the Spleen, for it may be inflated by blowing into any Part of the Capſular Cavity, and the Air likewiſe paſſes into the Vena Renalis, *&c.*

441. This Cavity contains an unctuous viſcid Liquid of a yellowiſh red Colour, which with Age changes gradually into a yellowiſh Purple, a dark Yellow, and a black Yellow, and ſometimes it is perfectly black, but even then if it be ſpread thin on a large Surface, it appears yellow. I have ſometimes found it not only reddiſh, but mixed with real Blood.

442. The Uſes of theſe Renal Glands have not as yet been diſcovered; and all that we know about the Liquor contained in them is that it reſembles the Bile. They are very large in the Fœtus, and diminiſh in Adults. Theſe two Phænomena deſerve our Attention.

443. They lie ſometimes directly on the Top of the Kidneys, but I never found them on the gibbous Part. The Gland on the right Side is partly connected to the Diaphragm, under and very near the Adheſion of the great Lobe of the Liver to that Muſcle. That on the left Side adheres to the Diaphragm

Diaphragm below the Spleen; and both these Connections are confined to the contiguous Portions of the inferior Muscle of the Diaphragm. They are involved together with the Kidneys in the Membrana Adiposa, of which a very thin Portion insinuates itself between the Kidneys and Glands, and also between them and the Diaphragm; so that they adhere to both by the Intervention of the Cellular Substance, which in some Subjects contains a Stratum of Fat.

444. The Venal Ridge, already mentioned, sinks so deep into the Foreside in some Subjects, that the upper Part of this Side appears to be separated from the lower; but this is seen most distinctly when the Capsula is examined in clear Water.

445. When the Capsular Vein is opened lengthwise with the Point of a Lancet, we discover in it a great many small Holes, many of which are only the Orifices of the Rami of the Vein, others are simple Holes; and it is perhaps through these that the Air passes into the Gland, as already mentioned.

446. On the outer Surface of these Capsulæ we observe a very thin, distinct Coat, separate from the Cellular Substance that surrounds them. Sometimes this Coat is raised by an uneven Stratum of Fat, which makes it appear granulated; and for the same Reason the Capsulæ are of a pale Colour, like a Corpus Adiposum.

447. The Liquor contained in them appears sometimes in the Fœtus, and in young Children, of a bluish Colour.

448. To be able to discover the Uses of these Capsulæ, we must not only attend to the two Circumstances already mentioned, but also to their external Conformation, which is commonly more regular in the Fœtus, and in Children, than in Adults and old People. We must likewise consider the Consistency and Solidity of their Substance, which is greater before Birth, and in Childhood, than in an advanced or old Age, in which they are often very flaccid, and very much decayed; and this perhaps may be the Reason why the Figures given of these Glands taken out of their Membrana Adiposa are so very irregular and different from what I have demonstrated for above twenty Years past.

§. 19. *Vesica Urinaria.*

449. The Bladder is a Kind of membranous and fleshy Pouch or Bottle, capable of Dilatation and Contraction, situated in the lower Part of the Abdomen, immediately behind the Symphysis of the Ossa Pubis, and opposite to the Beginning of the Intestinum Rectum. The Figure of it is nearly that of a short Oval. It is broader on the fore and back Sides, than on the lateral Parts, rounder above than below when empty, and broader below than above when full. *Situation, Figure, and Division of the Bladder.*

450. It is divided into the Body, Neck, and Bottom; into an anterior, posterior, and two lateral Parts. The upper Part is termed the Fundus or Bottom,

Bottom, and the Neck is a Portion of the lower Part, which is contracted like the Gullet of ſome Veſſels.

Structure of the Bladder.

451. The Bladder is made up of ſeveral Coats, almoſt like the Stomach. That Part of the external Coat which covers the upper, poſterior, and lateral Sides of the Bladder, is the true Lamina or Membrane of the Peritonæum, and the reſt of it is ſurrounded by a Cellular Subſtance, by the Intervention of which the Peritonæum is connected to the Muſcular Coat.

452. The proper Coats are three in Number, one muſcular, one nervous, and one villous, which is the innermoſt. The Muſcular Coat is compoſed of ſeveral Strata of fleſhy Fibres, the outermoſt of which are moſtly longitudinal; the next to theſe are more inclined toward each Hand; and the innermoſt more and more oblique, and they become at length almoſt tranſverſe. All theſe Fibres interſect each other in various Manners, and they are connected together by a fine Cellular Subſtance, and may be ſeparated by inflating that Subſtance.

453. The Nervous Coat is nearly of the ſame Structure with the Tunica Nervoſa of the Stomach.

454. The internal Coat is ſomething granulated and glandular, and a mucilaginous Serum is continually diſcharged through it, which moiſtens the inner Surface of the Bladder, and defends it againſt the Acrimony of the Urine. It appears ſometimes altogether uneven on the inner Side, being full of Eminences and irregular Rugæ when empty and in its natural State of Contraction. Theſe Inequalities diſappear when the Bladder is full, or when it is artificially diſtended by Air, or by injecting any Liquid.

Urachus.

455. At the Top of the Bladder, above the Symphyſis of the Oſſa Pubis, we obſerve a Ligamentary Rope, which runs up between the Peritonæum and the Linea Alba of the Abdomen, all the Way to the Navel, diminiſhing gradually in Thickneſs as it aſcends. This Rope had a particular Uſe in the Fœtus, as ſhall be ſaid in another Place. It is ſufficient to add here, that it is in Part originally a Production of the inner Coats of the Bladder, which Production is termed Urachus.

Arteriæ Umbilicales.

456. This Rope is compoſed likewiſe of two other Ligamentary Elongations, which are the Extremities of the Umbilical Arteries. Theſe Arteries come from the Hypogaſtricæ, run up by the Sides of the Bladder, and remain hollow and filled with Blood, even in Adults, as high as the Middle of the Bladder, through all which Space they likewiſe ſend off Ramifications. Afterwards they loſe their Cavity, and become ligamentary as they aſcend. At the upper Part of the Bladder they approach each other, and joining the Urachus form that Rope, which may be termed the ſuperior Ligament of the Bladder.

457. The external Fibres of the Muſcular Coat are more numerous than the internal, and the moſt longitudinal anterior Fibres form a Kind of Incurvation round the Urachus at the Top of the Bladder, much like that of one of the fleſhy Portions which ſurround the ſuperior Orifice of the Stomach, and lower Extremity of the Œſophagus. This Incurvation paſſes behind the Urachus.

458. The Portion of the Peritonæum, which covers the poſterior convex Side of the Bladder, forms a very prominent, tranſverſe Fold, when the Bladder is contracted, which diſappears when the Bladder is extended. This Fold ſurrounds the poſterior Half of the Bladder, and its two Extremities are elongated towards each Side; by which Elongations a Kind of lateral Ligaments of the Body of the Bladder are formed, which are more conſiderable in Children than in Adults.

459. The lower Part of the Bladder, which deſerves the Name of Fundus much better than the upper Part, is perforated by three Openings, one anterior, and two poſterior. The anterior Opening is formed by an Elongation of all the proper Coats, in Form of a Gullet, turned much in the ſame Manner with the inner Orifice of the Roſtrum of the Head of an Alembic. This Elongation is called the Neck of the Bladder, the Deſcription of which belongs to that of the Parts of Generation in Men.

460. The other two Openings in the true Fundus of the Bladder, are formed by the Ureters, which in their Courſe downward, already deſcribed, run behind the Spermatic Veſſels, and then behind the lower Part of the Bladder, approaching each other. Each Ureter lies between the Umbilical Artery, and Vas Deferens of the ſame Side; the Artery lying on the Outſide of the Ureter, and the Vas Deferens on the Inſide.

461. Afterwards they get between the Vaſa Deferentia and the Bladder, croſſing theſe Canals; and then at about a Finger's Breadth from each other, they begin to pierce the Coats of the Bladder. They run a little Way between the Muſcular and Nervous Coats, and open into the Bladder obliquely, ſomething nearer each other than when they firſt entered its Coats.

462. The Orifices of the Ureters in the Bladder are ſomething oval and narrower than the Cavity of the Ureters immediately above them. The Edge of theſe Orifices is very thin, and ſeems to be formed meerly by the Union of the internal Coat of the Bladder with that of the Ureters.

Blood Veſſels and Nerves of the Bladder.

463. The Arteries of the Bladder are furniſhed by the Hypogaſtricæ or Iliacæ Internæ; being Rami of the Arteria Sciatica, Epigaſtrica and Umbilicalis on each Side. The Veins come from thoſe of the ſame Names with the Arteries.

464. The Nerves of the Bladder come from the Crurales, and alſo from the Sympathetici Maximi, by means of their Communication with the Crurales. It has likewiſe ſome Nerves from the Plexus Meſentericus Inferior.

465. Besides the Ligaments already mentioned, there are likewiſe two ſmall ones, by which the anterior Part of the true Fundus of the Bladder is connected to the Oſſa Pubis, which ſhall be deſcribed with the Neck and Sphincter, after the Hiſtory of the Parts of Generation in both Sexes; and I refer to the ſame Place, all that relates to the Connexion of the Bladder with the other neighbouring Parts.

§. 20. *The Parts of Generation in Males.*

Situation in general, and Diviſion of theſe Parts.

466. THE Parts of Generation in Males are of different Kinds, ſome of them being wholly contained in the Abdomen, and others lying without it. From this Situation, they might properly enough be divided into external and internal Parts; and all thoſe belonging to the firſt Claſs might be deſcribed before thoſe of the ſecond.

467. BUT as it is ſtill more proper to have a regard to the Œconomy of theſe Parts, according to which, their Functions begin in ſome internal Parts, are continued in ſome external Parts, return again to the internal, and are finiſhed in the external; I ſhall follow the ſame Order in deſcribing them, and this is what I conſtantly obſerve in my publick Lectures.

468. THE firſt of theſe four Claſſes comprehends the Spermatic Veins and Arteries; the ſecond, the Teſtes, Epididymes and Scrotum; the third, the Vaſa Deferentia, Veſiculæ Seminales, and Proſtates; and the fourth, the Corpora Cavernoſa, Urethra, Integuments, *&c.*

469. I formerly made a fifth Claſs out of ſome of theſe Parts, which I looked upon as accompanying the reſt; but I now think it better to include them all in the four Claſſes that I have mentioned.

The Spermatic Veſſels.

470. THE Spermatic Arteries go out moſt commonly from the anterior Part of the inferior Aorta, near each other, and about an Inch lower than the Arteriæ Renales. Their Origin oftentimes varies; for I have obſerved them to ariſe from the Renal Artery; and ſometimes they go out higher, lower or more laterally than is common, and each Artery has been ſeen to ariſe from different Places.

471. THEY run down obliquely in the poſterior Part of the Abdomen, within the Cellular Subſtance of the Peritonæum, paſſing inſenſibly from behind, forward; and ſo parting gradually more and more from the Aorta, they croſs over the Foreſide of the Ureters, and run through the Openings or Rings of the Abdominal Muſcles, along with the Elongations or Productions of the Cellular Portion of the Peritonæum.

472. THEY are ſmall at their Origin, and in their Courſe downward, they give off pretty conſiderable lateral Ramifications, to the Membrana Adipoſa, Peritonæum, and alſo to the Meſentery, where they ſeem to communicate with the Meſenteric Arteries.

473. THEY ſometimes paſs through the Areolæ, or Meſhes of the Spermatic Veins; and before they go out of the Abdomen, they are divided into very fine Rami, which run in a more or leſs winding Courſe, almoſt parallel to each other.

474. AFTERWARDS they enter the Cellular Productions of the Peritonæum, which ſerve them for Vaginæ. They do not fluctuate indifferently from one Side to the other of theſe Vaginæ; but are connected along their inner Surface by thin membranous Laminæ, which are likewiſe Continuations of the Cellular Subſtance of the Peritonæum.

475. THE

475. The Arteries continue the ſame winding Courſe within theſe Vaginæ, paſſing before the Vaſa Deferentia, which are likewiſe contained in them; and at length they terminate by Ramifications in the Epididymes and Teſtes, in the Manner that ſhall be afterwards explained.

476. The Spermatic Veins accompany the Arteries, and have nearly the ſame Courſe. The right Vein ariſes commonly from the Trunk of the Vena Cava, in the ſame Manner as the Artery from the Aorta; and I have ſometimes obſerved it to go out from the Union of the right Renal Vein with the Vena Cava, and ſometimes I have ſeen three Veins on the right Side, go out ſeparately from the Trunk of the Vena Cava. The left Spermatic Vein ariſes moſt commonly from the Vena Renalis Siniſtra.

477. In their Courſe downward, they firſt join the Arteries, and together with them, enter the Cellular Productions of the Peritonæum, to which they are connected in the ſame Manner. From their Origin to their Paſſage through the Openings or Rings of the Abdominal Muſcles, they ſend off ſeveral Rami to the Membrana Adipoſa of the Kidneys, Peritonæum and Meſentery, where they ſeem to communicate with the Venæ Meſaraicæ, and conſequently with the Vena Portæ.

478. A little below the Place where they croſs over the Ureters, they ſend out a conſiderable Branch, which is afterwards divided into two Rami, one of which communicates with the Vena Capſularis, and the other oftentimes with the Renalis; and lower down they give out the Vein which communicates with the Vena Meſaraica, as already obſerved.

479. They differ from the Spermatic Arteries, not only in that they are larger, and their Coats thinner, but alſo in being more divided and multiplied, as they deſcend to the Rings of the Abdominal Muſcles; and as they gradually produce a large Faſciculus of Ramifications, the Ancients gave to them and to the Arteries, the Name of Vaſa Pyramidalia.

480. These Ramifications often communicate with each other in this Courſe, and form a great Number of Areolæ, Contortions and Convolutions, ſo as to repreſent a Kind of Plexus, which is connected to the Cellular Vagina of each Side, by very fine Laminæ; and the Artery which accompanies the Vein, croſſes it in ſeveral Places, and runs through the Areolæ in different Directions. Theſe frequent Convolutions gave riſe to the Name of Vaſa Pampiniformia, formerly given to theſe Veſſels; and their particular Adheſions to each other at ſome Places, made it be believed, that there were real Anaſtomoſes between the Artery and the Vein.

481. *Leal Lealis* an *Italian* Anatomiſt not attending to the lateral Ramifications of the Spermatic Arteries and Veins, believed himſelf able to eſtabliſh and demonſtrate theſe pretended Anaſtomoſes. The Experiments made by him on living Animals, prove nothing. His Way was to make a common Ligature on both Veſſels, a little above the Teſticle, and another on the Trunk of the Vein, after he had emptied it. Then preſſing the Aorta to force the Blood into the Spermatic Artery, the Vein which he had before emptied, was found to be preſently filled.

482. From thence he concluded, that the Courſe of the Blood to and from the Teſticle being obſtructed by the inferior Ligature, there muſt be ſome Anaſtomoſes between the two Ligatures, through which the Vein was ſupplied with Blood. But it is very plain, that this Effect was owing to the lateral Ramifications of the Spermatic Artery and Vein, and not to his pretended Anaſtomoſis. Theſe fine lateral Ramifications were well known to *Euſtachius*, but had eſcaped *Leal Lealis*.

Teſtes. 483. The Teſtes are two glandular Bodies, ſituated near each other, without the Abdomen, below the Interſtice between the Groins in an Adult. The Ancients named them Didymi or Gemini. The Size is nearly that of a Pigeon's Egg, and they are of an oval Figure, a little flatted at each Side. We may conſider in each Teſticle, two Extremities, two Edges, and two Sides. One Extremity is ſituated forward, and a little upward, the other backward, and a little downward; and their Edges lie upward and downward.

484. At the upper Edge they have each an Appendix, called Epididymis, together with which it is involved in ſeveral Coverings; and they are both ſuſpended in a common Covering, called the Scrotum.

485. Each Teſticle is a Spermatic Gland formed by a vaſt Number of fine whitiſh Tubes, folded and twiſted in different Manners, and diſtributed in different Faſciculi, between membranous Septa; the whole being ſurrounded by a ſtrong common Covering, named Tunica Albuginea.

486. These Septa are diſpoſed longitudinally, divaricating from each other on one Side, and approaching on the other. They approach each other along one Edge of the Teſticle, and terminate in a long narrow whitiſh Body, as in a Kind of Axis.

487. From thence they divaricate in a regular Manner, and are fixed by their oppoſite Edges in the inner Surface of the Tunica Albuginea, of which they appear to be a Continuation. This white Body may be termed the Nucleus of the Teſticle.

488. From this Deſcription, we ſee that all theſe Septa are not of an equal Breadth; that the Interſtices between them are in ſome Meaſure triangular; and that the Extent of the ſmall Tubes, which lie therein, muſt be very conſiderable. They have been reckoned to amount to many Ells, by taking the Sum of all their ſeveral Portions; and they may be eaſily unfolded by a long Maceration, which deſtroys the delicate Subſtance by which all their Folds and Convolutions are connected and tied down.

489. All theſe ſmall Canals ſeem to terminate by a ſmaller Number of common Trunks at the white Body or Nucleus already mentioned; which Trunks do afterwards pierce the upper Part of the anterior Extremity of the Teſticle, and are diſpoſed in ſeveral Folds along the lateral external Part of the upper Edge, all the Way to the poſterior Extremity. From this Union ariſes a long whitiſh, plaited Faſciculus or Bundle, called Epididymis, which is a *Greek* Term ſignifying an Appendix to the Teſticle.

Epididymis. 490. The Epididymis thus formed, may be reckoned a Production of the Teſticle, or a Kind of Teſtis Acceſſorius; and it reſembles in ſome Meaſure an Arch

Arch ſupported by its Center or Frame. It is more contracted at the Middle than at the Extremities, by which it is cloſely united to thoſe of the Teſticle.

491. Between its Extremities it does not immediately touch the Teſticle, but is only looſely connected to it by the Duplicature of a very fine and almoſt tranſparent Membrane, as by a Kind of Ligament. This Membrane is the Continuation and Duplicature of the Tunica Albuginea, or proper Coat of the Teſticle, which having ſupplied the Place of a Ligament to the Epididymis, afterwards inveſts it.

492. The Epididymis is flat, a little concave on the under Side, or that next the Teſticle, irregularly convex on the upper Side, or that turned from the Teſticle; and theſe two Sides are diſtinguiſhed by two angular Edges, by the innermoſt of which it is connected to the Teſticle in the Manner already ſaid, but the outer Edge and flat Side are looſe and free.

493. The anterior Extremity or Head of the Epididymis ariſes from the Teſticle; and the poſterior Extremity or Tail, which likewiſe adheres very cloſely to it, is incurvated from behind forward, and a little upward, and contracting by Degrees, forms a particular Canal, termed Vas Deferens, which ſhall be deſcribed after the Scrotum. By this Deſcription of the Extremities and Edges of the Epididymis, I demonſtrated many Years ago a Method to diſcover whether a Teſticle viewed extra Situm belongs to the right or left Side.

494. The Scrotum is the cutaneous Covering of the Teſtes. Outwardly it is a Bag common to both, formed by a Continuation of the Skin of the neighbouring Parts, and commonly very uneven, having a great Number of Rugæ on its outer Surface. Interiorly it is fleſhy, and forms a Muſcular Capſula for each Teſticle, termed Dartos. *Scrotum.*

495. The exterior or cutaneous Portion of the Scrotum is nearly of the ſame Structure with the Skin in general, of which it is a Continuation, only it is ſomething finer; and it is likewiſe plentifully ſtored with ſebaceous Glands and Bulbs or Roots of Hair.

496. Tho' it is a common Covering for both Teſticles, it is nevertheleſs diſtinguiſhed into two lateral Parts by a ſuperficial and uneven prominent Line, which appears like a Kind of Suture, and from thence has been termed Raphe.

497. This Line is a Continuation of that which divides in the ſame Manner the cutaneous Covering of the Penis, and it is continued through the Perinæum, which it divides likewiſe all the Way to the Anus. It is only ſuperficial, and does not appear on the Inſide of the Skin.

498. The inner Surface of this cutaneous Bag is lined by a very thin Cellular Membrane, through which the Bulbs and Glands appear very diſtinctly when we view its Inſide. The Rugæ of the Scrotum are in the natural State commonly a Mark of Health, and then its Size is not very large. It increaſes in Size, chiefly according to its Length, and then the Rugæ diſappear more or leſs, according to the Degrees of the preternatural State or Indiſpoſition.

499. The

Dartos.

499. The Dartos or fleſhy Portion of the Scrotum is a true cutaneous Muſcle, the Fibres of which are for the moſt Part ſtrongly connected to the Skin, running through the Cellular Subſtance which lies between theſe two Portions in Place of a Membrana Adipoſa, but without the leaſt Appearance of Fat. This Muſcle is thin, and by the Diſpoſition of its Fibres forms a Bag with two Cavities, or two ſmall Bags joined laterally to each other, and contained within the cutaneous Portion.

500. The lateral Parts of theſe two Bags, which are turned from each other, are longer than thoſe which are joined together; and by this Union a Septum is formed between the Teſtes, which may be called Mediaſtinum Scroti.

501. The Raphe or Suture, already mentioned, adheres to the Edge of this Septum, and thereby braces down the Middle of the cutaneous Portion, which from thence appears to have in part two Cavities; and this was perhaps what gave Occaſion to make the *French* Word for the Scrotum to be in the plural Number. The other Edge of the Septum adheres to the Urethra.

502. The two Bags of the Dartos are lined on the inner or concave Side by a Cellular Subſtance more conſiderable than that between the convex Side and the Skin; ſo that the fleſhy Fibres, all the Way to the Septum, lie between two Cellular Strata. They run through the outer Stratum, as has been ſaid, to be inſerted in the Skin, and by their Contraction they form the natural Rugæ of the Scrotum.

503. These fleſhy Fibres have likewiſe a ſtrict Connection with the internal Cellular Membrane, eſpecially at the upper Part below the Groin, where the anterior and external lateral Portions of the Dartos terminate by a Kind of tendinous or ligamentary Expanſion, which is ſtrongly united to the internal Cellular Membrane. I have often ſhewn this as a particular Faſcia Lata, which gives Inſertion to the Portions of the Dartos juſt mentioned, and has a broad Frænum which keeps the ſame Portions together.

504. The aponeurotic or ligamentary Expanſion of the Dartos is fixed in the Ramus of the Os Pubis, between the Muſculus Triceps and the Origin of the Corpus Cavernoſum of the ſame Side (which ſhall be deſcribed hereafter) all the Way to the lower Part of the Symphyſis of theſe Bones. The internal Portion of theſe Muſcular Bags, or that which forms the Septum Scroti, is fixed to the Urethra by Means of a Communication between the ſame ligamentary Expanſion and another, which ſhall be explained in its proper Place.

Vaſa Deferentia.

505. The Vaſa Deferentia are two white ſolid flatted Tubes, one lying on the right Side, the other on the left, from the Epididymis, of which they are Continuations, as has been already ſaid; each of them runs up in the Cellular Vagina of the Spermatic Veſſels, as high as the Openings in the Abdominal Muſcles, the Blood-Veſſels lying forward, and the Vas Deferens behind them.

506. This Faſciculus thus formed by the Blood-Veſſels, Vas Deferens, and their common Covering, is termed the Spermatic Rope. The Cover-

ing is ſmoother on the outer than on the inner Side, and for that Reaſon it has been looked upon as a Vagina, the internal Subſtance of which is moſt cellular, and connects all the Veſſels together, while the external forms a Covering to inveſt them.

507. The Vas Deferens having reached the membranous Lamina of the Peritonæum, where that Lamina runs over the Orifice of the Vagina, ſeparates from the Blood-Veſſels, and runs backward, in Form of an Arch, in the Cellular Subſtance of the Peritonæum, as far as the neareſt Side of the Bladder.

508. It paſſes afterwards behind the Body of the Bladder, to which it adheres very cloſely, as alſo to the Lamina of the Peritonæum which covers it, and then continues its arched Courſe towards the Neck of the Bladder, where both Vaſa Deferentia meet, and their Arches terminate.

509. In this Courſe the Vas Deferens paſſes behind and croſſes the neighbouring Umbilical Artery, croſſes the Extremity of the Ureter of the ſame Side, in its Paſſage between that Extremity and the Bladder, and having got behind the Bladder, it meets the Vas Deferens of the other Side, between the Inſertions of the Ureters, and they run down together to the Neck of the Bladder.

510. This Canal, which at the Origin of the Epididymis is pretty large and plaited, becomes immediately afterward ſmaller and ſmoother, and continues in that Form till it gets behind the Bladder, where it begins again to be larger and more uneven.

511. It ariſes from the angular Portion or poſterior Extremity of the Epididymis, and from thence runs forward in a very oblique Courſe on the poſterior Half of the Epididymis, where it is a little incurvated as it joins the Backſide of the Spermatic Veſſels.

512. The Texture of the ſmooth Portion of this Canal is very ſolid, and in a Manner cartilaginous, eſpecially near the Surface of its Cavity, which though very narrow, is ſtill kept open by Means of the Solidity and Thickneſs of its Sides.

513. The Cavity of the Vas Deferens is cylindrical, though the whole Tube is flat, and its external Circumference oval, as may be ſeen by cutting it tranſverſely; and the Cavity enlarges as it paſſes behind the Bladder. The Termination of theſe Canals muſt be referred to the Hiſtory of the Urethra.

Coats of the Teſtes.

514. The particular Coverings of the Teſtes are commonly called Coats, and they are reckoned to be three in Number, the Tunica Muſculoſa, named Cremaſter, Vaginalis and Albuginea. The firſt two are common to each Teſticle, and to the Spermatic Rope that belongs to it, and the third is peculiar to the Teſticle alone.

515. The Tunica Vaginalis is the moſt conſiderable of the three, and muſt be deſcribed firſt, in order to conceive the Structure and Connexion of the Cremaſter, which is very improperly called a Coat. The Albuginea has been already deſcribed with the Teſtes.

516. The Tunica Vaginalis is a Continuation of the Vagina of the Spermatic Rope, which, as it approaches the Teſticle, is gradually dilated, and forms

forms two Capſulæ, one contained within the other, the external being the longeſt and broadeſt at Bottom; ſo that there is a void Space there left between them, in which the Teſticle is lodged.

517. This Structure may likewiſe be explained in the following Manner: The Vagina having reached as low as the Teſticle, is divided into two Laminæ, the innermoſt of which is the Bottom of the Vagina, and the outermoſt is expanded round the Teſticle, and gives it a Coat, called Vaginalis, from the Latin Word *Vagina*. The Ancients termed it likewiſe Elytroides, from a *Greek* Word that ſignifies the ſame Thing.

518. The inner Surface of this Coat is lined by a fine Membrane, which ſtrengthens the Bottom of the Vagina, and forms a Kind of Diaphragm, which prevents all Communication between the Vagina of the Spermatic Rope and the Tunica Vaginalis of the Teſticle.

Cremaſter. 519. The Cremaſter, improperly termed a Coat, is a thin Muſcle or fleſhy Plane, which runs down round the Vagina of the Spermatic Rope, and terminates in the Tunica Vaginalis of the Teſticle.

520. It ſurrounds almoſt the whole Vagina, and afterwards expands itſelf on the upper and external Part of the Tunica Vaginalis, in which it is inſerted and loſt.

521. It ariſes partly from the Ligamentum Fallopii, and partly from the lower Edge of the internal oblique Muſcle of the Abdomen; and on this Account it ſeems ſometimes to ariſe from the Spine of the Os Ileum; and it is probable that the Muſculus Tranſverſalis likewiſe contributes ſomething to its Formation.

522. It is covered by a very fine Cellular Membrane detached from the Outſide of the Aponeuroſis of the Obliquus Externus, round the Opening commonly called the Ring. This Membrane is loſt in the Cellular Subſtance of the Inſide of the Dartos.

523. From all this we ſee that the Cremaſter is rather a Muſcle of the Tunica Vaginalis, than a particular Coat. Thoſe among the Ancients who believed it to be a Coat, called it Tunica Erythroides, from a Greek Word which ſignifies red; but this Muſcle is not always red, neither is that Colour eſſentially neceſſary to a fleſhy Subſtance.

Corpora Cavernoſa. 524. The Corpora Cavernoſa are two ligamentary and very limber Tubes, united laterally to each other through the greateſt Part of their Length, and ſolid at their two Extremities, two of which are connected together, and rounded like the End of a Finger; the other two divaricate, like the Branches of the Greek Y, and diminiſhing gradually in Size after the Divarication, terminate in an oblique Point. Theſe divaricated and pointed Extremities may be called the Roots, and the round Extremities the Heads.

525. These two Bodies are almoſt cylindrical, being round, and of an equal Diameter from the Roots to the Head, where they are in ſome Meaſure conical. The Ligamentary Subſtance of their Sides is elaſtic, and compoſed of fine cloſe Fibres, which are partly tranſverſe, and partly more or leſs oblique.

526. The

526. The Cavity of theſe Ligamentary Tubes is entirely filled by a ſtrong Cellular or Cavernous Subſtance, which does not ſeem to be a Continuation of the Subſtance of the Sides. Theſe Cells communicate with each other, and are always more or leſs full of Blood, reſembling pretty much the Cellular Subſtance of the Spleen, only with this Difference, that the Sides of the Cells are thicker in theſe Cavernous Bodies, and without any additional Subſtance.

527. By the Union of the two Corpora Cavernoſa, two external Grooves are formed, one on the upper Side, the other on the lower. The lower Groove is ſomething broader than the upper, and it is filled through its whole Length by a third Tube, narrower than the Corpora Cavernoſa, called the Urethra, which ſhall be preſently deſcribed.

528. The Roots of the Corpora Cavernoſa are fixed each to the Edge of the ſmall Ramus of the Os Iſchium and Os Pubis. They meet at the Symphyſis of the Oſſa Pubis, where each of them becomes a Cylindrical Tube, and unites with the other in the Manner already ſaid.

529. The Heads or rounded Extremities join the Baſis of a diſtinct Body, called the Glands, which is an Expanſion of the Urethra, and cloſely united to it in the Manner that ſhall be explained hereafter.

530. By the Union of the Corpora Cavernoſa from their Roots to their round Extremities or Heads, a particular Septum is formed by the tranſverſe Fibres of both. Between the Fibres of this Septum ſeveral ſmall void Spaces are left, by which the Corpora Cavernoſa communicate with each other, and therefore by blowing into one of them, we preſently inflate the other. Toward the rounded Extremities the Septum diminiſhes every Way.

531. The Urethra is the third ſpungy Tube which compoſes the Penis, and it adheres to the Corpora Cavernoſa through the whole Length of the inferior Groove formed by their Union. It differs from the other two, both as it is narrower, and as it forms a true hollow Canal. Its Subſtance is ſpungy or cavernous, except a ſmall Portion next the Bladder, and its inner and outer Surfaces are membranous. *Urethra.*

532. It is at firſt no more than a membranous Canal continued from the anterior Opening of the Bladder at the Place called the Neck of the Bladder, which is a Name that would be more proper for this Portion of the Urethra.

533. About a Finger's Breadth and an half from its Origin, it joins a cavernous Subſtance like that of the two other Tubes, only ſmaller, which ſurrounds it through the whole Extent of the inferior Groove of the Corpora Cavernoſa.

534. But before this ſpungy Subſtance begins to ſurround the Urethra, it forms a diſtinct oblong Body, like a Pear or Onion, which is connected only to the lower convex Side of the Canal, and afterwards being ſplit on each Side, inveſts it quite round. This Body is called the Bulb of the Urethra, being larger than any other Part of that Canal, and divided interiorly

by a very fine membranous Septum into lateral Parts; and therefore when it is inflated it appears to be double or with two Heads.

Proſtatæ. 535. The firſt Portion of the Urethra, or that which is not covered by the Cavernous Subſtance, and which from the Bladder to the Bulb is only a membranous Canal, is ſuſtained by a large ſolid whitiſh Maſs of the Figure of a Cheſnut, and ſituated between the Bladder and the Bulb of the Urethra, its Baſis being toward the Bladder, the Apex or Point toward the Urethra, and the Sides lying upward and downward.

536. This Body is termed the Proſtates, from a Greek Word that expreſſes its Situation before the Veſiculæ Seminales, and implies a Plurality, becauſe it appears to be divided into two lateral Lobes by a hollow Groove, which runs through its upper Side from the Baſis to the Apex. The firſt Portion of the Urethra lies in this Groove, adhering very cloſely to the Proſtates which ſurround it.

537. The Body of the Proſtates lies on the Inteſtinum Rectum, and the Apex is under the internal Labium of the Cartilaginous Arch of the Oſſa Pubis. The inner Subſtance is ſpungy, but very compact, and in each Lobe there are ſeveral Folliculi which open into the firſt Portion of the Urethra, toward the Bottom of the Groove, as we ſhall ſee hereafter. The ſmall Portion of the Urethra between the Apex of the Proſtates and the Bulb, perforates the Interoſſeous Ligament of the Oſſa Pubis deſcribed N° 183. This Portion is very ſhort, its Length being no more than what is ſufficient to paſs through the Hole in the Ligament, the Backſide of which conſequently touches the Apex of the Proſtates, and its Foreſide the Bulb of the Urethra. This Portion might be called the Neck of the Urethra, and that which lies between the Body of the Bladder and the Proſtates, might be called the Neck of the Bladder.

Glans. 538. The ſpungy Subſtance of the Urethra having reached the Extremity of the Corpora Cavernoſa, forms a large Head, called the Glans, which crowns the three ſpungy Pillars, with this Difference however, that it is a Continuation of the ſpungy Subſtance of the Urethra, and only adheres to the Extremity of the Corpora Cavernoſa without any direct Communication.

539. It is for this Reaſon that if we blow into the ſpungy Subſtance of the Urethra, the Glans is preſently inflated, and no Air paſſes into the Corpora Cavernoſa; but when we blow into one of theſe Bodies the Air paſſes immediately into the other, the Urethra and Glans remaining as they were.

540. The Figure of the Glans is that of a rounded Cone, a little flattened at the lower Part, and with an oblique prominent Baſis, the Circumference of which is ſomething greater than that of the Corpora Cavernoſa.

541. The ſpungy Subſtance of the Glans is thick and uniform next the Corpora Cavernoſa, but next the Urethra it is perforated by a Continuation of that Canal, and is there no thicker than the Urethra before the Formation of the Glans.

542. Therefore

542. Therefore the Canal of the Urethra does not lie in the Middle of the Glans, but continues its direct Courſe through the lower flat Side of it all the Way to the Extremity, where it terminates by an oblong Orifice.

543. All the convex Surface of the Gland is covered by a fine villous Subſtance, and that again by a fine Membrane, reſembling the red Part of the Lips. The Circumference of the Baſis of the Gland has a double Row of ſmall Papillæ, which may be reckoned Sebaceous Glands, from which a thick Matter is diſcharged.

544. We have ſeveral Things to take Notice of in the Cavity of the Urethra. At the Bottom of the Cavity of the firſt Portion, or that which lies within the Proſtates, there is a ſmall oblong oval Eminence, pretty large on the Backpart, and terminating forward in a Point, called Caruncula or Verumontanum. The large Portion of it is commonly perforated by two Holes, ſometimes only by one, and very ſeldom by three; and theſe are the excretory Orifices of the Veſiculæ Seminales, of which hereafter. Each Orifice has a ſmall thin membranous Border, which may ſerve for Valves to the excretory Ducts of the Veſiculæ. *Caruncula.*

545. On each Side of the large Portion of the Caruncula there are five or ſix Holes ranked in Form of a Creſcent round its lateral Parts, which are the Orifices of the excretory Ducts of the Proſtates that come from the Folliculi already mentioned, and run in an oblique Courſe to the Orifices in a Kind of membranous Duplicature.

546. The Veſiculæ Seminales are ſoft whitiſh knotted Bodies, about three or four Fingers Breadth in Length, one in Breadth, and about three Times as broad as thick, ſituated obliquely between the Rectum and lower Part of the Bladder in ſuch a Manner as that their ſuperior Extremities are at a Diſtance from each other, and their lower Extremities united between thoſe of the Vaſa Deferentia, of which they imitate both the Obliquity and the Incurvation. *Veſiculæ Seminales.*

547. They are irregularly round on the upper Part, and their Breadth decreaſes gradually from thence. By the Union of their lower Extremities they form a Kind of Fork, the Branches of which are broad, and bent like Rams Horns. Theſe Extremities are very narrow, and form a ſmall Neck, which runs behind the Bladder toward its Orifice, and continues its Courſe in the Groove of the Proſtates through the Subſtance of the contiguous Portions of the Urethra, till its Extremities pierce the Caruncle in the Manner already mentioned.

548. The inner Subſtance of the Veſiculæ is plaited, and in a Manner diſtinguiſhed into ſeveral Capſulæ by contorted Folds. Their external Surface is covered by a fine Membrane, which ſerves for a Border and Frænum to the Folds, and is a true Continuation of the Cellular Subſtance of the Peritonæum. The Veſiculæ may eaſily be unfolded, and all their Contorſions ſtraightened, and by this Means they become much longer than in their natural State.

549. Their inner Surface is villous and glandular, and continually furniſhes a particular Fluid, which exalts, refines, and perfects the Semen, which they receive from the Vaſa Deferentia, and of which they are the Reſervatories for a certain Time.

550. The Paſſage of the Vaſa Deferentia into the Veſiculæ is very particular. I have already obſerved that theſe Canals are incurvated behind the Bladder, and that their contracted Extremities unite at that Place. They unite in an Angle, and run between the contiguous Extremities of the Veſiculæ; and this Union is ſo cloſe, that the adhering Portions ſeem to form only one middle Septum between two ſmall Tubes, each of which is formed partly by the Extremity of one Vas Deferens, and partly by that of the neighbouring Veſiculæ.

551. This lateral Union of the Extremities of the Vas Deferens, and Veſicula Seminalis on each Side, forms likewiſe a Kind of ſhort Septum, which terminates in a Creſcent, like a ſmall Semilunar Valve, and the Extremity of the Vas Deferens is narrower than that of the Veſicula. By this Mechaniſm the Fluid contained in each Vas Deferens has Liberty to enter the contiguous Veſicula, but that contained in the Veſicula cannot return into the other Canal.

552. If we blow into one of the Vaſa Deferentia, after having compreſſed the Urethra, the Air inflates the contiguous Veſicula Seminalis, and the Bladder of Urine, without paſſing into the Veſicula or Canal of the other Side, except we blow with too great Violence.

553. Afterwards the two ſmall Tubes, formed each by the Extremities of the Vas Deferens and Veſicula, run in between the Baſis of the Proſtates and Canal of the Urethra, and perforating the Sides of that Canal obliquely, they terminate in the Caruncula in the Manner already ſaid.

Lacunæ of the Urethra.

554. The Inſide of the Canal of the Urethra is lined by a fine Membrane full of Capillary Blood-Veſſels, and its Surface is perforated by a great Number of oblong Holes or ſmall Lacunæ of different Sizes, the largeſt lying near the Glands.

555. These Lacunæ, or Orifices of the Excretory Ducts of the ſame Number of ſmall Glands, are diſperſed through the Subſtance of the Urethra. Which Ducts run for ſome Way in the ſpungy Subſtance along the convex Side of the internal Membrane of the Urethra, and open obliquely from behind forward into the great Canal. The Edges of the Lacunæ are ſemilunar, or like a Creſcent, becauſe of the Obliquity of their Opening.

Anti-Proſtatæ.

556. A little Way from the Beginning of the Cellular Subſtance of the Urethra we meet with two Lacunæ more conſiderable than the reſt, and their Ducts are very long. Theſe Lacunæ and Ducts lead to two glandular Bodies ſituated on the two convex Sides of the ſpungy Subſtance of the Urethra near the Bulb. Each of them is about the Size of a Cherry-ſtone, but they are oblong and flat, and covered intirely by the Muſcles called Acceleratores, of which hereafter. Theſe two Bodies are commonly called Proſtatæ Inferiores; but if their Situation be carefully examined, they will be

be found to be higher than the true Proſtates. There is a third Body of the ſame Kind ſituated more anteriorly.

Orifice of the Urethra.

557. The Cavity of the Urethra reſembles nearly that of a ſmall writing Pen. It is not every where round, and towards the Gland becomes broader and flatter on each Side, eſpecially in the Gland itſelf, where there is a Kind of oval or navicular Foſſula.

558. This Canal terminates at the Extremity of the Glans by a narrow oblong Orifice or Fiſſure, which is much leſs than the reſt of the Cavity. The Commiſſures of this ſmall Fiſſure are turned one toward the convex, the other toward the flat Side of the Glans; and the Labia of the Fiſſure are its lateral Parts; and it ſeems to be ſurrounded by fleſhy Fibres.

The common Integuments.

559. The Integuments which cover all theſe Parts, are three or four in Number. The firſt is the Skin with the Cuticula; the ſecond is the common Cellular Membrane, which in this Place ſeldom contains any Fat; the third is termed Nervous; and the fourth is a particular Cellular Membrane, which is not always to be found.

Præputium.

560. The firſt of theſe Integuments, the Skin, is a Continuation of that of the Pubis and Scrotum, and it adheres to the ſecond all the Way to the Baſis of the Gland, where that ſecond Integument ends. The reſt of the Cutaneous Integument covers the Glans without Adheſion, and terminates by an Opening. This Portion is named Præputium, and along the whole lower or Backſide, both of the whole Integument in general, and of the Præputium in particular, there runs a fine Suture, which is a Continuation of the Raphe of the Perinæum and Scrotum.

561. The inner Surface of the Præputium is lined with a fine Membrane from the Opening all the Way behind the Baſis of the Glans, and the ſame Membrane is folded from behind, forward, round the Glans, forming the proper Integument thereof, and covering very cloſely its whole villous Surface, as far as the Orifice of the Urethra, where it joins the Membrane, which lines the inſide of that Canal.

562. This proper Membrane of the Glans, and internal Membrane of the Præputium, form conjointly along the flat Part of the Glans, from its Baſis to the Orifice of the Urethra, a Membranous Duplicature, which like a Septum or Mediaſtinum divides this Part into two lateral Portions, and limits the Motions of the Præputium; for which reaſon it is called Frænum Præputii.

563. The Surface of the internal Membrane of the Præputium diſcharges a Fluid which prevents it from adhering to the Glans; and perhaps ſerves likewiſe to dilute that which is collected at the Baſis of the Glans, from the Glandulæ Sebaceæ, already mentioned.

564. The ſecond common Integument of theſe Parts, is nearly the ſame with what is every where found under the Skin, except that it is not filled with Fat, and that it is more fibrous than cellular, and a little looſe. It accompanies the Skin to the Baſis of the Glans, as has been already obſerved.

565. The

Ligamentum Suſpenſorium.

565. THE third common Integument, improperly called Tunica Nervoſa, is of a firm, elaſtic, ligamentary Subſtance, and its Fibres are ſometimes of a yelloviſh Colour. It inveſts the Corpora Cavernoſa and Urethra from the Glans to the Symphyſis of the Oſſa Pubis; and at ſome Diſtance from theſe Bones, it forms on the ſuperior Groove of the Corpora Cavernoſa, a cloſe Duplicature; and by this Duplicature, a flat broad Ligament, which runs directly upward, and is inſerted in the fore-mentioned Symphyſis, as far as the tendinous Baſis of the Muſculi Pyramidales of the Abdomen.

566. THIS Ligament has been called Ligamentum Elaſticum, becauſe it yields and recovers itſelf; and Suſpenſorium, becauſe it ſuſpends theſe Parts, by means of its Inſertion in the Symphyſis. It ſends off a Detachment or Ala toward each Side, one Edge of which is fixed between the Muſculus Triceps and the Corpus Cavernoſum, and forms the Ligamentary Expanſion in which the Dartos is inſerted, as has been already ſaid. It ſeems likewiſe to ſend down another Elongation directly to the Perinæum and Anus.

567. THE fourth Integument of theſe Parts is the Tunica Celluloſa of M. *Ruyſch*, which immediately ſurrounds the Corpora Cavernoſa and Urethra, lying between theſe and the third Integument, from which it ſeems to be diſtinguiſhed only by the Cloſeneſs and Fineneſs of its Texture; and it is ſometimes hardly perceivable.

The Muſcles.

568. SEVERAL Muſcles are inſerted in the Parts which we have deſcribed in this Paragraph. They may be reckoned to be ten in Number, two for the Corpora Cavernoſa, two for the Urethra, two common Muſcles called Tranſverſales, and four ſmall ones for the Proſtates.

569. THE firſt two Muſcles are commonly termed Erectores, but might be more properly named Iſchio-Cavernoſi. The next two are called Acceleratores, but the Name of Bulbo-Cavernoſi would better agree to them. The four ſmall Muſcles, two of which are ſuperior, and two inferior, may be called Proſtatici. I obſerved in the Beginning of the Deſcription of the Muſcles, that the Names taken from the ſuppoſed Uſes are very equivocal.

570. THE Muſculi Iſchio-Cavernoſi lie along the Roots of the Corpora Cavernoſa; each of them being fixed by one Extremity very obliquely, in the internal Labium of the Ramus of the Os Iſchium, from the Tuberoſity upward. From thence it accompanies the Root of the Corpus Cavernoſum, all the Way to the Symphyſis of the Oſſa Pubis, and is fixed by its other Extremity, in the Corpora Cavernoſa, near their Union; where the Fibres of both Muſcles meet, and are reciprocally expanded over both Corpora. They lie a little lower, and more interiorly than the Roots of theſe Cavernous Bodies.

571. I have ſhown two other Muſculi Acceſſorii, which I looked upon as lateral Acceleratores, or as Acceleratores Acceſſorii; fixed lower, and more interiorly in the Os Iſchium, than the former, which they accompany all the Way to the Corpora Cavernoſa, and then leaving them, they are inſerted chiefly in the Urethra, near the Bifurcation of the Muſculus Bulbo-Cavernoſus.

572. THESE

572. These Bulbo-Cavernoſi, commonly termed Acceleratores, form firſt of all, a Penniform Muſcle, by Means of a middle Tendon, fixed in the lower Part of the Interoſſeous Ligament of the Oſſa Pubis, deſcribed N° 184. and to the Union of the Muſculi Tranſverſales with the Sphincters of the Anus; from which they paſs in an expanded Form over the Bulb of the Urethra, covering that Bulb and the Urethra itſelf, and adhering in ſome Meaſure to both, as high as the Origin of the Ligamentum Suſpenſorium, the middle Tendon anſwering to the Septum of the Bulb.

573. Afterwards the two fleſhy Planes ſeparate, and run obliquely to the right and left Hands from behind, forward, and from below, upward; ſurrounding the Corpora Cavernoſa, in the outer Sides of which they are inſerted. The middle Tendon adheres very ſtrongly to the lower Part of the Septum of the Bulb, in which, and in the Urethra itſelf, ſeveral of the Fibres of theſe Muſcles are fixed.

574. The Muſculi Tranſverſi, called alſo Triangulares, are two long, narrow, fleſhy Faſciculi, inſerted each by one Extremity in the Root or Beginning of the Ramus of the Os Iſchium; from whence they run tranſverſely along the Edge of the Interoſſeous Ligament of the Oſſa Pubis, as far as the Apex of the Proſtates, where their other Extremities meet, and form commonly a Kind of Digaſtric Muſcle, the Middle of which gives Inſertion to the Muſcles of the Urethra, and to the Cutaneous Sphincters of the Anus.

575. The ſuperior Proſtatici are two thin Planes fixed in the upper Part of the Inſide of the ſmall Rami of the Oſſa Pubis, from whence they are ſpread over and inſerted in the Proſtates. Their Inſertions in the Oſſa Pubis are on one Side of thoſe of the Obturatores Interni.

576. The Proſtatici Inferiores are ſmall tranſverſe Planes, each of which is fixed in the Symphyſis, between the Ramus of the Os Pubis and Os Iſchium, and from thence runs tranſverſely, till it meets its Fellow from the other Side under the Proſtates, to which they are both ſtrongly connected, and they ſerve like a Girth to ſuſtain theſe Glands. They may be conſidered as two ſmall or internal Tranſverſales, and the other two Tranſverſales may be diſtinguiſhed by the Names of great or external. They have likewiſe ſome Adheſions to the Point in which all theſe Muſcles hitherto deſcribed, are united.

Blood-Veſſels.

577. The Arteries of theſe Parts come chiefly from the Iliacæ Internæ or Hypogaſtricæ, and the reſt from the Iliacæ Externæ or Crurales. The principal Arteries are termed Pudicæ, of which one is external, the other internal.

578. The Pudicæ Externæ ſend a Branch to each Side, which having paſſed out of the Pelvis by the Side of the Os Sacrum, runs on the Inſide of the Tuberculum Iſchii, to the Roots of the Corpora Cavernoſa, along the Inſide of the Muſculi Iſchio-Cavernoſi or Erectores. It ſends Ramifications to the bulbous Head of the Urethra and to the Corpora Cavernoſa; and together with the Glutæa, with which it communicates in its Paſſage, it likewiſe ſupplies the Scrotum.

579. The

579. The Pudicæ Internæ having furniſhed the Inteſtinum Rectum Bladder, Veſiculæ Seminales and Proſtates, communicate with the Hæmorrhoidales, paſs under the Arch of the Oſſa Pubis, and partly enter the Corpora Cavernoſa, and partly run along their upper Side, ſending off ſmall lateral Branches, which ſurround theſe Bodies, like irregular Half-Arches, and penetrate them by numerous Ramifications.

580. The Crural Arteries ſend each likewiſe a Branch, which running behind the contiguous Crural Vein, is diſtributed to the Integuments of the Penis, by the Name of Pudica Externa, and communicates by lateral Ramifications with thoſe of the Pudica Interna. Theſe Communications are not only between the internal and external Pudicæ of the ſame Side, but alſo between thoſe of both Sides, which reciprocally communicate with each other.

581. The Diſtribution of the Veins follows nearly that of the Arteries, but they have more Ramifications and Communications, as in other Places. The principal Vein is that which paſſes directly under the Symphyſis of the Oſſa Pubis between the two Arteries, and runs along the whole ſuperior Groove, formed by the Union of the Corpora Cavernoſa. It is very large, often double, and very ſeldom triple; but the Trunks do not ſeparate, while in the Groove, and it has a great Number of Valves.

582. This great middle Vein is formed by the Union of the Hypogaſtric Branches, which after paſſing on the two inner Sides of the Pelvis, meet about the Middle of the Arch of the Oſſa Pubis. At this Place we obſerve a Venal Plexus, which covers the upper convex Side of the firſt Portion of the Urethra, before it is ſurrounded by the ſpongy Subſtance.

583. The Spermatic Veſſels, of which I have already deſcribed the Origin and Courſe all the Way to where they go out of the Abdomen, having reached on each Side near the Teſticle, are divided into two principal Faſciculi, one of which is larger than the other. The largeſt is the anterior, and is diſtributed through the Teſticle, by a prodigious Number of very fine Capillary Ramifications, which accompany all the Convolutions and Folds of the Canals.

584. The other Faſciculus is poſterior, and is diſtributed to the Epididymis in the ſame Manner.

585. The Spermatic Artery is accompanied by a Ramus of the Epigaſtric Artery, which runs down on the Side of it, as far as the Teſticle, where they communicate reciprocally with each other. There is ſometimes a ſmall Ramus of the Hypogaſtric Artery, which accompanies the Vas Deferens to the Epididymis, and there communicates with the Arteria Spermatica.

Nerves. 586. The Nerves of theſe Organs come from the Lumbares and Sacri, and they communicate with the Sympatheticus Maximus and Plexus Meſenterici. Near the Arch of the Os Pubis, they form together, on each Side, a particular Rope, which paſſes under that Arch along the upper Side of the neighbouring Corpus Cavernoſum, near the Artery already mentioned.

587. In their Paſſage over the Corpora Cavernoſa, they ſend off a great many Rami, which ſurround theſe Bodies on all Sides, between the Skin and ligamentary

ligamentary Integument, being ſo diſpoſed as that the Arteries lie between them and the middle Vein. They muſt be examined preſently after the Skin has been raiſed, becauſe when the Ramifications are dried by the Air they diſappear.

588. There are two Nerves which accompany the Spermatic Rope, whereof one comes from the Nervi Lumbares, near the anterior Spine of the Os Ilium, which is incurvated in its Paſſage out of the Abdomen through the Muſcles, and ſerves to diſtinguiſh the Cremaſter. The other Nerve comes from the Plexus Renalis.

589. There is likewiſe one Nerve on each Side, which being produced from the Union of the ſecond, third and fourth Pairs of the Nervi Sacri, eſpecially from the third, goes out of the Abdomen above the Ligamentum Iſchio-Sacrum, paſſes by the Inſide of the Tuberoſity and ſmall Branch of the Os Iſchium, and is diſtributed to the Corpora Cavernoſa, to the Muſcles belonging to them, and to the neighbouring Parts.

§. 21. *The Parts of Generation in Females.*

590. The Parts of Generation in Females are ſeveral in Number, ſome of them external, and ſome internal; and they are all ſubordinate to one principal internal Part called the Uterus. The other internal Parts are the Tubæ Fallopianæ, Ovaria, Vaſa Spermatica, Ligamenta Lata, the Ropes or Bands called Ligamenta Rotunda, and the Canal of the Uterus. The external Parts are the Pubes, the Alæ, Nymphæ, Clitoris, Orifice of the Urethra, and Orifice of the Canal of the Uterus.

591. The Uterus lies between the Bladder and Inteſtinum Rectum. It *Uterus.* is a Body inwardly hollow, outwardly of a whitiſh Colour, of a pretty ſolid Subſtance, and except in Time of Pregnancy, of the Figure of a flat Flaſk, being in Adults about three Fingers Breadth in Length, one in Thickneſs and two in Breadth at one End, and ſcarcely one at the other. This Size varies according to the Age of the Subject.

592. The broadeſt Portion is termed the Fundus, and the narroweſt the Neck. Its Situation is oblique, the Fundus being turned backward and upward, and the Neck forward and downward; the broad Sides lie next the Rectum and Bladder, and the narrow Sides are lateral.

593. The Cavity of the Uterus is flat, and reſembles an oblong Triangle, the ſhorteſt Side of which anſwers exactly to the Fundus, and the two longeſt Sides lie one on the right Hand, the other on the left, and they are all bent inward, or toward the Cavity formed by them.

594. Of the three Angles of this Cavity the two which terminate the Fundus are perforated each by a narrow Duct, which with Difficulty admits a Hog's Briſtle. The third Angle forms a flat Duct wider than the former, which perforates the Neck of the Uterus likewiſe, and terminates at the Extremity of that Neck by a tranſverſe Opening.

595. This Opening is termed the internal Orifice of the Uterus, and in the natural State is narrower than the Duct of the Collum Uteri, ſo that only

only a ſmall Stilet can be paſſed through it. At the Edge of this Orifice are ſeveral ſmall Holes, anſwering to the ſame Number of Glandular Corpuſcles which diſcharge a viſcid Lympha.

596. The inner Surface of the Cavity of the Uterus is lined by a very fine Membrane, which at the Fundus or broad Portion is ſmooth and even, but in the narrower Portion which leads to the Orifice, it is wrinkled in a particular Manner.

597. The Portion of this Membrane, which covers the Bottom of the Cavity, is perforated by a great Number of conſiderable Holes, through which ſmall Drops of Blood may be obſerved to paſs when the whole Uterus is compreſſed; and ſometimes it appears to have very ſmall Hairs or Villi. Both theſe Villi and Holes are obſerved to be more or leſs tinged with Blood in thoſe Women who die in the Time of their Menſes.

598. In the narrow Part, which anſwers to the Collum, each Side is divided into two lateral Parts by a Kind of prominent longitudinal Line, which is larger in the upper or anterior Side than in the lower or poſterior.

599. On each Side of theſe two longitudinal Lines there are Lines or Rugæ obliquely tranſverſe, and diſpoſed like Branches, the longitudinal Lines repreſenting Trunks. Between and round theſe Rugæ there are ſmall Lacunæ, through which a mucilaginous Fluid is diſcharged that cloſes the Orifice of the Uterus. We obſerve likewiſe in the Interſtices between the Rugæ ſeveral tranſparent globular Corpuſcles, which a modern Author took for a Kind of Ova.

Structure of the Uterus.

600. The Subſtance of the Body of the Uterus is ſpungy and compact, with a copious Intertexture of Veſſels. Its Thickneſs is nearly equal and uniform in the Sides and Edges, but the Fundus is thicker toward the Middle than toward the two Angles, where the Thickneſs decreaſes gradually. The Edges are likewiſe much thinner near theſe Angles than near the Extremity of the Neck.

601. The Uterus is covered by a Portion of the Peritonæum, which ſerves it for a Coat, and is the Continuation of that which covers the Bladder and Inteſtinum Rectum, running up from the lower and poſterior Part of the Bladder, over the anterior Part of the Uterus, and from thence over the Fundus, and down the Backſide, and afterwards going to the Rectum.

602. On each lateral Part, or Edge of the Uterus, this Portion of the Peritonæum forms a broad Duplicature, which is extended on each Side, more or leſs, directly to the neighbouring lateral Parts of the Pelvis, forming a Kind of membranous Septum between the anterior and poſterior Halves of the Cavity of the Pelvis, and it is afterwards continued in a looſe Manner, with the Peritonæum, on the Sides of the Pelvis.

Broad Ligaments of the Uterus.

603. These two broad Duplicatures have the Name of Ligamenta Lata, and Veſpertilionum Alæ. The upper Edge of each is partly double, or folded, forming two ſmall diſtinct Duplicatures, which I term the Pinions of the broad Ligaments. The anterior Pinion is more raiſed than the poſterior, and they are both very looſe.

604. The

604. The Laminæ of all these Duplicatures are connected by a Cellular Substance, in the same Manner as the other Duplicatures of the Peritonæum, and they contain the Fallopian Tubes, the Ovaria, a Part of the Spermatic Vessels, and of those that go to the Body of the Uterus, the Ropes called the round Ligaments, the Nerves, *&c.*

Ovaria.

605. The Ovaria are two whitish oval, flat, oblong Bodies, situated on the Sides of the Fundus Uteri, to which they are fixed by a Kind of short round Ligament, and inclosed together with it in the Duplicature of the posterior Pinion of the Ligamenta Vasa.

606. They are composed of a compact spungy Substance, and of several little Balls, or transparent Vesiculæ, which are called Ova. The spungy Substance surrounds each of these Vesiculæ very closely, and seems likewise to furnish them with distinct spungy Coverings or Calices. These Vesiculæ are to be carefully distinguished from other preternatural ones termed Hydatides.

607. The Ligaments of the Ovaria lie in the Edges of the posterior Pinions of the Ligamenta Lata, much in the same Manner as the Umbilical Vein in the anterior or Umbilical Ligament of the Liver. They are round Ropes of a filamentary Texture, fixed by one Extremity to the Corner of the Fundus Uteri, a little above and behind the Level of that Fundus. They were formerly believed to be hollow, and looked upon as Vasa Deferentia.

Tubæ Fallopianæ.

608. The Fallopian Tubes are two flaccid, conical, and vermiform Canals, situated more or less transversely on each Side of the Uterus, between the Fundus and the lateral Parts of the Pelvis, and included in the anterior Duplicatures or Pinions of the Ligamenta Lata.

609. Each of them is fixed by its narrow Extremities in the Corner of the Fundus Uteri, into which it opens, tho' by so narrow a Duct as hardly to admit a large Bristle. From thence their Diameter augments by Degrees all the Way to the other Extremity, where it is about one third Part of an Inch. The Body of the Tubæ goes in a winding Course, and their large Extremity is bent toward the Ovaria.

610. These large Extremities are irregularly round, and terminate by a narrow Orifice a little plaited and turned toward the Ovarium, where it presently expands in Form of a membranous Fringe full of Plaits and Incisures. These Fringes are called the broad Ends of the Fallopian Tubes.

611. The Breadth of the Fringe is not equal in all Parts. Its Circumference is in a Manner oval, and the longest Segment of the Fringe reaches to and is fixed in the Ovarium. The Folds are dispos'd like Laminæ on the concave Side.

612. These Tubes are composed of fleshy Fibres, whereof some are longitudinal, and some obliquely circular, with an Intertexture of another very fine Substance.

613. The anterior Pinions of the Ligamentum Latum serve for a common or external Coat to both Tubæ, and also to connect them in the same Manner as the Mesentery connects the Intestines. From thence the

the Tubæ, and eſpecially their Fringes come to be looſe, and their Direction to be very imperfectly determined in the greateſt Part of the Figures.

614. Their Cavity is lined by a ſoft glandular Membrane, which is plaited longitudinally, almoſt like the inner Surface of the Aſpera Arteria; and theſe Folds are ſtronger and broader near the great Extremities than any where elſe. Their Subſtance ſeems to be ſpungy, and the Interſtices between them are moiſtened more or leſs by a Fluid, which is continually diſcharged there.

Blood-Veſſels. 615. The Blood-Veſſels of theſe Parts are of different Kinds, *viz.* the Hypogaſtric Arteries and Veins, the Ramifications of which belong chiefly to the Body of the Uterus; the Spermatic Veſſels, and the two Vaſcular Ropes called Ligamenta Rotunda, which might be more properly termed the Vaſcular Ropes of the Uterus, or of the Ligamenta Lata.

616. The Hypogaſtric Branches are Arterial and Venal Ramifications, ariſing from the Artery and Vein of the ſame Name, which having reached the lateral Edges of the Uterus, are diſtributed to all the Parts thereof, both internal and external, forming a great Number of Incurvations, and particular Intertextures.

617. The Arteries of one Side communicate both upon the Uterus, and through its whole Subſtance, with thoſe of the other Side, and the Arterial Ramifications of each Side form numerous Anaſtomoſes with each other. The Veins communicate together on each Side in the ſame Manner; and all theſe Blood-Veſſels communicate likewiſe with the Spermatic Veſſels, with the Vaſcular Ropes of the Ligamenta Lata, and with the Hæmorrhoidales.

618. These frequent Anaſtomoſes may be demonſtrated by injecting or blowing into the Hypogaſtric Veſſels, having firſt made proper Ligatures to prevent the Liquor or Air from running into other Parts. The Extremities of theſe Arteries terminate and open into the Cavity of the Uterus, as has been already ſaid; and there is this peculiar to the Veins, that they communicate with the Hæmorrhoidales, and conſequently with the Vena Portæ.

619. The Spermatic Veſſels have nearly the ſame Origin in Females as in Males, and likewiſe the ſame Courſe and Intertextures, but they never paſs out of the Abdomen, being wholly diſtributed to the Ovaria and Tubes, and they communicate with the Hypogaſtrics, and with the Vaſcular Ropes of the Ligamenta Lata. The Veins are very large in Proportion to the Arteries, and theſe Veſſels ſend out lateral Ramifications, which ſeem to communicate with the Meſaraicæ and Vena Portæ.

620. The Vaſcular Ropes, commonly called the round Ligaments, are two long ſmall Faſciculi of Arteries and Veins interwoven and connected together by a fine Cellular Subſtance, and they run in the great Duplicature of the Ligamenta Lata, from each Corner of the Fundus Uteri, as far as the Annular Openings of the Abdominal Muſcles.

621. In this Courſe each Rope thruſts outward, or raiſes the anterior Lamina of the Duplicature, which conſequently gives a Kind of Coat to theſe Vaſcular Faſciculi, and makes them appear like diſtinct Ropes connected to this Foreſide of the Duplicatures.

622. They

622. They ſeem to ariſe from the Communication between the Vaſa Spermatica and Hypogaſtrica, and might be reckoned a particular Continuation of the Spermatic Veſſels. The Diſpoſition of their Adheſions to the Angles of the Fundus Uteri, with reſpect to that of the Tubes and Ligaments of the Ovaria which lie all near each other, is this: The Tubes lie higheſt, the Ligaments of the Ovaria moſt backward, and the Vaſcular Ropes forward, and a little lower than the Ligaments of the Ovaria.

623. Afterwards they run in a Courſe, nearly reſembling that of the Spermatic Veſſels in Males, paſs out of the Abdomen, through the Openings of the Abdominal Muſcles, and are loſt in the Fat of the upper and middle Parts of the Groins. It may be conjectured, that theſe Veſſels furniſh the Lacunæ, of which hereafter. As they paſs out of the Abdomen, they are accompanied by a Production of the Cellular Portion of the Peritonæum, as the Spermatic Rope in Men, and by a Faſciculus of fleſhy Fibres, repreſenting a Kind of Premaſter.

624. Beſides all the Veſſels hitherto mentioned, we obſerve Nerves and Lymphatics, to which we may add the Lactiferous Ducts that are ſeen in an advanced Pregnancy. The Nerves come from the Lumbares, Sacri and Sympathetici Maximi, in the ſame Manner as in Males. The Lymphatic Veſſels run chiefly in the Coats continued from the Peritonæum. I ſhall in another Place explain the Lactiferous Ducts, and alſo the particular Fibres which ſeem to be interwoven in the Subſtance of the Uterus in a pregnant Woman, the innermoſt of which being diſpoſed in a vortical or turbinated Manner, gave Occaſion to *M. Ruyſch* to deſcribe them particularly by the Name of Muſculus Uteri Orbicularis. *Nerves, Lymphatics, &c.*

625. The Pubes is that broad Eminence at the lower Part of the Hypogaſtrium, between the two Inguina, on which Hairs grow at a certain Age, called in *Latin* by the ſame Name, and almoſt of the ſame Kind with thoſe found under the Axillæ. This Eminence is owing to a particular Thickneſs of the Membrana Adipoſa which cover the Forepart of the Oſſa Pubis, and ſome ſmall Portions of the neighbouring Muſcles. *Pubes.*

626. The longitudinal Cavity which reaches from the middle and lower Part of the Pubes, within an Inch of the Anus, was by the Ancients termed Sinus; and they called the lateral Parts of that Cavity Alæ, which is a more proper Name than that of Labia, commonly given to them. The Places where the Alæ are joined above and below, are termed Commiſſures; and may likewiſe be called the Extremities or Angles of the Sinus. *Sinus & Alæ.*

627. The Alæ are more prominent, and thicker above than below, and lie nearer each other below than above. They are chiefly compoſed of the Skin, Cellular Subſtance and Fat. The exterior Skin is a Continuation of that of the Pubes and Inguina. It is more or leſs even, and furniſhed with a great Number of Glandular Corpuſcles, from which a whitiſh Ceruminous Matter may be expreſſed; and after a certain Age it is likewiſe covered in the ſame Manner with the Pubes.

628. The

628. The inner Side of the Alæ is ſomething like the red Portion of the Lips of the Mouth; and is diſtinguiſhed every where from the external Side by a Kind of Line, in the ſame Manner as the red Portion of the Lips from the reſt of the Skin; being likewiſe thinner and ſmoother than the outward Skin. A great Number of Pores are obſervable in it, and alſo numerous Glandular Corpuſcles which furniſh a Liquor more or leſs ſebaceous; and theſe Corpuſcles are larger near the Edges than in the other Parts.

Lacunæ. 629. Near the inner Edge of the inner Surfaces of the Alæ, on each Side of the Orifice of the Canal of the Uterus, we find a ſmall Hole more viſible than the reſt. Theſe two Holes are termed Lacunæ; and they communicate by two ſmall Ducts with the ſame Number of Follicular Bodies lying in the Subſtance of the Alæ, and which may be looked upon as ſmall Proſtates anſwering to the Glandulæ Proſtaticæ in Males. When compreſſed they diſcharge a viſcid Liquor.

630. Above the ſuperior Commiſſure, a thin flat Ligament runs down from each ſmall Branch of the Oſſa Pubis, which penetrates the Fat in the Subſtance of each Ala, and is loſt therein inſenſibly near the Edge. Theſe may be looked upon as the Ligamenta Suſpenſoria of the Alæ. The inferior Commiſſure of the Alæ is very thin or like a membranous Ligament, and together with the neighbouring Parts of the inner Sides, it forms a Foſſula, termed Navicularis or Scaphoides. The Space between the inferior Commiſſure and Anus, termed Perinæum, is about a large Finger's Breadth in Length.

631. The other external Parts are ſituated in the Sinus, and hid by the Alæ. Directly under the ſuperior Commiſſure lies the Clitoris, with its Covering, called Præputium. A little lower is the Orifice of the Urethra; and below that is the Orifice of the great Canal of the Uterus. The Circumference of this Orifice is bordered either by a Membranous Circle, called Hymen, or by fleſhy Portions, termed Carunculæ Myrtiformes. On each Side of the Clitoris begins a very prominent Fold, like a Criſta, which runs down obliquely on each Side of the Orifice of the Urethra. Theſe Folds are termed Nymphæ, and they might likewiſe be named Criſtæ Clitoridis. On each Side of the great Orifice lies the ſmall Proſtatic Hole already deſcribed.

Clitoris. 632. The Clitoris appears at firſt Sight like a ſmall imperforated Glans. Its upper and lateral Sides are covered by a Kind of Præputium, formed by a particular Fold of a Portion of the inner Side of the Alæ; which appears to be glandular, and to diſcharge a certain Moiſture, and its Inſide is granulated.

633. By Diſſection, we diſcover in the Clitoris a Trunk and two Branches, as in the Penis, made up of a ſpongy Subſtance, and of very elaſtic Coats, but without any Urethra. This Subſtance may be inflated either by Air or by anatomical Injections into the Artery, *&c.* The Trunk is divided into two lateral Parts by a middle Septum, from the Bifurcation, to the Glans, where it is inſenſibly loſt.

634. The

634. The Bifurcation of the Trunk is on the Edge of the cartilaginous Arch of the Ossa Pubis; and the Branches which resemble the Roots of the Corpora Cavernosa are inserted in the inferior Rami of these Bones, and in those of the Ossa Ischium, where they terminate by Degrees; but there is sometimes a membranous Tube on each Side, which reaches to the Tuberosity of the Ischium.

635. The Trunk of the Clitoris is sustained by a Ligamentum Suspensorium fixed in the Symphysis of the Ossa Pubis, and containing this Trunk in its Duplicature, nearly as in the other Sex.

636. Four Muscles or Fasciculi of fleshy Fibres are inserted in the Trunk of the Clitoris, two on each Side. One of them runs down on the Foreside of the neighbouring Corpus Cavernosum, and is inserted by a tendinous or aponeurotic Portion, partly in the Extremity of the Corpus Cavernosum, and partly in the Tuberosity of the Ischium. These two Muscles are called Erectores, but the Name of Ischio-Cavernosi would be more proper.

637. The other Muscle on each Side lies under the former, and runs down on the Side of the Urethra and great Orifice of the Uterus, all the Way to the Anus; increasing gradually in Breadth in its Passage, and terminating partly like that which is called Accelerator in Males.

638. These two Muscles surround very closely the lateral Parts of the Urethra, and of the great Orifice. They expand very much as they descend, and are spread on the lower and lateral Parts of the great Orifice; for which Reason several Anatomists have looked upon them as muscular Sphincters. All these four Muscles, and especially the two latter, are oftentimes almost covered with Fat.

639. The Blood-Vessels of the Clitoris come chiefly from the Hypogastricæ; and the Nerves from the second and third Pairs of the Nervi Sacri, by means of which they communicate with the inferior Mesenteric Plexus, and with the great Sympathetici.

Nymphæ.

640. The Nymphæ, Cristæ Clitoridis, or as they may likewise be termed, Alæ Minores sive Internæ, are two prominent Folds of the inner Skin of the great or external Alæ, reaching from the Præputium of the Clitoris to the two Sides of the great Orifice of the Uterus. They begin very narrow, and having increased in Breadth in their Course downward, they are again contracted at the lower Extremity.

641. These are of a spongy Substance, intermixed with Glands, several of which may be perceived by the naked Eye. Their Situation is oblique, their upper Extremities lying near each other, and the lower at a much greater Distance. In married Women they are more or less flaccid and decayed.

Urethra.

642. By the Urethra in Females, we mean the Urinary Duct, the Orifice of which is between the Nymphæ below the Glans of the Clitoris. The Sides of this Orifice are a little prominent and wrinkled, and perforated by small Lacunæ, from which a viscid or mucilaginous Liquor may be squeezed. In Time of Pregnancy, this Orifice is sometimes drawn a little inward.

643. The

643. The Body of the Urethra is a ſpongy Duct of the ſame Structure as in Males, but much ſhorter, ſituated directly under the Trunk of the Clitoris, and above the great Canal of the Uterus, adhering to each of theſe Canals between which it lies, by membranous Filaments. It paſſes under the cartilaginous Arch of the Oſſa Pubis, and terminates by an oblique Opening at the Neck of the Bladder; being bent a little downwards between its Extremities.

644. The Internal Membrane of the Urethra is a little plaited, and perforated by ſmall Holes, which communicate with Folliculi, lying hid in its Subſtance, as in Males. If we blow into one of theſe Holes, we obſerve a ſmall Canal to be inflated, which runs from without inwards, and terminates in ſome Places by a Kind of Sacculus, by compreſſing which, a viſcid Liquor is diſcharged.

645. The Continuation of this Membrane, which lines the Neck of the Bladder, forms likewiſe ſeveral Rugæ more or leſs equal, but that which lines the Cavity of the Bladder, is wrinkled in an irregular Manner when the Bladder is empty.

The Canal of the Uterus.

646. The great Canal, formerly called the Neck of the Uterus, is ſituated below the Urethra, and above the Extremity of the Inteſtinum Rectum, a little obliquely, being more raiſed on the inner and back Part, than on the outer and Forepart.

647. Its inner or poſterior Extremity joins the Extremity of the Body of the Uterus, and ſurrounds its Orifice much in the ſame Manner as the Duodenum ſurrounds the Pylorus, or as the Ilium is ſurrounded by the Cæcum and Colon.

648. The anterior Extremity forms the great Orifice, which lies under that of the Urethra, and above the Foſſula of the inferior Commiſſure of the Alæ.

649. The Body of the Canal is chiefly made up of a ſpongy Subſtance, interwoven with numerous Blood-Veſſels, and it is commonly longer and narrower in Virgins than in married Women.

650. Its inner or concave Surface has ſeveral tranſverſe Rugæ, and is covered by a particular Membrane. The Rugæ are formed by oblong narrow Eminences, incurvated like Portions of Arches, placed very near each other, and diſpoſed in ſuch a Manner, as to divide the Cavity of the Canal, into an upper and lower Side.

651. By the Union of the Extremities of the upper and lower Rugæ, a Kind of Raphe or Suture is formed on the right and left Sides; and both Arches are ſometimes interſected in the Middle, and ſo form two Half-Arches; but in this there is ſome Variety.

652. In general, theſe Arches are very conſiderable in young Perſons, become gradually more ſuperficial in married Women, and are quite loſt in Time of Delivery.

653. The inner or poſterior Extremity of this great Canal, ſurrounds the Orifice of the Uterus, a little obliquely, in ſuch a Manner, as that the upper Side of the Canal lies very near the Orifice, and the lower Side, at a

greater

greater Distance from it, and this makes the Extremity of the Uterus appear to advance more into the Canal on the lower, than on the upper Part.

Circulus Membranosus.

654. The exterior or anterior Extremity of the great Canal in Virgins, and especially before the first Eruption of the Menses, is commonly bordered by a circular membranous Fold, of different Breadths, more or less smooth, and sometimes Semilunar, which in some Subjects leaves but a very small Opening, in others a larger Opening, and in all, renders the external Orifice narrower than the rest of the Cavity. This Fold, called Hymen, is formed by the Union of the Internal Membrane of the great Canal, with that on the Inside of the Alæ, and represents a membranous Circle of different Breadths, and sometimes uneven.

Carunculæ.

655. This membranous Circle is commonly ruptured after the Consummation of Marriage; is quite lost in Delivery; and afterwards only some irregular Portions of it remain, which, from their supposed Resemblance to Myrtle Leaves, have been termed Carunculæ Myrtiformes. This Circle may likewise suffer some Disorder by too great a Flux of the Menses, by Imprudence, Levity, and other particular Accidents.

Plexus Retiformis.

656. Each Side of the anterior Portion of the great Canal is covered exteriorly by a thin broad cavernous and vascular Plexus, called the Plexus Retiformis of that Canal. These two Planes run down on each Side of the Clitoris behind the Nymphæ, and likewise cover the Urethra like a Collar, before they are spread on the great Canal.

657. This Plexus is strictly united to the Muscular Portions commonly taken for Accelerators or Constrictors, lying between these Portions and the lateral Parts of the Urethra and of the great Canal.

658. This Plexus may be inflated by Air like a flaccid Spleen, or like the spungy Substance of the Clitoris, with which it seems to have some Communication; and on this Account the lateral Portions of this reticular Plexus have been named the internal Crura of the Clitoris. It is a Kind of Rete Mirabile, composed of Vessels which come chiefly from the Hypogastricæ.

659. It still remains to be observed, that on each Side of the Bottom of the Pelvis in both Sexes, opposite to the lower Part of the Bladder, there is an aponeurotic or tendinous Ligament, which runs over the inner Surface of the Musculus Obturator Internus from before backward. The anterior Extremity of this Ligament is fixed on one Side of the Middle Portion of the Symphysis of the Ossa Pubis; and the posterior Extremity, to the middle Part of the Ligamentum Sacro-Sciaticum described in Sect. II.

660. A little above the Elongation, called the Neck of the Bladder, there is another Ligamentary Expansion on each Side of the Bladder; the Forepart of which is narrow, and fixed to the anterior Extremity of the Ligament already mentioned; and the broad posterior Part, to the Side of the Bladder. These two lateral Expansions may be looked upon as proper Ligaments of the Bladder, by which it is connected to the Inner Side of both Ossa Pubis.

661. To the anterior Portion of each of these Ligaments of the Bladder is fixed a particular Fasciculus of fleshy Fibres, which run up obliquely on the Foreside of the Bladder, on which those of each Side meeting together, form a Kind of Muscular Intertexture, and unite with the most transverse Fibres of the Bladder.

662. These two Muscular Fasciculi form a Part, and perhaps the principal Part of what is called the Sphincter of the Bladder; but to have a true Idea of them, they must be examined *in Situ*, without destroying any of their natural Connexions. When the Bladder is removed out of its Place, as is done in the common Method of Dissection, these Fasciculi are cut, and thereby their Direction being lost, they appear transverse, and are taken by those who know no better, for Portions of an orbicular Sphincter.

663. In Males, these two Fasciculi are partly fixed in the Prostates; but in Females they are very broad, and appear sometimes to be double on each Side, one Plane lying above the other. They are to be looked upon as true Muscles, fixed by small Tendons on the Sides of the Symphysis of the Ossa Pubis.

SECT.

SECT. IX.

A Deſcription of the Thorax.

§. 1. *Introduction.*

1. IN the compendious View Sect. VII. I gave a general Idea of all the external and internal Parts which compoſe what Anatomiſts call the Middle Venter, Breaſt or Thorax in the Human Body; and I beg the Reader to turn to what was there ſaid, to prevent the Neceſſity of repeating it here.

2. THE whole Extent of the Thorax in a living Subject, is commonly determined not only by the Sternum, Vertebræ of the Back and Ribs, but alſo by all that Space contained between the Articulations of the two Arms with the Scapulæ and Claviculæ; and in this Senſe, the Outſide of the Thorax is broader above than below in a healthy Subject, who has a moderate Share of Fleſh on his Bones. *External Conformation of the Thorax.*

3. THIS Breadth of the upper Part of the Breaſt is owing to the Pectorales Majores and Latiſſimi Dorſi viewed directly forward or backward. But when we take a direct lateral View of the Breaſt, it appears narrower above than below, not only in an intire Subject, but even after every Thing has been removed that cover the Sides of the Thorax, and in the Skeleton itſelf.

4. THE common Integuments of the Thorax are the ſame with thoſe of the Abdomen; and the convex Side of this Part of the Body is likewiſe covered by ſeveral Muſcles. Anteriorly, we find the Pectorales Majores and Minores, a large Portion of the Serrati Majores, the Subclavii, a Portion of the Scaleni and of the Obliqui Abdominis Externi. Poſteriorly, we have all the Muſcles which cover both Sides of the Scapula, the Serrati Poſtici, and a Part of the Sacro-Lumbares, Longiſſimi Dorſi, Vertebrales, &c. as in the Hiſtory of the Muſcles. Among all the external Parts of the Thorax, only two are peculiar to it in the Human Body; I mean the two Eminences called Mammæ, which muſt therefore be deſcribed in this Section.

5. THE hard Parts which form the Sides of the Cavity of the Thorax, are the twelve Vertebræ of the Back, all the Ribs, and the Sternum. The ſoft Parts which compleat the Sides, are the Membrane called Pleura, which lines the Cavity, and the Muſculi Inter-Coſtales, Sterno-Coſtales, and Diaphragma, already deſcribed among the Muſcles. *Cavity of the Thorax.*

6. ALL theſe hard and ſoft Parts taken together repreſent a Kind of Cage, in ſome Meaſure of a conical Figure, flatted on the Foreſide, depreſſed on the Backſide, and in a Manner divided into two Nooks by the

Figure of the Vertebræ of the Back, and terminated below by a broad arched Baſis inclined backward. The Intercoſtal Muſcles fill up the Interſtices betwixt the Ribs, and ſo compleat the Sides of the Cavity; the Baſis is the Diaphragm, and the Pleura not only covers the whole inner Surface of the Cavity, but by forming the Mediaſtinum, divides it into two, one on the right Hand, the other on the left.

§. 2. *Mammæ.*

7. The Name of Mammæ or Breaſts is given to two Eminences more or leſs round, ſituated in the anterior and a little toward the lateral Parts of the Thorax, their Center or middle Part lying almoſt oppoſite to the bony Extremity of the ſixth true Rib on each Side. Their Size and Figure vary in the different Sexes and different Ages.

8. In Children of both Sexes, and in Males of all Ages, they are commonly no more than cutaneous Tubercles, or ſoft Verrucæ of a reddiſh Colour, called Papillæ or Nipples, each of them being ſurrounded by a ſmall, thin and pretty broad Circle or Diſk, more or leſs of a browniſh Colour and an uneven Surface, termed Areola.

9. In Females come to the Age of Puberty, which is ſometimes ſooner, ſometimes later, a third Part is joined to the two former, which is a convex Protuberance, more or leſs round, of about five or ſix Fingers in Breadth; the Papilla and Areola being ſituated near the Middle of its convex Surface. This is what is properly termed Mamma, and it may be termed the Body of the Breaſt, when compared with the other two Parts. It increaſes with Age, and is very large in Women with Child, and in thoſe that give Suck. In old Age it decreaſes and becomes flabby, loſing its natural Conſiſtence and Solidity.

Body of the Mammæ.

10. The Body of the Mammæ is partly Glandular, and partly made up of Fat; or it is a Glandular Subſtance mixed with Portions of the Membrana Adipoſa, the Cellulous Pelliculæ of which ſupport a great many Blood-Veſſels, Lymphatics, and Serous or Lactiferous Ducts, together with ſmall Glandular Moleculæ which depend on the former; all of them being cloſely ſurrounded by two Membranes continued from the Pelliculæ.

11. The innermoſt of theſe two Membranes, which is, in a Manner, the Baſis of the Body of the Mamma, is thick and almoſt flat, adhering to the Muſculus Pectoralis Major. The ſecond or external Membrane is thinner, forming a particular Integument for the Body of the Mamma, more or leſs convex, and adhering cloſely to the Skin.

12. The Corpus Adipoſum of the Mamma, in particular, is a ſpungy Cluſter, more or leſs interlarded with Fat, or a Collection of Membranous Pelliculæ, which, by the particular Diſpoſition of their outer Sides, form a Kind of Membrane in Shape of a Bag, in which all the reſt of the Corpus Adipoſum is contained. The anterior or outer Portion of this Bag, or that

that which touches the Skin, is very thin, but that Side next the Pectoralis Major is thick.

13. The Glandular Body contains a white Mass, which is merely a Collection of membranous Ducts, narrow at their Origin, broad in the Middle, and which contract again as they approach the Papilla, near which they form a Kind of Circle of Communication. They are named Ductus Lactiferi. *Ductus Lactiferi.*

14. The coloured Circle or Disk, already mentioned, is formed by the Skin, the inner Surface of which sustains a great Number of small Glandular Moleculæ, of that Kind which *Morgagni* calls Glandulæ Sebaceæ. They appear very plainly all over the Areola, even on the Outside, where they form little flat Heights or Eminences at different Distances quite round the Circle. *Areola.*

15. These Tubercles are perforated by small Holes, through which a Kind of sebaceous or cheesy Matter, more or less liquid, may be squeezed out. Sometimes this is a serous Liquor, sometimes a milky Serum, and sometimes pure Milk, especially in Nurses; and I have seen both serous and milky Drops come out at the same Time.

16. From thence I am inclined to think that these Holes communicate with the Lactiferous Ducts, and that the Tubercles are a Kind of auxiliary Papillæ added to the true ones. The different Matters or Liquors that may be squeezed from the same Glandular Body, gives also Room to think that the Holes in them communicate by their Extremities with several other smaller Holes.

17. The Tubercle which lies in the Center of the Areola is termed Papilla, or the Nipple. It is of different Sizes in different Ages and Constitutions, and in the different Conditions of Females in particular. In Women with Child, or who give Suck, it is pretty large, and generally longer or higher than it is thick or broad, and when it happens to be short, it causes great Uneasiness to the Child. *Papilla.*

18. The Texture of the Nipple is spungy, elastic, and liable to divers Changes of Consistence, being sometimes harder, sometimes more flaccid. It seems to be made up chiefly of Ligamentary Fasciculi, the Extremities of which form the Basis and Apex of the Nipple. These Fasciculi appear to be gently folded or curled during their whole Length, and if by drawing the Fibres out these Folds be destroyed, they return again as soon as that Action ceases.

19. Between these spungy and elastic Fasciculi lie seven or eight particular Tubes at small Distances from each other, and all in the same Direction. These Tubes end at the Basis of the Papilla in the irregular Circle of Communication of the Lactiferous Ducts, and at the Apex in the same Number of almost imperceptible Holes or Orifices; and as they are closely united to the elastic Fasciculi, they are folded in the same Manner with them.

20. The

20. The Body of the Papilla is covered by a thin cutaneous Production, and by the Epidermis. Its outer Surface is uneven, being full of ſmall Tubercles and Wrinkles, among which thoſe near the Circumference of the Nipple ſeem to have a tranſverſe or annular Diſpoſition, which however is not uniform.

21. This Diſpoſition or Direction ſeems to be owing to the elaſtic Folds already mentioned; and from this ſimple Structure it is eaſy to explain how Infants in ſucking the Nipple, and Women in drawing the Teats of Cows, bring out the Milk; for the Excretory Tubes being wrinkled in the ſame Manner as the Faſciculi, do by theſe Wrinkles or Folds, as by ſo many Valves, hinder the Milk contained in the Ducts from flowing out; but when the Nipple is drawn or elongated, the Tubes loſe their Folds, and the Paſſage becomes ſtraight. Beſides this, when they are drawn with a conſiderable Force, the whole Body of the Mamma is increaſed in Length, and contracted in Breadth, and thereby the Milk is preſſed into the open Tubes, and thus by barely preſſing the Body of the Breaſt, the Milk may be forced toward the Nipple, and even through the Tubes.

Arteries, Veins, Nerves, &c.

22. The Arteries and Veins diſtributed through the Mammæ, are Ramifications of the Arteriæ and Venæ Mammariæ, of which one Kind comes from the Subclaviæ, and are named Mammariæ Internæ; the others from the Axillares, called Mammariæ Externæ.

23. These Veſſels communicate with each other, with thoſe near them, and with the Vaſa Epigaſtrica, as was obſerved in the Deſcription of the Arteries and Veins. The Nerves come chiefly from the Coſtales, and by Means of theſe communicate with the great Nervi Sympathetici.

Uſes.

24. The Uſe of the Mammæ in the Nouriſhment of Children is known to all the World: But it is not certainly known what the Papillæ and Areolæ in Males can be deſigned for. Milk has been obſerved in them, in Children of both Sexes; and this happened to one of my own Brothers when he was about two Years of Age.

§. 3. *Pleura and Mediaſtinum.*

25. The Pleura is a Membrane which adheres very cloſely to the inner Surface of the Ribs, Sternum, and Muſculi Inter-Coſtales, Sub-Coſtales, and Sterno-Coſtales, and to the convex Side of the Diaphragm. It is of a very firm Texture, and plentifully ſtored with Blood-Veſſels and Nerves, in all which it reſembles the Peritonæum; and likewiſe in that it is made up of an inner true Membranous Lamina, and a Cellular Subſtance on the Outſide, which is a Production or Continuation of the Lamina.

26. The Cellular Portion goes quite round the inner Surface of the Thorax, but the Membranous Portion is diſpoſed in a different Manner. Each Side of the Thorax has its particular Pleura intirely diſtinct from the other, and making as it were two great Bladders, ſituated laterally with Reſpect to each other in the great Cavity of the Breaſt; in ſuch a Manner

ner as to form a double Septum or Partition running between the Vertebræ and the Sternum, their other Sides adhering to the Ribs and Diaphragm.

27. This particular Duplicature of the two Pleuræ is termed Mediaſtinum. The two Laminæ of which it is made up are cloſely united together near the Sternum and Vertebræ; but in the Middle, and toward the lower Part of the Foreſide, they are ſeparated by the Pericardium and Heart, as we ſhall ſee hereafter. A little more backward they are parted in a tubular Form by the Œſophagus, to which they ſerve as a Covering; and in the moſt poſterior Part, a triangular Space is left between the Vertebræ and the two Pleuræ from above downward, which is filled chiefly by the Aorta.

28. Before the Heart, from the Pericardium to the Sternum, the two Laminæ adhere very cloſely, and there the Mediaſtinum is tranſparent, except for a ſmall Space near the upper Part, where the Thymus is ſituated; ſo that in this Place there is naturally no Interſtice or particular Cavity. The apparent Separation is owing intirely to the common Method of raiſing the Sternum, as was plainly demonſtrated by *Bartholinus*, my firſt Maſter in Anatomy, in his Treatiſe of the Diaphragm publiſhed at *Paris* in 1676. I ſhall have Occaſion to mention *Euſtachius*'s Tables, where the ſame Fault is ſaid to be found, in another Place.

29. The Mediaſtinum does not commonly terminate along the Middle of the Inſide of the Sternum, as the common Opinion has been. I demonſtrated in the Year 1715, to the Academy of Sciences, that from above downward, it inclines toward the left Side; and that if before the Thorax is opened, a ſharp Inſtrument be run through the Middle of the Sternum, there will be almoſt the Breadth of a Finger between the Inſtrument and the Mediaſtinum; provided that the Sternum remain in its natural Situation, and the Cartilages of the Ribs be cut at the Diſtance of an Inch from it, on each Side.

30. From all this we ſee not only that the Thorax is divided into two Cavities intirely ſeparated from each other, by a middle Septum without any Communication; but alſo that by the Obliquity of this Partition, the right Cavity is greater than the left; and from hence we may judge of the Uncertainty of Trepanning the Sternum, which the Ancients have recommended in ſome Caſes.

31. The Cellular Portion of the Pleura connects the Membranous Portion to the Sternum, Ribs, and Muſcles; to the Diaphragm, Pericardium, Thymus, and Veſſels; and in a Word, to whatever lies near the convex Side of the Membranous Portions of the Pleura. It likewiſe inſinuates itſelf between the Laminæ of the Duplicature of which the Mediaſtinum is formed, and unites them together. It even penetrates the Muſcles, and communicates with the Cellular Subſtance in their Interſtices, all the Way to the Membrana Adipoſa on the external convex Side of the Thorax. In this the Pleura reſembles the Peritonæum.

32. The Surface of the Pleura turned to the Cavities of the Breaſt, is continually moiſtened by a Lymphatic Seroſity which tranſudes through the Pores of the Membranous Portion. This Fluid is ſaid to be ſecreted by imperceptible Glands; but the Exiſtence of theſe Glands has not been hitherto demonſtrated; as was likewiſe obſerved of the Glands of the Peritonæum.

Arteries and Veins.

33. The Arteries and Veins of the Pleura are chiefly Ramifications of the Intercoſtals; and theſe Ramifications are exceedingly numerous, and for the moſt Part very ſmall. The Mammariæ Internæ and Diaphragmaticæ likewiſe ſend Branches hither, which communicate very frequently with thoſe that come from the Intercoſtals.

34. The Mediaſtinum has particular Veſſels called Arteriæ and Venæ Mediaſtinæ, which are commonly Branches of the Subclaviæ. The Mammariæ Internæ ſend likewiſe Ramifications to the Forepart of it, the Diaphragmaticæ to the lower Part, and the Inter-Coſtales and Œſophagææ to the Backpart.

Nerves.

35. The Nerves are Ramifications of the true Inter-Coſtales, called otherwiſe Coſtales and Dorſales. Near the Vertebræ they communicate with the great Sympathetic Nerves, improperly called Inter-Coſtales, and but very little with the middle Sympathetici or thoſe of the eighth Pair.

Uſes.

36. The Pleura ſerves in general for an inner Integument to the Cavity of the Thorax. The Mediaſtinum cuts off all Communication between the two Cavities, and hinders one Lung from preſſing on the other when we lie on one Side. It likewiſe forms Receptacles for the Heart, Pericardium, Œſophagus, &c. and is continued over the Lungs in the Manner which ſhall be explained hereafter.

37. Before we leave the Pleura, it muſt be obſerved that theſe Portions of it which adhere immediately to the Ribs, may be looked upon as the Perioſteum of their inner Sides. This Adheſion keeps the Pleura ſtretched, and hinders it from ſlipping or giving way. It likewiſe renders this Membrane extremely ſenſible of the leaſt Separation cauſed by a coagulated Lympha or accumulated Blood; the Nervous Filaments being likewiſe in this Caſe very much compreſſed in Inſpiration, by the ſwelling of the Intercoſtal Muſcles.

§. 4. *Thymus.*

38. The Thymus is an oblong Glandular Body, round on the upper Part, and divided below into two or three Lobes, of which that toward the left Hand is the longeſt. In the Fœtus it is of a pretty large Size, leſs in Children, and very little in aged Perſons. In Children it is of a white Colour, ſometimes mixed with red; but in an advanced Age its Colour is generally dark.

39. The greateſt Part of the Thymus lies between the Duplicature of the ſuperior and anterior Portion of the Mediaſtinum, and the great

Veſſels of the Heart, from whence it reaches a little higher than the Tops of the two Pleuræ, ſo that ſome Part of it is out of the Cavity of the Thorax; and in the Fœtus and in Children, it lies as much without the Thorax as within it.

40. Its particular inward Structure and Secretions are not as yet ſufficiently known to determine its Uſes, which however ſeem to be deſigned more for the Fœtus than for Adults. It has Veſſels belonging to it called Arteriæ and Venæ Thymicæ.

§. 5. *Cor.*

Situation in general and Conformation.

41. The Heart is a muſcular Body ſituated in the Cavity of the Thorax on the anterior Part of the Diaphragm, between the two Laminæ of the Mediaſtinum. It is in ſome Meaſure of a conical Figure, flatted on the Sides, round at Top, and oval at the Baſis. Accordingly, we conſider in the Heart the Baſis, Apex, two Edges, and two Sides, one of which is generally flat, the other more convex.

42. Beſides the muſcular Body which chiefly forms what we call the Heart, its Baſis is accompanied by two Appendices called Auriculæ, and by large Blood-Veſſels, of which hereafter; and all theſe are included in a membranous Capſula, named Pericardium.

43. It is hollow within, and divided by a Septum which runs between the Edges, into two Cavities called Ventriculi, one of which is thick and ſolid, the other thin and ſoft. This latter is generally termed the right Ventricle, the other the left Ventricle, though in their natural Situation the right Ventricle is placed more anteriorly than the left, as we ſhall ſee hereafter.

44. Each Ventricle opens at the Baſis by two Orifices, one of which anſwers to the Auricles, the other to the Mouth of a large Artery; and accordingly one of them may be termed the Auricular Orifice, the other the Arterial Orifice. The right Ventricle opens into the right Auricle, and into the Trunk of the Pulmonary Artery; the left, into the left Auricle, and into the great Trunk of the Aorta. At the Edges of theſe Orifices are found ſeveral moveable Pelliculæ, called Valves by Anatomiſts; of which ſome are turned inward toward the Cavity of the Ventricles, called Triglochines, or Tricuſpides; others are turned toward the great Veſſels called Semilunares or Sigmoidales. The Valvulæ Tricuſpides of the left Ventricle are likewiſe termed Mitrales.

Ventriculi.

45. The inner Surface of the Ventricles is very uneven, many Eminences and Cavities being obſervable therein. The moſt conſiderable Eminences are thick fleſhy Productions called Columnæ. To the Extremities of theſe Pillars are faſtened ſeveral tendinous Cords, the other Ends of which are joined to the Valvulæ Tricuſpides. There are likewiſe other ſmall ſhort tendinous Ropes along both Edges of the Septum between the Ventricles. Theſe ſmall Cords lie in an obliquely tranſverſe Situation, and form a Kind of Network at different Diſtances.

46. The Cavities of the inner Surface of the Ventricles are ſmall deep Foſſulæ or Lacunæ placed very near each other, with ſmall prominent Interſtices between them. The greateſt Part of theſe Lacunæ are Orifices of the Venal Ducts to be deſcribed hereafter.

Structure of the Ventricles.

47. The fleſhy or muſcular Fibres of which the Heart is made up, are diſpoſed in a very ſingular Manner, eſpecially thoſe of the right or anterior Ventricle; being either bent into Arches or folded into Angles.

48. The Fibres which are folded into Angles are longer than thoſe which are only bent into Arches. The Middle of theſe Arches, and the Angles of the Folds, are turned toward the Apex of the Heart, and the Extremities of the Fibres towards the Baſis. Theſe Fibres differ not only in Length but in their Directions, which are very oblique in all, but much more ſo in the long or folded Fibres than in the ſhort ones, which are ſimply bent.

49. It is commonly ſaid that this Obliquity repreſents the Figure 8, but the Compariſon is very falſe, and can only agree to ſome bad Figures drawn by Perſons ignorant of the Laws of Perſpective.

50. All theſe Fibres, Regard being had to their different Obliquity and Length, are diſpoſed in ſuch a Manner, as that the longeſt form partly the moſt external Strata on the convex Side of the Heart, and partly the moſt internal on the concave Side; the Middle of the Arches and the Angles meeting obliquely and ſucceſſively to form the Apex.

51. The Fibres ſituated within theſe long ones grow gradually ſhorter and ſtraighter all the Way to the Baſis of the Heart, where they are very ſhort and very little incurvated. By this Diſpoſition, the Sides of the Ventricles are very thin near the Apex of the Heart, and very thick toward the Baſis.

52. Each Ventricle is compoſed of its proper diſtinct Fibres, but the left Ventricle has many more than the right. Where the two Ventricles are joined, they form a Septum which belongs equally to both.

53. There is this likewiſe peculiar to the left Ventricle, that the Fibres which form the innermoſt Stratum of its concave Side, form the outermoſt Stratum of the whole convex Side of the Heart, which conſequently is common to both Ventricles; ſo that by carefully unravelling all the Fibres of the Heart, we find it to be made up of two Bags contained in a third.

54. The anterior or right Ventricle is larger than the poſterior or left, as was well obſerved by the Ancients, and clearly demonſtrated by *M. Helvetius*. They are both nearly of the ſame Length in Men, and in ſome Subjects they end exteriorly in a Kind of double Apex.

55. All the Fibres are not directed the ſame Way, though they are all more or leſs oblique; for ſome end toward the right Hand, others toward the left; ſome forward, ſome backward, and others in the intermediate Places; ſo that in unravelling them, we find that they croſs each other gradually, ſometimes according to the Length of the Heart, and ſometimes according to its Breadth.

56. The

56. The Tubes which croſs each other tranſverſely are much more numerous than thoſe which croſs longitudinally; which ought to be taken Notice of, that we may rectify the falſe Notions that have been entertained concerning the Motion of the Heart; namely, that it is performed by a Contorſion or Twiſting like that of a Screw, or that the Heart is ſhortened in the Time of Contraction, and lengthened in Dilatation.

57. The Fibres which compoſe the inner or concave Surface of the Ventricles, do not all reach to the Baſis; ſome of them running into the Cavity, and there forming the fleſhy Columnæ, to which the looſe floating Portion of the Tricuſpidal Valves is faſtened by tendinous Ropes.

58. Besides theſe fleſhy Pillars, the internal Fibres form a great many Eminences and Depreſſions, which not only render the inner Surface of the Ventricles uneven, but give it a great Extent within a ſmall Compaſs. Some of theſe Depreſſions are the Orifices of the Venal Ducts found in the Subſtance of the Ventricles, which have been already mentioned. The Circumferences of the great Openings at the Baſis of the Heart are tendinous, and may be looked upon as the common Tendon of all the fleſhy Fibres of which the Ventricles are compoſed.

59. The Valves at the Orifices of the Ventricles are of two Kinds; one Kind allows the Blood to enter the Heart, and hinders it from going out the ſame Way; the other Kind allows the Blood to go out of the Heart, but hinders it from returning. The Valves of the firſt Kind terminate the Auriculæ, and thoſe of the ſecond lie in the Openings of the great Arteries. The firſt are termed Semilunar or Sigmoidal Valves, the others Triglochines, Tricuſpidal, or Mitral. *Valvulæ.*

60. The Tricuſpidal Valves of the right Ventricle are fixed to its Auricular Orifice, and turned inward toward the Cavity of the Ventricle. They are three triangular Productions, very ſmooth and poliſhed on that Side which is turned towards the Auricle, and on the Side next the Cavity of the Ventricle, they have ſeveral membranous and tendinous Expanſions; and their Edges are notched and indented. The Valves of the Auricular Orifice of the left Ventricle are of the ſame Shape and Structure, but they are only two in Number; and from ſome ſmall Reſemblance to a Mitre, they have been named Mitrales.

61. These five Valves are very thin, and faſtened by ſeveral tendinous Ropes to the fleſhy Columnæ of the Ventricles. The Cords of each Valve are fixed to two Pillars; and between theſe Valves there are other ſmall ones of the ſame Figure. They may all be termed Valvulæ Tricuſpides, Auriculares, or Venoſæ Cordis.

62. The Semilunar Valves are ſix in Number, three belonging to each Ventricle, ſituated at the Mouths of the great Arteries; and they may be properly enough named Valvulæ Arteriales. Their concave Sides are turned toward the Cavity of the Arteries, and their convex Sides approach each other. In examining them with a Microſcope, we find fleſhy Fibres lying in the Duplicature of the Membranes of which they are compoſed.

63. They are truly ſemilunar or in Form of a Creſcent, on that Side by which they adhere; but their looſe Edges are of a different Figure, each of them repreſenting two ſmall Creſcents, the two Extremities of which meet at the Middle of this Edge, and there form a Kind of ſmall Papilla.

The Aorta in general.

64. The great Artery that goes out from the left Ventricle, is termed Aorta. As it goes out, it turns a little toward the right Hand, and then bends obliquely backward to form what is called Aorta Deſcendens, which I ſhall have Occaſion to mention again hereafter. From about the Middle of the convex Side of this Curvature, three great Branches ariſe, which furniſh an infinite Number of Ramifications to the Head and upper Extremities of the Body; as the deſcending Aorta does in the ſame Manner to the Thorax, Abdomen, and lower Extremities.

The Arteria Pulmonaris in general.

65. The Trunk of the Artery which goes out from the right Ventricle, is called Arteria Pulmonaris. This Trunk, as it is naturally ſituated in the Thorax, runs firſt of all directly upward for a ſmall Space, then divides laterally into two principal Branches, one for each Lung; that which goes to the right Lung being the longeſt, for a Reaſon that ſhall be given hereafter.

Auriculæ.

66. The Auricles are muſcular Bags ſituated at the Baſis of the Heart, one towards the right Ventricle, the other towards the left, and joined together by an inner Septum and external communicating Fibres, much in the ſame Manner with the Ventricles; one of them being named the right Auricle, the other the left. They are very uneven on the Inſide, but ſmoother on the Outſide, and terminate in a narrow, flat, indented Edge, repreſenting a Cock's Comb, or in ſome Meaſure the Ear of a Dog; and for that Reaſon a famous Anatomiſt of *Leyden* would fain have diſtinguiſhed this Edge by the particular Name of Auricle, calling the reſt the Bag. They open into theſe Orifices of each Ventricle, which I name Auricular Orifices; and they are tendinous at their Opening, in the ſame Manner as the Ventricles.

67. The right Auricle is larger than the left, and it joins the right Ventricle by a common tendinous Opening, as has been already obſerved. It has two other Openings united into one, and formed by two large Veins which meet and terminate there, almoſt in a direct Line, called Vena Cava Superior and Inferior. The notched Edge of this Auricle terminates obliquely in a Kind of obtuſe Point, which is a ſmall particular Production of the great Bag, and is turned toward the Middle of the Baſis of the Heart.

68. The whole inner Surface of the right Auricle is uneven, by Reaſon of a great Number of prominent Lines which run acroſs the Sides of it, and communicate with each other by ſmaller Lines, which lie obliquely in the Interſtices between the former. The Lines of the firſt Kind repreſent Trunks, and the others, ſmall Branches in an oppoſite Direction to each other. In the Interſtices between theſe Lines, the Sides of the Auricle are very thin and almoſt tranſparent, ſeeming to be formed meerly by the ex-

ternal and internal Coats of the Auricle joined together, especially near the Point.

69. The left Auricle is in the Human Body a Kind of Muscular Bag or Reservoir, of a pretty considerable Thickness and unequally square, into which the four Veins open, called Venæ Pulmonares, and which has a distinct Appendix belonging to it, like a third small Auricle. This Bag is very even on both Sides, for which Reason one might be led to call it the Trunk of the Pulmonary Veins, and its Appendix, the left Auricle. However, the Bag and Appendix have but one common Cavity; and therefore may still be both comprehended under the common Name of the left Auricle. In Men, the small Portion may likewise be named the Appendix of the left Auricle, but in other Animals, the Case is different.

70. This small Portion or Appendix of the left Auricle is of a different Structure from that of the Bag or large Portion. Exteriorly, it resembles a small oblong Bag, bent different Ways, and indented quite round the Edges. Interiorly, it is like the Inside of the right Auricle. The whole common Cavity of the left Auricle is smaller in an adult Subject than that of the right; and the fleshy Fibres of this left Auricle cross each other obliquely, in Strata differently disposed.

71. Besides the great common Vessels, the Heart has Vessels peculiar to itself, called the Coronary Arteries and Veins, because they in some Measure crown the Basis of the Heart. The Coronary Arteries, which are two in Number, go out from the Beginning of the Aorta, and afterwards spread themselves round the Basis of the Heart, to the Substance of which they send numerous Ramifications. *Arteriæ & Venæ Coronariæ.*

72. The exterior Course of the Veins is pretty much the same with that of the Arteries, but they end partly in the right Auricle, and partly in the right Ventricle. They likewise terminate in the left Ventricle, but in smaller Numbers; and in both they end by certain Venal Ducts, which open into the Fossulæ or Lacunæ already taken Notice of, in the uneven inner Sides of the Ventricles. There are likewise Lacunæ of the same Kind in the Auricles between the prominent Lines before-mentioned; and in the great Bag of the left Auricle, we find likewise small Holes which seem to have the same Use.

73. There are seldom more than two Arteries; of which one lies toward the right Hand, the other toward the left of the anterior third Part of the Circumference of the Aorta. The right Coronary Artery runs in between the Basis and right Auricle, all the Way to the flat Side of the Heart, and so goes half-way round. The left Artery has a like Course between the Basis and left Auricle, and before it turns on the Basis, it sends off a capital Branch, which runs between the two Ventricles. Another principal Branch goes off from the Union of the two Arteries on the flat Side of the Heart, which running to the Apex, there joins the other Branch.

74. The Coronary Veins are distributed exteriorly, much in the same Manner. Their Trunk opens principally into the right Auricle by a particular Orifice furnished with a Semilunar Valve. All the Coronary Veins and

and their Ramifications communicate with each other, ſo that if we blow through a ſmall Hole made in any of theſe Branches, having firſt compreſſed the Auricles and large Veſſels, we obſerve that the Air ſwells all the Veſſels, and the Ventricles likewiſe by paſſing through the Ductus Venoſi.

Particular Situation of the Heart.

75. The Heart lies almoſt tranſverſely on the Diaphragm, the greateſt Part of it being in the left Cavity of the Thorax, and the Apex being turned toward the bony Extremity of the ſixth true Rib. The Baſis is toward the right Cavity, and both Auricles, eſpecially the right, reſt on the Diaphragm.

76. The Origin or Baſis of the Pulmonary Artery is, in this natural Situation, the higheſt Part of the Heart on the Foreſide, and the Trunk of this Artery lies in a perpendicular Plane, which may be conceived to paſs between the Sternum and Spina Dorſi. Therefore ſome Part of the Baſis of the Heart is in the right Cavity of the Thorax; and the reſt, all the Way to the Apex, is in the left Cavity; and it is for this Reaſon that the Mediaſtinum is turned toward that Side.

77. According to this true natural Situation of the Heart, the Parts commonly ſaid to be on the right Side, are rather anterior; and thoſe on the left Side, poſterior; and that Side of the Heart which is thought to be the Foreſide, is naturally the upper Side; and the Backſide conſequently the lower Side.

78. The lower Side is very flat, lying wholly on the Diaphragm, but the upper Side is a little convex through its whole Length, in the Direction of the Septum between the Ventricles. And it may be proper here to remark, that though commonly received Terms of Art may ſtill be retained, yet it is neceſſary to prevent their communicating falſe Ideas to thoſe who have not had an Opportunity of making Obſervations themſelves, or of being inſtructed by others.

Pericardium.

79. The Heart, with all the Parts belonging to it, is contained in a Membranous Capſula called Pericardium, which is in ſome Meaſure of a Conical Figure, and much bigger than the Heart. It is not fixed to the Baſis of the Heart, but round the large Veins above the Auricles, before they ſend off the Ramifications, and round the large Arteries, before their Diviſions.

80. The Pericardium is made up of three Laminæ, the middle and chief of which is compoſed of very fine tendinous Filaments, cloſely interwoven and croſſing each other in different Directions. The internal Lamina ſeems to be a Continuation of the outer Coat of the Heart, Auricles and great Veſſels. The Trunks of the Aorta and Pulmonary Artery have one common Coat which contains them both as in a Sheath, and is lined on the Inſide by a Cellular Subſtance, chiefly in that Space which lies between where the Trunks are turned to each other, and the Sides of the Sheath. There is but a very ſmall Portion of the inferior Vena Cava contained in the Pericardium.

81. It

81. It is the middle Lamina which chiefly forms the Pericardium; and the Figure of this Bag is not ſimply conical, its Apex or Point being very round, and the Baſis having a particular Elongation which ſurrounds the great Veſſels, as has been already ſaid, as amply as the other Portion ſurrounds the Heart.

82. The Pericardium is cloſely connected to the Diaphragm, not at the Apex, but exactly at that Place which anſwers to the flat or lower Side of the Heart; and it is a very difficult Matter to ſeparate it from the Diaphragm in Diſſection. This adhering Portion is, in ſome Meaſure, of a triangular Shape, anſwering to that of the lower Side of the Heart; and the reſt of the Bag lies upon the Diaphragm, without any Adheſion.

83. The external Lamina or common Covering, as it may be called more properly, is formed by the Duplicature of the Mediaſtinum. It adheres to the proper Bag of the Pericardium by the Intervention of the Cellular Subſtance in that Duplicature, but leaves it where the Pericardium adheres to the Diaphragm, on the upper Surface of which it is ſpread, as being a Continuation of the Pleura.

84. The internal Lamina is perforated by an infinite Number of very ſmall Holes, through which a ſerous Fluid continually tranſudes, in the ſame Manner as in the Peritonæum. This Fluid being gradually collected after Death, makes what is called Aqua Pericardii, which is found in conſiderable Quantities, in opening dead Bodies while they remain freſh. Sometimes it is of a reddiſh Colour, which may be owing to a Tranſudation of Blood through the fine Membrane of the Auricles.

85. The Heart and Parts belonging to it are the principal Inſtruments of the Circulation of the Blood. The two Ventricles ought to be conſidered as two Syringes ſo cloſely joined together as to make but one Body, and furniſhed with Suckers placed in contrary Directions to each other, ſo as that by drawing one of them, a Fluid is let in, and forced out again by the other. *Uſes in general.*

86. The Heart is made up of a Subſtance capable of Contraction and Dilatation. When the fleſhy Fibres of the Ventricles are contracted, the two Cavities are leſſened in an equal and direct Manner, not by any Contorſion or Twiſting, as the falſe Reſemblance of the Fibres to a Figure of Eight has made Anatomiſts imagine. For if we conſider attentively in how many different Directions, and in how many Places, theſe Fibres croſs each other, as has been already obſerved, we muſt ſee clearly that the whole Structure tends to make an even, direct and uniform Contraction, more according to the Breadth or Thickneſs, than according to the Length of the Heart, becauſe the Number of Fibres ſituated tranſverſely, or almoſt tranſverſely, is much greater than the Number of longitudinal Fibres.

87. The fleſhy Fibres, thus contracted, do the Office of Suckers, by preſſing upon the Blood contained in the Ventricles, which Blood being thus forced toward the Baſis of the Heart preſſes the Tricuſpidal Valves againſt each other, opens the Semilunares, and ruſhes with Impetuoſity through

through the Arteries and their Ramifications, as through ſo many elaſtic Tubes.

Syſtole. 88. The Blood thus puſhed on by the Contraction of the Ventricles, and afterwards preſſed by the elaſtic Arteries, enters the Capillary Veſſels, and is from thence forced to return by the Veins to the Auricles, which like Retirements, Porches, or Anti-chambers, receive and lodge the Blood returned by the Veins during the Time of a new Contraction. This Contraction of the Heart is by Anatomiſts termed Syſtole.

Diaſtole. 89. The Contraction or Syſtole of the Ventricles ceaſes immediately, by the Relaxation of their fleſhy Fibres, and in that Time the Auricles which contain the Venal Blood, being contracted, force the Blood through the Tricuſpidal Valves into the Ventricles, the Sides of which are thereby dilated and their Cavities enlarged. This Dilatation is termed Diaſtole.

Circulation. 90. In this Manner does the Heart, by the alternate Syſtole and Diaſtole of its Ventricles and Auricles, puſh the Blood through the Arteries to all the Parts of the Body, and receive it again by the Veins. This is called the Circulation of the Blood, which is carried on in three different Manners.

91. The firſt and moſt univerſal Kind of Circulation is that by which almoſt all the Arteries of the Body are filled by the Syſtole of the Heart, and the greateſt Part of the Veins evacuated by the Diaſtole.

92. The ſecond Kind of Circulation, oppoſite to the firſt, is through the Coronary Veſſels of the Heart, the Arteries of which are filled with Blood during the Diaſtole of the Ventricles, and the Veins emptied during the Syſtole.

93. The third Kind of Circulation is that of the left Ventricle of the Heart; through the venal Ducts of which a ſmall Quantity of Blood paſſes, without going through the Lungs, which is the Courſe of all the remaining Maſs of Blood.

94. Besides theſe three different Kinds of Circulation, there are ſome Peculiarities in the Courſe of the Blood, which may be looked upon as particular Circulations. Such is the Paſſage of the Blood through the Liver, Spleen, Corpora Cavernoſa of the Parts of Generation, and through the Cavernous Sinuſes of the Dura Mater. I do not here examine the Circulation peculiar to the Fœtus.

§. 6. *Pulmones.*

Situation in general and Figure. 95. The Lungs are two large ſpongy Bodies of a reddiſh Colour in Children, greyiſh in adult Subjects, and bluiſh in old Age; filling the whole Cavity of the Thorax, one being ſeated on the right Side, the other in the left, parted by the Mediaſtinum and Heart, and of a Figure anſwering to that of the Cavity which contains them; that is, convex next the Ribs, concave next the Diaphragm, and irregularly flatted and depreſſed next the Mediaſtinum and Heart.

96. When

96. When the Lungs are viewed out of the Thorax, they repreſent in ſome Meaſure an Ox's Foot, with the Forepart turned to the Back, the Backpart to the Sternum, and the lower Part to the Diaphragm.

Diviſion and Figure in particular.

97. They are diſtinguiſhed into the right and left Lung; and each of theſe into two or three Portions called Lobi, of which the right Lung has commonly three, or two and a Half, and the left Lung two. The right Lung is generally larger than the left, anſwerably to that Cavity of the Breaſt, and to the Obliquity of the Mediaſtinum.

98. At the lower Edge of the left Lung, there is an indented Notch or Sinus oppoſite to the Apex of the Heart, which is therefore never covered by that Lung even in the ſtrongeſt Inſpirations, and conſequently the Apex of the Heart and Pericardium may always ſtrike againſt the Ribs; the Lungs not ſurrounding the Heart in the Manner commonly taught. This Sinus is expreſſed in *Euſtachius*'s Tables.

Structure.

99. The Subſtance of the Lungs is almoſt all ſpungy, being made up of an infinite Number of membranous Cells, and of different Sorts of Veſſels ſpread among the Cells, in innumerable Ramifications.

Coats.

100. This whole Maſs is covered by a Membrane continued from each Pleura, which is commonly ſaid to be double; but what is looked upon as the inner Membrane is only an Expanſion and Continuation of a Cellular Subſtance which ſhall be ſpoken to, after I have deſcribed the Veſſels of this Viſcus.

Bronchia.

101. The Veſſels which compoſe Part of the Subſtance of the Lungs are of three or four Kinds; the Air-Veſſels, Blood-Veſſels and Lymphatics, to which we may add the Nerves. The Air-Veſſels make the chief Part, and are termed Bronchia.

102. These Bronchia are Conical Tubes, compoſed of an infinite Number of Cartilaginous Fragments, like ſo many irregular Arches of Circles, connected together by a Ligamentary Elaſtic Membrane, and diſpoſed in ſuch a Manner as that the lower eaſily inſinuate themſelves within thoſe above them.

103. They are lined on the Inſide by a very fine Membrane, which continually diſcharges a Mucilaginous Fluid; and in the Subſtance of the Membrane are a great Number of ſmall Blood-Veſſels, and on its convex Side, many longitudinal Lines, which appear to be partly fleſhy, and partly made up of an elaſtic Subſtance of another Kind.

104. The Bronchia are divided in all Directions into an infinite Number of Ramifications, which diminiſh gradually in Size; and as they become Capillary, change their Cartilaginous Structure into that of a Membrane. Beſides theſe very ſmall Extremities of this numerous Series of Ramifications, we find that all the ſubordinate Trunks, from the greateſt to the ſmalleſt, ſend out from all Sides a vaſt Number of ſhort Capillary Tubes of the ſame Kind.

Veſiculæ Bronchiales.

105. Each of theſe numerous Bronchial Tubes is widened at the Extremity, and thereby formed into a ſmall membranous Cell, commonly called a Veſicle. Theſe Cells or Folliculi are cloſely connected together in Bundles;

Bundles; each ſmall Branch producing a Bundle proportionable to its Extent and the Number of its Ramifications.

Lobuli. 106. These ſmall Veſicular or Cellulous Bundles are termed Lobules; and as the great Branches are divided into ſmall Rami, ſo the great Lobules are divided into ſeveral ſmall ones. The Cells or Veſicles of each Lobule have a free Communication with each other, but the ſeveral Lobules do not communicate ſo readily.

Interlobular Subſtance. 107. The Lobules appear diſtinctly to be parted by another Cellulous Subſtance, which ſurrounds each of them in Proportion to their Extent, and fills up the Interſtices between them. This Subſtance forms likewiſe a Kind of irregular membranous Cells, which are thinner, looſer, and broader than the Bronchial Veſicles.

108. This Subſtance is diſperſed through every Part of the Lungs, forms cellulous or ſpongy Vaginæ which ſurround the Ramifications of the Bronchia and Blood-Veſſels, and is afterwards ſpread over the outer Surface of each Lung, where it forms a Kind of fine Cellular Coat, joined to the general Covering of that Viſcus.

109. When we blow into this Interlobular Subſtance, the Air compreſſes and flattens the Lobuli; and when we blow into the Bronchial Veſicles they preſently ſwell, and if we continue to blow with Force, the Air paſſes inſenſibly into the Interlobular Subſtance. We owe this Obſervation to *M. Helvetius.*

Vaſcular Texture. 110. All the Bronchial Cells are ſurrounded by a very fine Reticular Texture of the ſmall Extremities of Arteries and Veins which communicate every Way with each other. The greateſt Part of this admirable Structure isthe Diſcovery of the illuſtrious *Malpighi.*

Blood-Veſſels. 111. The Blood-Veſſels of the Lungs are of two Kinds; one common, called the Pulmonary Artery and Veins; the other proper, called the Bronchial Arteries and Veins.

112. The Pulmonary Artery goes out from the right Ventricle of the Heart; and its Trunk having run almoſt directly upward as high as the Curvature of the Aorta, is divided into two lateral Branches, one going to the right Hand, called the right Pulmonary Artery, the other to the left, termed the left Pulmonary Artery. The right Artery paſſes under the Curvature of the Aorta, and is conſequently longer than the left. They both run to the Lungs, and are diſperſed through their whole Subſtance by Ramifications nearly like thoſe of the Bronchia, and lying in the ſame Directions.

113. The Pulmonary Veins having been diſtributed through the Lungs in the ſame Manner, go out on each Side, by two great Branches which open laterally into the Reſervoir or Muſcular Bag of the right Auricle.

114. The Ramifications of theſe two Kinds of Veſſels in the Lungs, are ſurrounded every where by the Cellular Subſtance already mentioned, which likewiſe gives them a Kind of Vagina; and the Rete Mirabile of *Malpighi*, deſcribed above, is formed by the Capillary Extremities of theſe Veſſels. It muſt be obſerved, that the Ramifications of the Arteries are more

more numerous and larger than thoſe of the Veins, which in all other Parts of the Body exceed the Arteries both in Number and Size.

Bronchial Arteries and Veins.

115. BESIDES theſe capital Blood-Veſſels, there are two others called the Bronchial Artery and Vein. The Artery has become very famous of late, by the Deſcription given of it by *M. Ruyſch.* The Vein was doubted of for ſome Time, but it exiſts as really as the Artery, and may be eaſily demonſtrated.

116. THESE two Veſſels are very ſmall, appearing only like very fine Arteries and Veins coming from the Aorta, Vena Cava and their Branches, in the Manner already ſaid in the Deſcription of the Arteries and Veins; and they ſeem to have no other Uſe but that of nouriſhing the Lungs.

117. THE Varieties in the Origins of the Bronchial Arteries and Veins, eſpecially of the Arteries, their Communications or Anaſtomoſes with each other, and with the neighbouring Veſſels, and above all, the immediate Anaſtomoſis of the Bronchial Artery with the common Pulmonary Vein, are of ſo great Conſequence in the Practice of Phyſick, that it will be proper to repeat here what I have ſaid about them elſewhere, that the Attention of the Readers may not be diverted by being obliged to turn to another Place of this Work.

118. THE Bronchial Arteries come ſometimes from the anterior Part of the Aorta Deſcendens Superior, ſometimes from the firſt Intercoſtal Artery, and ſometimes from one of the Œſophagææ. They go out ſometimes ſeparately, toward each Lung, ſometimes by a ſmall common Trunk which afterwards divides to the right and left, near the Bifurcation of the Aſpera Arteria hereafter to be deſcribed, and follow Ramifications of the Bronchia.

119. THE left Bronchial Artery comes pretty frequently from the Aorta, and the right from the ſuperior Intercoſtal on the ſame Side, becauſe of the Situation of the Aorta. There is likewiſe another, which ariſes from the Aorta poſteriorly near the ſuperior Intercoſtal, and above the anterior Bronchialis.

120. THE Bronchial Artery gives off a ſmall Branch to the Auricle of the Heart on the ſame Side, which communicates immediately with the Coronary Artery.

121. IN the Year 1719 I obſerved a very plain Anaſtomoſis between ſome Branches of the left Pulmonary Vein, and of one of the Arteriæ Œſophagææ, which came from the firſt left Intercoſtalis, together with a Bronchial Artery of the ſame Side.

122. IN that or the following Year, I obſerved likewiſe an Anaſtomoſis between the left Bronchial Artery and the Vena Azygos; and in the Month of *April* 1721, I ſaw an Anaſtomoſis between a Branch of this Artery, and the Body of the juſt mentioned Vein.

123. SOMETIMES one Bronchial Artery gives Origin to ſeveral ſuperior Intercoſtales; and ſometimes ſeveral Bronchial Arteries ſend off ſeparately the ſame Number of Intercoſtals.

124. The Bronchial Veins, as well as Arteries, were known to *Galen*. Theſe Veins are ſometimes Branches of the Azygos, coming from the upper Part of the Curvature or Arch. The left Vein is ſometimes a Branch of the common Trunk of the Intercoſtales of the ſame Side; and ſometimes both Veins are Branches of the Gutturalis.

Nervi. 125. The Lungs have a great many Nerves diſtributed through them by Filaments which accompany the Ramifications of the Bronchia and Blood-Veſſels, and are ſpread on the Cells, Coats, and all the membranous Parts of the Lungs. The Nervi Sympathetici Medii and Majores, commonly called the Nerves of the eighth Pair, or the Intercoſtals, form behind each Lung a particular Intertexture, called Plexus Pulmonaris, from whence nervous Filaments go out, which communicate with the Plexus Cardiacus and Stomachicus.

Vaſa Lymphatica. 126. On the Surface of the Human Lungs, between the external and Cellular Coat, we obſerve ſomething that looks like Lymphatic Veſſels; but we ought to take Care not to miſtake for ſuch Veſſels, a tranſparent Reticular Subſtance obſervable on the Surface of the Lungs, after blowing ſtrongly into the Lobuli; this Appearance being intirely owing to the Air which paſſes through the Bronchial Veſicles into the Interlobular Cells, and which, by ſeparating a certain Number of Lobuli, finds Room to lodge between them. The true Lymphatic Veſſels of the Lungs are moſt viſible in Brutes; and in a Horſe particularly, I have obſerved one of theſe Veſſels to run along a great Part of one Edge of the Lungs.

Ligaments. 127. Under the Root of each Lung, that is, under that Part formed by the ſubordinate Trunk of the Pulmonary Artery, by the Trunks of the Pulmonary Veins, and by the Trunk of the Bronchia, there is a pretty broad membranous Ligament which ties the poſterior Edge of each Lung to the lateral Parts of the Vertebræ of the Back, from that Root all the Way to the Diphragm.

Trachea Arteria. 128. The Bronchia already deſcribed are Branches or Ramifications of a large Canal, partly cartilaginous, and partly membranous, called Trachea or Aſpera Arteria. It is ſituated anteriorly in the lower Part of the Neck, from whence it runs down into the Thorax between the two Pleuræ, through the upper Space left between the Duplicature of the Mediaſtinum, behind the Thymus.

129. Having reached as low as the Curvature of the Aorta, it divides into two lateral Parts, one toward the right Hand, the other toward the left, which enter the Lungs, and are diſtributed through them in the Manner already ſaid. Theſe two Branches are called Bronchia, and that on the right Side is ſhorter than that of the left, whereas the right Pulmonary Artery is the longeſt.

130. The Trachea is made up of Segments of Circles or Cartilaginous Hoops, diſpoſed in ſuch a Manner as to form a Canal open on the Back-part, the Cartilages not going quite round; but this Opening is filled by a ſoft Glandular Membrane, which compleats the Circumference of the Canal.

131. Each

131. EACH Circle is about the twelfth Part of an Inch in Breadth, and about a Quarter of that Space in Thickneſs. Their Extremities are round, and they are ſituated horizontally above each other, ſmall Interſtices being left between them, and the lower Edge of the ſuperior Segments being turned toward the upper Edge of thoſe next below them.

132. THEY are all connected by a very ſtrong elaſtic membranous Ligament fixed to their Edges. I have obſerved the firſt three Segments united into one, bent alternately in two different Places, according to its Breadth. Sometimes two are continuous in the ſame Manner.

133. THE Canal of the Aſpera Arteria is lined on the Inſide by a particular Membrane, which appears to be partly fleſhy or muſcular, and partly ligamentary, perforated by an infinite Number of ſmall Holes more or leſs imperceptible, through which a mucilaginous Fluid continually paſſes to defend the inner Surface of the Trachea againſt the Acrimony of the Air which we breathe.

134. THIS Fluid comes from ſmall Glandular Bodies diſperſed through the Subſtance of the Membrane, but eſpecially from Glands ſomething larger than the former, which lie on the outer or poſterior Surface of that ſtrong Membrane, by which the Circumference of the Canal is compleated. The ſame Structure is obſervable in the Ramifications of the Trachea from the greateſt to the ſmalleſt.

135. ALL the Veſſels of which the Lungs are chiefly compoſed, that is, the Air-Veſſels or Bronchia, and Blood-Veſſels, that is, the Pulmonary and Bronchial Arteries and Veins, accompany each other through this whole Viſcus.

136. THEY are diſpoſed commonly in ſuch a Manner, even to the laſt Ramifications, as that a ſubordinate Trunk or Branch of the Bronchia lies between the like Trunks or Branches of the Pulmonary Artery and Vein, the Bronchial Veſſels being immediately joined to the Bronchia. In ſome Places theſe three Kinds of Veſſels touch each other in ſuch a Manner as to leave a triangular Space in the Middle.

137. THE Bronchia are divided into a very great Number of Ramifications, and the laſt Rami are the Pedicles or Footſtalks of the ſmall Lobuli. All the Lobuli are angular, oblong, broad, thin, *&c.* The Footſtalks ſend out other ſmaller membranous Pedicles, which are very ſhort, and terminate in the Bronchial Veſicles or Cells, of which they are Continuations. The ſubordinate Trunks and Rami detach a great Number of theſe Pedicles from their convex Surface.

138. WHEN we blow into the Lungs the Bronchial Cells neareſt their outer Surface appear like ſmall Portions of round Veſicles; and from this Appearance all the Bronchial Cells have got the Name of Veſicles, though they are all angular, except thoſe which I have now mentioned.

139. WHEN we examine a Lung without blowing it up, we find that the Cartilaginous Segments of the Bronchia lie ſo near as to be engaged in each other; and in drawing out any Portion of the Bronchia by the two Ends, theſe Segments are parted, and the whole Canal is increaſed in Length,

but

but it contracts again by Means of its elaſtic Membrane, as ſoon as that Force is taken off.

140. When we open lengthwiſe any Portion of the Pulmonary Artery and Vein in the ſame Lung, we meet with a great Number of tranſverſe Rugæ, which are deſtroyed when theſe Veſſels are elongated. This is an Obſervation made by M. *Helvetius*.

141. By Virtue of this Structure all the Ramifications both of the Bronchia and Pulmonary Arteries and Veins have conſtantly the ſame Direction, whether the Lung be inflated or collapſed; and they contract in Length without being either contorted or folded. In Expiration theſe Veſſels are elongated, and ſhortened in Inſpiration.

142. These three Veſſels lie in a ſort of Cellular Vagina which accompanies all their Ramifications, and is a Continuation of the Interlobular Cells, or Cellular Subſtance in the Interſtices of the Lobuli. The Pelliculæ which compoſe it are however diſpoſed there in a more regular Manner, and more longitudinally than in other Places, and thereby appear to form a true Vagina.

143. When we blow through a Pipe introduced ſo far as to touch immediately a Trunk of the Blood-Veſſels or Bronchia, the Air runs at firſt through all the Cells that lie neareſt that Trunk or its Branches; but if we continue to blow it inſinuates itſelf through the whole Interlobular Subſtance.

Bronchial Glands.

144. At the Angle of the firſt Ramification of the Trachea Arteria we find on both the fore and back Sides certain ſoft, roundiſh, Glandular Bodies, of a bluiſh or blackiſh Colour, and of a Texture partly like that of the Thymus already deſcribed, and partly like that of the Glandula Thyroides, of which hereafter. There are other Glands of the ſame Kind at the Origin of each Ramification of the Bronchia, but they decreaſe proportionably in Number and Size. They are fixed immediately to the Bronchia, and covered by the Interlobular Subſtance, and they ſeem to communicate by ſmall Openings with the Cavity of the Bronchia.

145. The Trachea has ſeveral Coats, as has been already obſerved. The outermoſt or common Covering ſurrounds that Part of the Trachea which lies in the Thorax; but out of the Thorax this firſt Coat is derived from the Aponeurotic Expanſions of the Muſcles of the Neck; and it is between this and the following Covering that the Glands already mentioned are ſituated.

146. The ſecond is a proper Coat, being a Continuation of the Cellular Covering of the Lungs, and the Pelliculæ thereof, neareſt the Cartilaginous Segments, ſerve them for an external Perichondrium. The third Membrane lies on the Inſide, adhering cloſely to the ſame Cartilages, and ſupplying to theſe the Place of an internal Perichondrium.

147. The fourth Membrane is that which compleats the Circumference of the Cartilaginous Circles of the Trachea. It conſiſts chiefly of two Laminæ or Strata, partly muſcular and partly tendinous, the external or poſterior Lamina being made up of longitudinal Fibres, and the internal

or

or anterior of tranſverſe Fibres. This Membrane is perforated by the ſmall Ducts of the abovementioned Glands, which diſcharge a Fluid when preſſed, and being examined through a Microſcope they appear veſicular or follicu-lous, much like thoſe of the Stomach.

148. The Ligaments between the Cartilaginous Circles are very ſtrong and elaſtic, and each of them is confined to two Cartilages without communicating with any of the reſt, being fixed to the Edges of theſe Cartilages much in the ſame Manner as the Intercoſtal Muſcles are inſerted in the Ribs.

149. As the Bronchia penetrate into the Subſtance of the Lungs, they gradually loſe their Cartilages; but the Muſcular Lines or Columnæ of M. *Morgagni* appear as much, and ſometimes more than before. The two Planes abovementioned continue likewiſe to be viſible; and we obſerve very diſtinctly, ſometimes even without a Microſcope, a great many ſmall Holes in the Pedicles of the Lobuli and Bronchial Veſicles or Cells, which open from within outwards.

150. Respiration is performed by Organs of two Kinds, one of which *Uſes.* may be looked upon as active, the other as paſſive. The Lungs are of the ſecond Kind, and the firſt comprehends chiefly the Diaphragm and Intercoſtal Muſcles.

151. As ſoon as the Intercoſtal Muſcles begin to contract, the Arches of the Ribs are raiſed together with the Sternum, and placed at a greater Diſtance from each other, by which Means the Cavity of the Thorax is enlarged on the two lateral and anterior Sides.

152. At the ſame Inſtant the Diaphragm is flatted or brought toward a Plane by two Motions, which are apparently contrary, that is, by the Contraction of the Diaphragm, and the Dilatation of the Ribs in which it is inſerted. The external Surface of the Thorax being thus in a Manner increaſed, and the Cavity of the Bronchia being at the ſame Time and by the ſame Means leſs reſiſted or preſſed upon, the ambient Air yields to the external Preſſure, and inſinuates itſelf into all the Places where the Preſſure is diminiſhed, that is, into the Aſpera Arteria, and into all the Ramifications of the Bronchia all the Way to the Veſicles. This is what is called Inſpiration.

153. This Motion of Inſpiration is inſtantaneous, and ceaſes in a Moment by the Relaxation of the Intercoſtal Muſcles, the elaſtic Ligaments and Cartilages of the Ribs bringing them back at the ſame Time to their former Situation. This Motion by which the Ribs are depreſſed and brought nearer each other is termed Expiration.

154. The Pulmonary Arteries and Veins which accompany the Bronchia through all their Ramifications, and ſurround the Veſicles, tranſmit the Blood through their narrow Capillary Extremities, and thereby change or modify it at leaſt in three different Manners.

155. The firſt Change or Modification which the Blood undergoes in the Lungs, is to have the Coheſions of its Parts broken, to be attenuated, pounded, and as it were reduced to Powder. The ſecond is to be deprived

prived of a certain Quantity of Serum, which transpires through the Lungs, and is what we commonly call the Breath. The third is to be in a Manner reanimated by the Impression of the Air, whether the whole Body of the Air enters the Blood, whether the common Air is only the Vehicle of some finer Parts which are conveyed to it, or whether the Air only compresses and shakes the Blood as it passes round the Bronchial Vesicles in the Reticular Capillary Extremities of the Vessels.

156. The Cartilages of the Aspera Arteria and Bronchia serve in general to compose a Canal, the Sides of which will not sink in or subside by Compression, but will nevertheless yield to certain Pressures and Impulses without breaking. As these Cartilages are not compleat Circles or Rings, and as their Circumferences are compleated by elastic Membranes, they allow of these Dilatations and Contractions which modulate the Voice; and as they are connected by elastic Ligaments of a considerable Breadth, the alternate Elongation and Contraction of the Bronchia is facilitated in the Motions of Respiration.

157. I say nothing here of the Larynx, which is commonly looked upon as the upper Part of the Aspera Arteria, but refer the Description of it to that of the Head, with which it has a particular Connexion in Relation to the Tongue; and this I do the more willingly, because I have included in the same Treatise all that relates to the Neck, as not furnishing Matter enough for a particular Section, though in the general Division of the Human Body it may naturally enough be looked upon as a distinct Part lying between the Head and the Thorax.

§. 7. *Œsophagus.*

Situation and Figure.

158. The Œsophagus is a Canal partly Muscular and partly Membranous, situated behind the Trachea Arteria, and before the Vertebræ of the Back, from near the Middle of the Neck down to the lower Part of the Thorax, from whence it passes into the Abdomen through a particular Hole of the small or inferior Muscle of the Diaphragm, and ends at the upper Orifice of the Stomach.

Structure and Coats.

159. It is made up of several Coats almost in the same Manner as the Stomach, of which it is the Continuation. The first Coat, while in the Thorax, is formed only by the Duplicature of the posterior Part of the Mediastinum, and is wanting above the Thorax and in the Neck, where the outer Coat of the Œsophagus is only a Continuation of the Cellular Substance belonging to the neighbouring Parts.

160. The second Coat is Muscular, being made up of several Strata of fleshy Fibres. The outermost are mostly longitudinal, but they are not all continued from one End of the Canal to the other. The following Strata are obliquely transverse, the next to these more transverse, and the innermost are turned a little obliquely the contrary Way. They cross each other irregularly in many Places, but are neither spiral nor annular.

161. The third is termed the Nervous Coat, and is like that of the Stomach and Inteſtines. It is differently folded or plaited according to its Length, being much wider than the Muſcular Coat; and it is ſurrounded by a whitiſh, ſoft, fine Filamentary Subſtance like a Kind of Cotton, which, when ſteeped in Water, ſwells and grows thicker.

162. The fourth or innermoſt Coat reſembles in ſome Meaſure that of the Inteſtines, except that inſtead of the Villi it has ſmall and very ſhort Papillæ. It is folded lengthwiſe like the third Coat; ſo that the Œſophagus, when cut acroſs, repreſents one Tube within another. Through the Pores of this Coat, a viſcid Lympha is continually diſcharged.

163. The Œſophagus, from its very Beginning, turns a little to the left Hand, and naturally runs along the left Extremities of the Cartilages of the Aſpera Arteria. The Thyroide Gland and thoſe which lie behind the Middle of the Œſophagus ſhall be deſcribed in another Place, and I refer the Pharynx as well as the Larynx to the Deſcription of the Head, for a Reaſon that ſhall be given there.

§. 5. *Ductus Thoracicus.*

164. The Thoracic Duct is a thin tranſparent Canal, which runs up from the Receptaculum Chyli, along the Spina Dorſi, between the Vena Azygos and Aorta, as high as the fifth Vertebra of the Back or higher. From thence it paſſes behind the Aorta toward the left Hand, and aſcends behind the left Subclavian Vein, where it terminates in ſome Subjects by a Kind of Veſicula, in others by ſeveral Branches united together, and opens into the Backſide of the Subclavian Vein near the Outſide of the internal Jugular.

165. This Canal is plentifully furniſhed with Semilunar Valves turned upward. Its Opening into the Subclavian Vein in the Human Body, is, in the Place of Valves, covered by ſeveral Pelliculæ, ſo diſpoſed as to permit the Entrance of the Chyle into the Vein, and hinder the Blood from running into the Duct. It is ſometimes double, one lying on each Side, and ſometimes it is accompanied by Appendices called Pampiniformes.

SECT. X.

A Deſcription of the Head.

1. IN the Deſcriptions of the Abdomen and Thorax, I began by an Account of the external Parts of theſe two Cavities of the Human Body; and afterwards I proceeded to the internal Parts; but I muſt obſerve a different Order in deſcribing the Head. I ſhall here explain, firſt of all, the Contents of the Cranium, or all that lies within that bony Cavity; and afterwards all that ſurrounds it on the Outſide; and it is very proper that the Reader ſhould review what has been ſaid concerning the Structure of the Cranium in both Treatiſes of the Bones, before he begins this Section.

2. THE Head being conſidered in general as one of the three principal Cavities of the Human Body, has this peculiar to it, that its Outſide is the Seat and Baſis of ſeveral very complex particular Organs, whereas on the Inſide it contains only one, which is indeed the Organ of Organs, and the Primum Mobile of the whole Animal Œconomy; I mean the Brain, the Mechaniſm of which is ſtill very little known; and the Structure of its different Parts, even of thoſe which we are ſuppoſed to be moſt acquainted with, is very difficult to be demonſtrated.

ART. I.

The Brain and its Appendages.

3. THE Name of Brain is given to all that Maſs which fills the Cavity of the Cranium, and which is immediately ſurrounded by two Membranes called Meninges by the Greeks, and Matres by other Ancients, becauſe they were commonly of Opinion that theſe Membranes were the Origin, and, as it were, the Mother of all the other Membranes of the Body.

4. THIS general Maſs is divided into three particular Portions; the Cerebrum or Brain properly ſo called, the Cerebellum and Medulla Oblongata. To theſe three Parts contained within the Cranium, a fourth is added, which fills the great Canal of the Spina Dorſi by the Name of Medulla Spinalis, being a Continuation of the Medulla Oblongata.

5. THE Meninges or Membranes are two in Number, one of which is very ſtrong, and lies contiguous to the Cranium; the other is very thin, and immediately touches the Brain. The firſt is named Dura Mater; the ſecond Pia Mater, which is again divided into two, the external Lamina being

being termed Arachnoides; the internal retaining the common Name of Pia Mater. I begin by these Meninges.

§. 1. *Dura Mater.*

6. The Dura Mater incloses the Brain and all its Appendages. It lines the Inside of the Cranium, and supplies the Place of an internal Periosteum, being spread in all the Holes and Depressions, and covering all the Eminences in such a Manner as to prevent their being hurtful to the Brain. *Situation in general.*

7. In describing the Dura Mater we must take Notice, 1. Of its Composition. 2. Its Adhesions to the Cranium. 3. Its Folds or Septa. 4. Its Productions, Vessels and Nerves. *Division.*

8. The Dura Mater is made up of two Laminæ, adhering very closely together; the Fibres of both crossing each other obliquely. By rubbing any part of this Membrane between the Fingers, we easily perceive the two Laminæ sliding a little upon each other. Their Texture is very close and strong, appearing to be partly ligamentary and partly tendinous. *Composition.*

9. The Dura Mater sticks closely to the Cranium by a great Number of Filaments of the external Lamina, which enter the Pores of the Bones chiefly at the Sutures both above and below; and by penetrating these Joints, they communicate with the external Periosteum. These Filaments are, for the most part, small Vessels, which being broken in separating the Dura Mater from the Skull, a great Number of red Points appear on the external Surface of that Membrane. *Adhesions.*

10. It adheres much more to the whole inner Surface of the Cranium in Children and young Persons than in those of an advanced Age, the Filaments becoming then very small, being compressed by the Contraction of the bony Pores; and consequently they are more easily ruptured by any Force applied to them.

11. These Adhesions are formed intirely by the external Lamina. The internal Lamina is very smooth and polished on the Inside, which is also continually moistened by a fine Fluid discharged through its Pores, much in the same Manner as in the Peritonæum and Pleura. *Internal Lamina.*

12. The Folds of the Dura Mater are made by the internal Lamina; and three of them form particular Septa; one of which is superior, representing a Kind of Mediastinum between the two great Lobes of the Brain. The second is in a middle Situation, like a Diaphragm between the Cerebrum and Cerebellum; the third is inferior between the Lobes of the Cerebellum. The superior Septum is longitudinal in Form of a Scythe, from whence it is termed the Falx of the Dura Mater; and it may likewise be called Septum Sagittale, Verticale, or Mediastinum Cerebri. The middle Septum is transverse, and might be called the Floor of the Cerebellum, the Diaphragm of the Brain, or the Tent of the Cerebrum. The inferior Septum is very small, and runs down between the Lobes of the Cerebellum; on which Account it may be termed either simply Septum Cerebelli, or *Folds and Septa.*

Septum Occipitale Minus; the middle Partition being looked upon as the Septum Occipitale Majus.

13. The ſuperior or vertical Septum, called the Falx of the Dura Mater, is a long and broad Fold or Duplicature of the internal Lamina, reaching from the Edge of the Criſta Oſſis Cribroſi, along the Sagittal Suture, to the Middle of the tranſverſe Septum; which it joins in ſuch a Manner, as that the lateral Laminæ of the Falx are continuous on each Side, with the neighbouring Portions of the ſuperior Laminæ of the middle Septum.

14. It is broader where it joins the middle Septum than at the Os Ethmoides, and it is thicker at that Edge which adheres to the Cranium than at the other which lies looſe and is very ſharp, and from this Reſemblance to a Scythe it had the Name of Falx.

15. The tranſverſe or middle Septum is fixed to the Os Occipitis along the Grooves of the lateral Sinuſes, and thoſe of the great Angles of the Apophyſes Petroſæ all the Way to the poſterior Clinoide Apophyſes of the Os Sphenoidale. By this Situation it forms a Sort of Floor, Tent, or ſhallow Vault, on the Forepart of which is a large Notch almoſt of an oval Figure.

16. This Septum divides the Cranium into two Cavities, one large or ſuperior, and the other ſmall or inferior, which communicate together by the great oval Notch. It is formed by a particular Fold and a very broad Membrane of the internal Laminæ of the Dura Mater; and in the natural State it is very tenſe, becauſe of its Union, or rather Continuity with the Falx.

17. This Union or Continuity of theſe two Septa keeps them both very tenſe, ſo that the middle Septum is capable of ſuſtaining a conſiderable Weight without ſinking downward; and the Falx is able to reſiſt lateral Preſſures without giving way either to the right Hand or to the left.

18. We may be convinced of this reciprocal Tenſion by firſt touching theſe two Septa in their natural State; and again, after they have been cut one after the other according to their Breadth, or rather after having cut in this Manner the Falx in one Subject and the tranſverſe Septum in another; for as ſoon as the Falx is cut, the other will be perceived immediately to loſe its Tenſion and Firmneſs; and the ſame thing will be obſerved in the Falx as ſoon as we cut the Septum Medium.

19. The ſmall Occipital Septum is both very ſhort and narrow. It runs down from the Middle of the tranſverſe Septum, to the Edge of the great Occipital Hole, being fixed to the internal Spine of the Os Occipitis. It is formed by a Fold and Duplicature of the internal Lamina of the Dura Mater, in the ſame Manner as the other two, and diſtinguiſhes the lower part of the Occipital Cavity of the Cranium into two lateral Parts. In ſome Subjects this Septum is double, anſwering to the double Spine of the Os Occipitis.

Sphenoidal Folds.

20. Besides theſe large Folds, there are two ſmall lateral ones, on each Side of the Sella Sphenoidalis, each running from the poſterior to the anterior Clynoide Apophyſis on the ſame Side. Theſe two Folds, together with

with the anterior and posterior Parts of the Sella Sphenoidalis, form a small Fossula in which the Pituitary Gland is lodged. There are likewise two anterior Folds, at the Edges of the Sphenoidal or superior Orbitary Fissures, which augment the Depth of the middle Fossulæ of the Basis Cranii. Thus we have seven Folds of the internal Lamina of this Membrane, three large and four small, which may be termed internal Productions or Processes of the Dura Mater.

Elongations.

21. The Elongations of the Dura Mater are Productions of both Laminæ, which go beyond the general Circumference and pass out of the Cranium, through the Openings described in the Treatise of the Skeleton; and in this they differ from the Folds which are formed intirely by one Lamina and do not go out of the Skull. They may be named the external Productions of the Dura Mater.

22. The most considerable of these Elongations passes through the great Occipital Foramen, and runs down the common Canal of the Vertebræ in Form of a Tube, lining the Inside of that Canal and including the Medulla Spinalis, by the Name of the Dura Mater of that Medulla. The other Elongations accompany the Nerves out of the Cranium in Form of Vaginæ, which are more numerous than the Nervous Trunks reckoned in Pairs. For the Olfactory Nerves, there is the same Number of distinct Vaginæ as there are Holes in the Lamina Ethmoidalis; and some Nerves are accompanied by several Vaginæ through one Hole, as those of the ninth Pair.

23. There are two particular Elongations which form the Periosteum of the Orbits, together with the Vaginæ of the Optic Nerves. These Orbitary Elongations go out by the Sphenoidal or superior Orbitary Fissures, and increasing in Breadth in their Passage, line the whole Cavity of the Orbits, at the Edges of which they communicate with the Pericranium and Periosteum of the Face. They communicate likewise through the Spheno-Maxillary or inferior Orbitary Fissures with the Pericranium of the Temporal and Zygomatic Fossæ; and by these Communications we may explain the Accidents which happens to these Parts, in Wounds of the Head.

24. The Elongations of the Dura Mater which accompany the Blood-Vessels through the Foramina of the Cranium, unite with the Pericranium immediately afterwards. Such, for Instance, are the Elongations which line the Fossulæ of the Foramina Lacera or Jugularia, and the bony or Carotid Canals of the Apophysis Petrosa, &c.

Arteries.

25. The Vessels of the Dura Mater are Arteries, Veins and Sinuses. The Arteries in general are distinguished into Anterior, Middle and Posterior, and come from the Carotides and Vertebrales on each Side. The external Carotid sends a Branch through the Spinal Hole of the Os Sphenoidale, which is the middle Artery of the Dura Mater, and is called by way of Eminence, Arteria Duræ Matris. It is divided into a great Number of Branches, which are plentifully dispersed through the Substance of the external Lamina as high as the Falx, where these Ramifications communicate with their Fellows from the other Side. The Impressions of this Artery are

ſeen on the Inſide of the Parietal Bones, the anterior and lower Angle of which, inſtead of a ſimple Impreſſion, contains a Canal for the Paſſage of a Trunk or Branch of this Artery, on which Account ſeveral Accidents happen in Fractures of the Skull, as I demonſtrated at the Royal Garden above eight Years ago.

26. The External Carotid ſends another ſmall Ramus through the Corner or ſmall End of the Sphenoidal or ſuperior Orbitary Fiſſure, where there is ſometimes a little Notch on Purpoſe, mentioned in the Deſcription of the Skeleton. This Branch is the anterior Artery of the Dura Mater, and it gives off Ramifications in the ſame Manner as the former with which it communicates, but its Ramifications are not ſo numerous. The internal Carotid, as it enters the Cranium, gives off a ſmall Branch to the Subſtance of the Dura Mater.

27. The two Vertebral Arteries enter by the great Occipital Foramen, and unite in one Trunk on the anterior or Sphenoidal Apophyſis of the Os Occipitis. Immediately afterwards, they enter the Subſtance of the Dura Mater on both Sides, each of them by one or two Branches. Theſe are the poſterior Arteries of the Dura Mater; and they communicate by ſome Ramifications with the middle or Spinal Artery abovementioned.

Veins and Sinuſes.

28. The Dura Mater contains in its Duplicature ſeveral particular Canals, into which the Venal Blood not only of that Membrane, but of the whole Brain, is carried. Theſe Canals are termed Sinuſes, and ſome of them are diſpoſed in Pairs, others in uneven Numbers, that is, ſome of them are placed alone, in a middle Situation; others are diſpoſed laterally on each Side of the Brain. The moſt ancient Anatomiſts reckoned only four; to which we can now add four Times as many.

29. These Sinuſes are in the Duplicature of the Dura Mater; and their Cavities are lined on the Inſide by particular very fine Membranes. They may be enumerated in this Manner.

The great Sinus of the Falx or ſuperior Longitudinal Sinus, which was reckoned the firſt by the Ancients.

Two great lateral Sinuſes, the ſecond and third of the Ancients.

The Sinus called Torcular Herophili, the fourth of the Ancients.

The ſmall Sinus of the Falx or inferior Longitudinal Sinus.

The poſterior Occipital Sinus, which is ſometimes double.

Two inferior Occipital Sinuſes, which form a Portion of a Circle, and may likewiſe be called the inferior Lateral Sinuſes.

Six Sinus Petroſi, three on each Side, one anterior, one middle or angular, and one inferior. The two inferior, together with the Occipital Sinuſes, compleat a circular Sinus round the great Foramen of the Os Occipitis.

The inferior Tranſverſe Sinus.

The ſuperior Tranſverſe Sinus.

Two Circular Sinuſes of the Sella Sphenoidalis; one ſuperior and one inferior.

Two Sinus Cavernoſi, one on each Side.
Two Orbitary Sinuſes, one on each Side.

30. All theſe Sinuſes communicate with each other, and with the great lateral Sinuſes, by which they diſcharge themſelves into the internal Jugular Veins, which are only Continuations of theſe lateral Sinuſes. They likewiſe unload themſelves partly into the Vertebral Veins, which communicate with the ſmall lateral or inferior Occipital Sinuſes; and partly into the external Jugular Veins, by the Orbitary Sinuſes which communicate with the Venæ Angulares, Frontales, Naſales, Maxillares, &c. as the lateral Sinuſes likewiſe communicate with the Venæ Occipitales, &c.

31. Thus the Blood which is carried to the Dura Mater, &c. by the external and internal Carotid, and by the Vertebral Arteries, is returned to the Heart by the external and internal Jugular and Vertebral Veins; ſo that when the Paſſage of the Blood is obſtructed in any particular Place, it finds another Way, by Virtue of theſe Communications, though not with the ſame Eaſe. This Obſervation is of Conſequence in Relation not only to Obſtructions, but to the different Situations of the Head.

32. The great Sinus of the Falx reaches from the Connection of the Ethmoidal Criſta with the Os Frontis, along the upper Edge of the Falx, all the Way to the poſterior Edge of the tranſverſe Septum, where it ends by a Biſurcation in the great lateral Sinuſes. It is very narrow at its anterior Extremity, and from thence becomes gradually wider all the Way to its poſterior Extremity.

33. The Cavity of this Sinus is not cylindrical but triangular, having in a Manner three Sides, one ſuperior parallel to the Cranium, and two lateral, inclined to the Plane of the Falx. The upper Side is formed by the external Lamina of the Dura Mater, and through the Middle of its Breadth a kind of fine Raphe or Suture runs from one End to the other.

34. The two lower or lateral Sides are Productions of the internal Lamina, which having parted from the external, are inclined toward each other, and then unite; forming firſt the Sinus, and afterwards the Duplicature of the Falx. This Sinus is lined interiorly by a fine proper Membrane, which forms likewiſe a Kind of Raphe or Suture along the Bottom of the Sinus, that is, along the Union of the two lateral Sides.

35. In this Sinus we obſerve ſeveral Openings and ſeveral Ligamentary Fræna. The Openings are Orifices of Veins, the ſmalleſt of which belong to the Dura Mater, the largeſt to the Brain. The Veins of the Brain enter the Sinus, for the moſt part, obliquely from behind forward, after they have run about a Finger's Breadth in the Duplicature of the Dura Mater.

36. It has been thought that the Arteries of the Dura Mater diſcharged themſelves immediately into the Sinuſes, becauſe Injections made by the Arteries, or a Hog's Briſtle thruſt into them, have been found to paſs into theſe Sinuſes. But on a more cloſe Examination, it has been diſcovered that the Injections paſſed from the Arteries into the Veins, and from thence into

into the Sinuſes, through the ſmall Orifices already mentioned; and that the Hog's Briſtle pierced the Sides of the Artery, which near the Sinuſes are very thin.

37. This Miſtake gave riſe to another, that the Dura Mater had no Veins; and what confirmed it was, that the Arteries of the Dura Mater cover the Veins ſo intirely, that the Edges of the Veins are hardly perceivable on either Side of the Arteries. There are however ſome Places where the Veins being broader than the Arteries, their two Edges are ſeen on each Side of the Arteries like Capillary Veſſels. Theſe Veins are for the moſt part Branches of the Sinuſes, and the ſmall Trunks of ſome of them open into the Head of the Vena Jugularis Interna. We may eaſily be ſatisfied that the Arteries on both Sides of the Dura Mater communicate with each other above the Falx, either by injecting or blowing into them.

38. The internal Frænæ of this great Sinus appear to be tendinous, and to be deſigned to prevent the too great Dilatation of the Sinus by the Blood. They vary, however, in different Subjects, and do not always reach from one Side to the other. It has been pretended that Glands have been found there; but we ought to take care not to miſtake for ſuch, certain ſmall Corpuſcles which are the Products of Diſeaſes.

39. The inferior Sinus of the Falx is ſituated in the lower Edge of its Duplicature, being very narrow, and, as it were, flatted on both Sides. It communicates immediately with the fourth Sinus of the Ancients; and in ſome Subjects, ſeems even to be a Continuation thereof. It likewiſe communicates with the great or ſuperior Sinus, by ſmall Veins which go from one to the other, and with the Veins of the Cerebrum by the ſame Means.

40. The lateral Sinuſes repreſent two large Branches of the ſuperior Longitudinal Sinus, one going to the right Hand the other to the left, along the great Circumference of the Tranſverſe Septum, all the Way to the Baſis of the Apophyſis Petroſa of the Oſſa Temporum. From thence they run down, having firſt taken a large Turn and then a ſmall one; and being ſtrongly fixed in the lateral Grooves of the Baſis Cranii, they follow the Courſe thereof all the Way to the Foramina Lacera and Foſſulæ of the Jugular Veins.

41. They do not always ariſe by an equal and ſymmetrical Bifurcation of the ſuperior Longitudinal Sinus; for in ſome Subjects, one of the lateral Sinuſes appears to be a Continuation of the Longitudinal, and the other, to be a Branch from it. This Variety may happen on either Side; and in a Word, we ſometimes find one of theſe Sinuſes higher or lower, larger or ſmaller than the other.

42. The Cavity of theſe lateral Sinuſes is likewiſe triangular, and furniſhed with a proper Membrane and with Frænæ; and it has alſo the ſmall Venal Openings, which are indeed common to it, not only with the Longitudinal Sinus, but with moſt Part of the others. The poſterior or outer Side

Side of this Cavity is formed by the external Lamina of the Dura Mater, and the other two by the internal Lamina.

43. As theſe two Sinuſes go out by the poſterior Portions of the Openings of the Baſis Cranii, called Foramina Lacera, they are dilated into a Kind of Bag proportioned to the Foſſulæ of the Venæ Jugulares, where they terminate in theſe Veins.

44. NEAR the Concourſe of the ſuperior longitudinal and lateral Sinuſes, we obſerve an Opening, (ſometimes double) which is the Orifice of a Sinus ſituated along the Union of the Falx and tranſverſe Septum. It does not always end directly at the lower Part of the ſuperior Sinus, but ſometimes opens at the Beginning of one of the lateral Sinuſes, eſpecially when the Bifurcation is not equal; and in this Caſe it often terminates in that lateral Sinus, which appears like a Branch from the common Trunk of the ſuperior and other lateral Sinus.

45. THIS Sinus has been named Torcular Herophili, from an ancient Author, who imagined that the Blood was in a Manner in a Preſs at the Union of theſe four Sinuſes. Its Diameter is but ſmall, and it forms a Kind of Bifurcation with the inferior longitudinal Sinus, and with a Vein of the Cerebrum, which is ſometimes double, called Vena Magna Galeni.

46. THE cavernous or lateral Sinuſes of the Os Sphenoides are Reſervatories of a very particular Kind, containing not only Blood, but conſiderable Veſſels and Nerves, (as we ſhall ſee hereafter) and likewiſe a ſpungy or cavernous Subſtance full of Blood, much like that of the Spleen or Corpus Cavernoſum of the Urethra.

Nerves and Glands.

47. WE obſerve ſome nervous Filaments which go to the Dura Mater, from the Trunk of the fifth Pair, at the Entry of the cavernous Sinus, and from the common Trunk of the eighth Pair and Nervus Acceſſorius or Spinalis, as they paſs through the Foramen Lacerum. The ſmall Tubercles ſometimes found on the lateral Sides of the longitudinal Sinus of the Falx, deſerve ſtill to be examined before we can determine any Thing about them. The whole Inſide of the Dura Mater is moiſtened in the ſame Manner as the Peritonæum and Pleura.

48. THE prominent Fibres interſecting each other in different Manners, which appear on the Inſide of the Dura Mater, eſpecially near the Falx and tranſverſe Septum, and which have been taken for a Kind of fleſhy Fibres, ſeem to be only ligamentary and elaſtic. The univerſal Adheſion of this Membrane to the Cranium proves that it can have no particular Motion, and conſequently that ſuch fleſhy or muſcular Fibres would be altogether uſeleſs. This Adheſion was plainly demonſtrated by *Veſalius*, *Riolan*, &c. long before *Roonhuyſen*.

§. 2. *Pia Mater.*

Situation in general.

49. THIS Membrane ſurrounds the whole Maſs of the Brain more particularly than the Dura Mater. It adheres very cloſely to the Brain, and is

is connected to the Dura Mater only by the Veins which open into the Sinuſes, as has been already ſaid.

Structure. 50. The Pia Mater is made up of two very fine Laminæ, the outermoſt of which covers pretty uniformly all the convex Surface of the Brain, and lines in the ſame Manner all the concave or inner Surface of the Dura Mater. The internal Lamina forms a great Number of Plicæ, Duplicatures and Septa, which inſinuate themſelves into all the Folds and Circumvolutions, and between the different Strata of the Cerebrum and Cerebellum.

51. The two Laminæ of the Pia Mater are not ſo cloſely united as thoſe of the Dura Mater, being connected only by a Cellulous Subſtance, which accompanies them through their whole Extent, except at ſome Places of the Baſis of the Cerebrum, *&c.* where the internal Lamina continuing its Inſertions, the external remains uniformly ſtretched over the prominent Parts, the Interſtices of which are entirely ſeparated from the other Lamina without any Cellular Subſtance between them. Theſe ſeparate Portions of the external Lamina have made it be looked upon as a third Membrane of the Brain diſtinct from the Pia Mater; and it has been named Membrana Arachnoides, from its Reſemblance to a Cobweb in Delicacy of Texture.

52. In each of theſe Laminæ of the Pia Mater, we diſcover another Kind of fine Duplicature which contains Veſſels, as I have demonſtrated in my private Courſes; but theſe ſmall Veſſels are hardly perceivable without the Help of an Injection, or of a great Inflammation. The Cellular Subſtance does not only accompany the two Laminæ through their whole common Extent, in the Manner already ſaid, but alſo the internal Lamina in particular through all its Duplicatures and Septa. This we diſcover by blowing through a ſmall Pipe cautiouſly introduced between the two Laminæ, ſo as not to offend any of the Parts near it, in the Manner which I demonſtrated publicly in the Year 1726, in the Diſſections which I performed myſelf at the Phyſic Schools, after the Example of the great *Riolan*.

§. 3. *Cerebrum.*

Situation and Figure. 53. The Cerebrum, properly ſo called, is a Kind of Medullary Maſs of a moderate Conſiſtence, and of a greyiſh Colour on the outer Surface, filling all the ſuperior Portion of the Cavity of the Cranium, or that Portion which lies above the tranſverſe Septum. The upper Part of the Cerebrum is of an oval Figure like Half an Egg cut lengthwiſe, or rather like two Quarters of an Egg cut lengthwiſe, and parted a little from each other. It is flatter on the lower Part, each lateral Half of which is divided into three Eminences called Lobes, one anterior, one middle, and one poſterior.

Subſtance. 54. The Subſtance of the Cerebrum is of two Kinds, diſtinguiſhed by two different Colours, one Part of it, which is ſofteſt, being of a greyiſh or Aſh-Colour, the other, which is more ſolid, being very white. The

Aſh-coloured Subſtance lies chiefly on the outer Part of the Cerebrum like a Kind of Cortex, from whence it has been named Subſtantia Corticalis or Cinerea. The white Subſtance occupies the inner Part, and is named Subſtantia Medullaris, or ſimply Subſtantia Alba.

Diviſion and Lobes.

55. THE Cerebrum is divided into two lateral Portions, ſeparated by the Falx or great longitudinal Septum of the Dura Mater. They are generally termed Hemiſpheres, but they are more like Quarters of an oblong Spheroid. Each of theſe Portions is divided into two Extremities, one anterior and one poſterior, which are termed the Lobes of the Cerebrum, between which there is a large inferior Protuberance, which goes by the ſame Name; ſo that in each Hemiſphere there are three Lobes, one anterior, one middle, and one poſterior.

56. THE anterior Lobes lie upon theſe Parts of the Os Frontis, which contribute to the Formation of the Orbits and of the Frontal Sinuſes, commonly called the anterior Foſſæ of the Baſis Cranii. The poſterior Lobes lie on the tranſverſe Septum, and the middle Lobes in the middle or lateral Foſſæ of the Baſis Cranii.

Sides and Inequalities.

57. EACH lateral Portion of the Cerebrum has three Sides, one ſuperior, which is convex, one inferior, which is uneven, and one lateral, which is flat, and turned to the Falx. Through the whole Surface of theſe three Sides we ſee Inequalities or Windings, like the Circumvolutions of Inteſtines, formed by waving Streaks or Furrows very deep and narrow, into which the Septa or Duplicatures of the Pia Mater inſinuate themſelves, and thereby ſeparate theſe Circumvolutions from each other.

58. NEAR the Surface of the Cerebrum theſe Circumvolutions are at ſome Diſtance from each other, repreſenting ſerpentine Ridges; and in the Interſtices between them the ſuperficial Veins of the Cerebrum are lodged between the two Laminæ of the Pia Mater, from whence they paſs into the Duplicature of the Dura Mater, and ſo open into the Sinuſes.

59. THESE Circumvolutions are fixed through their whole Depth to the Septa or Duplicatures of the Pia Mater, by an infinite Number of very fine Vaſcular Filaments, as may be ſeen by pulling the Circumvolutions a little aſunder with the Fingers.

60. WHEN they are cut tranſverſely we obſerve that the Subſtantia Alba lies in the Middle of each Circumvolution, ſo that there is the ſame Number of internal medullary Circumvolutions as of external cortical ones, the firſt repreſenting white Laminæ inveſted by others of an Aſh-colour, but the cortical Subſtance is in many Places thicker than the medullary.

Figure.

61. THE anterior and middle Lobes of the Cerebrum on each Side are parted by a deep, narrow Sulcus, which aſcends obliquely backward from the Temporal Ala of the Os Sphenoides, to near the Middle of the Os Parietale; and the two Sides of this Diviſion have each their particular Ridges and Circumvolutions, which give a very great Extent to the cortical Subſtance. This Sulcus is termed Fiſſura Magna Silvii, or ſimply Fiſſura Cerebri.

Corpus Calloſum.

62. HAVING cut off the Falx from the Criſta Galli, and turned it backward, if we ſeparate gently the two lateral Parts or Hemiſpheres of the Cerebrum, we ſee a longitudinal Portion of a white convex Body, which is named Corpus Calloſum. It is a middle Portion of the Medullary Subſtance, which under the inferior Sinus of the Falx, and alſo a little toward each Side, is parted from the Maſs of the Cerebrum, to which it is ſimply contiguous from one End of that Sinus to the other, ſo that at this Place the Edge of the Inſide of each Hemiſphere only lies on the Corpus Calloſum, much in the ſame Manner as the anterior and poſterior Lobes lie on the Dura Mater. Both Extremities of this Medullary Body terminate by a ſmall Edge bent tranſverſely downward.

63. THE Surface of the Corpus Calloſum is covered by the Pia Mater, which runs in between the lateral Portions of this Body, and the lower Edge of each Hemiſphere. Along the Middle of its Surface from one End to the other, there is a Kind of Raphe formed by a particular Intertexture of Fibres which croſs each other; for though theſe Fibres appear to be tranſverſe, yet they are really a little oblique, and thoſe that come from the right Side interſect thoſe that come from the left. This Raphe is made more perceivable by two ſmall Medullary Cords which accompany it on each Side, and adhere cloſely to the tranſverſe Fibres.

Medullary Arch and Centrum Ovale.

64. THE Corpus Calloſum becomes afterwards continuous on each Side with the Medullary Subſtance, which through all the remaining Parts of its Extent is entirely united with the Cortical Subſtance, and together with the Corpus Calloſum forms a Medullary Arch or Vault of an oblong or oval Figure. To perceive this, the whole Cortical Subſtance, together with the Medullary Laminæ mixed with it, muſt be cautiouſly and dexterouſly cut off in the ſame Direction with the Convexity of the Cerebrum. After which we will obſerve a Medullary Convexity much ſmaller than that which is common to the whole Cerebrum, but of the ſame Form; ſo that it appears like a Medullary Nucleus of the Cerebrum, eſpecially when we conſider it together with the Medullary Subſtance of the inferior Part or Baſis of the Cerebrum. And from thence M. *Vieuſſens* took Occaſion to name this Nucleus the Centrum Ovale.

Ventriculi Laterales.

65. UNDER this Arch are two lateral Cavities much longer than they are broad, and very ſhallow, ſeparated by a tranſparent Medullary Septum, of which hereafter. Theſe Cavities are generally named the anterior ſuperior Ventricles of the Cerebrum, to diſtinguiſh them from two other ſmaller Cavities which are ſituated more backward, as we ſhall ſee preſently; but the Name of lateral or great Ventricles given them by *Steno* is more proper than either of the other two.

66. THE lateral Ventricles are broad, and rounded at theſe Extremities which lie next the tranſparent Septum. They go from before backward, contracting in Breadth, and ſeparating from each other gradually in their Progreſs. Afterwards they bend downward, and return obliquely from behind forward in a Courſe like the Turning of a Ram's Horn, and termi-

nate

nate almoſt under their ſuperior Extremities, only a little more backward and outward.

67. At the Place where they begin to bend in order to run downward and then backward, there is on each Side a particular Elongation which runs from before backward, and terminates in a triangular pointed Cavity turned a little inward, the two Points reſembling Horns. Theſe Ventricles are every where lined with a thin Membrane.

68. The tranſparent Partition or Septum Lucidum, as it is commonly called, lies directly under the Raphe or Suture of the Corpus Calloſum, of which it is a Continuation, and a Kind of Duplicature. It is made up of two Medullary Laminæ, more or leſs ſeparated from each other by a narrow Medullary Cavity, ſometimes filled with a ſerous Subſtance. This Cavity, in ſome Subjects, reaches a great Way backward; and I am apt to think, communicates with the third Ventricle, of which hereafter. *Septum Lucidum.*

69. The Septum Lucidum is united by its lower Part to the anterior Portion of that particular Medullary Body, called improperly the Fornix with three Pillars, becauſe of ſome Reſemblance it is thought to bear to the Arches of ancient Vaults. It is in Reality nothing but the Corpus Calloſum, the lower Side of which is like a hollow Cieling with three Angles, one anterior and two poſterior; and three Edges, two lateral and one poſterior. The lateral Edges are terminated each by a large ſemicylindrical Border, like two Arches, which uniting at the anterior Angle, form by their Union what is called the anterior Pillar of the Fornix; and as they run backward ſeparately toward the two poſterior Angles, they have then the Name of the poſterior Pillars. *Fornix.*

70. The anterior Pillar being double is larger than either of the poſterior; and the Marks of this Duplicity always remain. Immediately below the Baſis of this Pillar, we obſerve a large, white, ſhort, Medullary Rope ſtretched tranſverſely between the two Hemiſpheres, and commonly called the anterior Commiſſure of the Cerebrum. It is to this Pillar that the Septum Lucidum adheres; but it has no total Adheſion below, and therefore the two lateral Ventricles communicate with each other. The poſterior Pillars are bent downward, and continued through the lower Portions of the Ventricles all the Way to their Extremities, reſembling a Ram's Horn, which is a Name that has been given to them. They diminiſh gradually in Thickneſs during this Courſe, and at their Outſides they have each a ſmall, thin, flat collateral Border, to which the Name of Corpora Fimbriata is owing.

71. The inferior Surface of the triangular Cieling which lies between theſe Arches, is full of tranſverſe, prominent, medullary Lines; for which Reaſon the Ancients called it Pſalloides and Lyra, comparing it to a ſtringed Inſtrument, ſomething like what is now called a Dulcimer.

72. The Fornix being cut off and inverted, or quite removed, we ſee firſt of all a vaſcular Web, called Plexus Choroides, and ſeveral Eminences more or leſs covered by the Expanſion of that Plexus. There are four Pairs of Eminences which follow each other very regularly, two large and *Eminences.*

two ſmall. The firſt two great Eminences are named Corpora Striata; and the ſecond, Thalami Nervorum Opticorum. The four ſmall Eminences are cloſely united together; the anterior being called Nates, and the poſterior, Teſtes; but it would be better to call them ſimply, anterior and poſterior Tubercles. Immediately before theſe Tubercles there is a ſingle Eminence called Glandula Pinealis.

Corpora Striata.

73. The Corpora Striata got that Name, becauſe in ſcraping them with the Knife we meet with a great Number of white and aſh-coloured Lines alternately diſpoſed, which are only the tranſverſe Section of the Medullary and Cortical Laminæ, mixed together in a vertical Poſition in the Baſis of the Cerebrum, as appears evidently by Inciſions made from above downward. Theſe two Eminences are of a greyiſh Colour on the Surface, oblong, roundiſh, pyrifom, and larger on the fore than on the Backpart, where they are narrow and bent.

74. They lie in the Bottom of the ſuperior Cavity of the lateral Ventricles, which they reſemble in ſome Meaſure in Shape, their anterior Parts being near the Septum Lucidum, from which they ſeparate gradually as they run backward and diminiſh in Size. They are in Reality the convex Bottoms of the Ventricles, and it is at the lower Part of the Interſtice between the largeſt Portions of them, that we obſerve the great tranſverſe Cord named the anterior Commiſſure of the Cerebrum, which I mentioned already in deſcribing the anterior Pillar of the Fornix Calloſus. This Cord communicates more particularly with the Bottom of the Corpora Striata, by a Turn toward each Side.

Thalami Nervorum Opticorum.

75. The Thalami Nervorum Opticorum are ſo named, becauſe theſe Nerves ariſe chiefly from them. They are two large Eminences placed by the Side of each other, between the poſterior Portions or Extremities of the Corpora Striata. Their Figure is ſemi-ſpheroidal and a little oval; and they are of a whitiſh Colour on the Surface; but their inner Subſtance is partly greyiſh and partly white, ſo that in cutting them, we ſee Streaks of different Colours like thoſe of the Corpora Striata.

76. These two Eminences are cloſely joined together, and at their convex Part, they are ſo far united as really to become one Body, the whitiſh outer Subſtance being continued uniformly over them both. This Subſtance is very thin, and falls to Pieces only by the Weight of the lateral Parts of the Brain when taken out of the Cranium. Therefore to learn the Structure of theſe Eminences, they muſt be examined *in Situ*, and even there they muſt be handled very gently.

77. Immediately within this whitiſh common Subſtance, theſe two Eminences are cloſely contiguous till about the Middle of their Thickneſs; and from thence they ſeparate inſenſibly toward the Bottom, where by the Space left between them a particular Canal is formed, named the third Ventricle, one Extremity of which opens forward, the other backward, as we ſhall ſee hereafter. Some Anatomiſts have miſtaken the ſuperficial Connexion of theſe Eminences for the Pons Varolii.

78. At

78. At the Bottom, these two Eminences are elongated downward toward both Sides, into two thick, round, whitish Cords, which separate from each other like Horns, by a large Curvature, and afterwards by a small Curvature turned forward in an opposite Direction to the former, and representing the Tip of an Horn, they approach each other again. The Size of these Ropes diminishes gradually from their Origin to their anterior Reunion. I shall have Occasion to mention them in another Place in speaking of the Optic Nerves.

Tubercula.

79. The Tubercles are four in Number, two anterior and two posterior; adhering together as if they made but one Body situated behind the Union of the Thalami Nervorum Opticorum. They are transversely oblong; the anterior being a little more rounded, and broader or larger from before backward, than the posterior. Their Surface is white and their inner Substance greyish. The Names of Nates and Testes given to these Tubercles, are very impertinent, there being no Resemblance between them and the Things from whence these Names are taken. I should like to call them Tubercula Quadrigemina; that Term being used by Anatomists on another like Occasion, to express four small Muscles lying near each other, and inserted round the great Trochanter of the Os Femoris.

Canalis Medius.

80. Directly under the Place where the Tubercles of one Side are united to those of the other Side, lies a small middle Canal, which communicates by its anterior Opening with the third Ventricle, under the Thalami Nervorum Opticorum, and by its posterior Opening, with the fourth Ventricle, which belongs to the Cerebellum, as we shall afterwards see.

Foramen Commune Posterius.

81. Where the convex Parts of the two anterior Tubercles join these posterior convex Parts of the Thalami Nervorum Opticorum, an Interstice or Opening is left between these four Convexities, which communicates with the third Ventricle, and with the small middle Canal. Instead of the ridiculous Name of Anus, which has been given to this Opening, it may be called Foramen Commune Posterius, to distinguish it from another which shall be mentioned hereafter, by the Name of Foramen Commune Anterius.

Glandula Pinealis.

82. The Glandula Pinealis is a small soft greyish Body, about the Size of an ordinary Pea, irregularly round, and sometimes of the Figure of a Pine Apple, situated behind the Thalami Nervorum Opticorum, above the Tubercula Quadrigemina. It is fixed like a small Button to the lower Part of the Thalami by two very white Medullary Pedunculi, which at the Gland are very near each other, but separate almost transversely toward the Thalami.

83. It seems to be mostly of a cortical Substance, except near the Footstalks where it is something medullary. The Footstalks are sometimes double, as if they belonged to the two anterior Tubercles. This Body adheres very close to the Plexus Choroides, by which it is covered, as we shall see hereafter; and it therefore requires some Dexterity to separate it from the Glandula, without altering its Situation or breaking the Pedunculi. This Gland has been often found to contain Gravel. Below the

the Glandula Pinealis there is a medullary tranſverſe Cord, called the poſterior Commiſſure of the Hemiſpheres of the Cerebrum.

Infundibulum. 84. BETWEEN the Baſis of the anterior Pillar of the Fornix, and the anterior Part of the Union of the Optic Thalami, lies a Cavity or Foſſula named Infundibulum. It runs down towards the Baſis of the Cerebrum, contracting gradually, and terminates in a ſtraight Courſe, by a ſmall membranous Canal, in a ſoftiſh Body ſituated in the Cella Sphenoidalis, named Glandula Pituitaria. The Infundibulum opens above, immediately before the Optic Thalami, by an oval Hole named Foramen Commune Anterius, and conſequently communicates with the lateral Ventricles.

The third Ventricle. 85. AT the lower Part of the Thalami Nervorum Opticorum, directly under their Union, lies a particular natural Canal, called the third Ventricle of the Cerebrum. I call it a natural Canal, that we may not miſtake for it, an accidental Fiſſure which lies between the Thalami in Cerebro taken out of the Cranium, as I have already ſaid.

86. THIS Canal opens forward into the Infundibulum under the Foramen Commune Anterius, by which it likewiſe communicates with the lateral Ventricles. It opens backward under the Foramen Commune Poſterius between the Thalami and Tubercula Quadrigemina, oppoſite to the ſmall middle Canal which goes to the Cerebellum.

Plexus Choroides. 87. THE Plexus Choroides is a very fine vaſcular Texture, conſiſting of a great Number of arterial and venal Ramifications, partly collected in two looſe Faſciculi, which lie one in each lateral Ventricle, and partly expanded over the neighbouring Parts, and covering in a particular Manner the Thalami Nervorum Opticorum, Glandula Pinealis, Tubercula Quadrigemina, and the other adjacent Parts both of the Cerebrum and Cerebellum, to all which it adheres.

88. IN each lateral Portion of this Plexus we obſerve a venal Trunk, the Ramifications of which are ſpread through the whole Extent of the two Portions. Near the Glandula Pinealis, theſe two Trunks approach each other, and uniting behind that Gland, they open into the Torcular or fourth Sinus of the Dura Mater. When we blow into one of theſe Trunks toward the Plexus, the Air paſſes into all its Ramifications; and in ſome Subjects, theſe two Veins form one Trunk which opens into the Sinus.

89. THE ventricular or looſe Portions of the Plexus often appear to contain a great Number of Tubercles like Glands, which in the natural State are extremely ſmall, but grow bigger in Diſeaſes. To be able to examine them as we ought, the looſe Portions muſt be made to ſwim in clear Water, and be there carefully expanded. Then by the Help of a Microſcope we will ſee theſe Tubercles in the natural State, like ſmall Folliculi or little Bags more or leſs flatted.

90. BESIDES this vaſcular Web or Plexus of the Septum Lucidum, the Sides of the Fornix, of the Eminences, Ventricles, Canals and Infundibulum, are all covered by a very fine Membrane, in which, by Injections or Inflammations, we diſcover a great Number of very fine Veſſels. This Membrane is in a Manner a Continuation of the Plexus, and that ſeems to

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be a Detachment from the Pia Mater. By the ſame Means we likewiſe diſcover an extremely thin Membrane on the Inſides of the Duplicature of the Septum, though in ſome Subjects theſe Sides touch each other.

91. The Pituitary Gland is a ſmall ſpungy Body lodged in the Sella Sphenoidalis between the Sphenoidal Folds of the Dura Mater. It is of a ſingular Kind of Subſtance, which ſeems to be neither Medullary nor Glandular. On the Outſide it is partly greyiſh, and partly reddiſh, and white within. It is tranſverſely oval or oblong, and on the lower Part in ſome Subjects it is divided by a ſmall Notch into two Lobes, like a Kidney Bean. It is covered by the Pia Mater as by a Bag, the Opening of which is the Extremity of the Infundibulum, and it is ſurrounded by the ſmall Circular Sinuſes which communicate with the Sinus Cavernoſi. *Glandula Pituitaria.*

§. 4. *Cerebellum.*

92. The Cerebellum is contained under the tranſverſe Septum of the Dura Mater. It is broader laterally than on the Fore or Backſides, flatted on the upper Side, and gently inclined both Ways, anſwerable to the Septum which ſerves it as a Kind of Tent or Cieling. On the lower Side it is rounder, and on the Backſide it is divided into two Lobes, ſeparated by the Occipital Septum of the Dura Mater. *Situation and Figure.*

93. It is made up like the Cerebrum, of two Subſtances, but it has no Circumvolutions on its Surface. Its Sulci are pretty deep, and diſpoſed in ſuch a Manner as to form thin flat Strata, more or leſs horizontal, between which the internal Lamina of the Pia Mater inſinuates itſelf by a Number of Septa equal to that of the Strata. *Structure.*

94. Under the tranſverſe Septum, it is covered by a Vaſcular Texture, which communicates with the Plexus Choroides. It has two middle Eminences called Appendices Vermiformes, one anterior and ſuperior which is turned forward, the other poſterior and inferior which goes backward. There are likewiſe two lateral Appendices, both turned outward. They are termed Vermiformes from their Reſemblance to a large Portion of an Earthworm.

95. Besides the Diviſion of the Cerebellum into lateral Portions or into two Lobes, each of theſe Lobes ſeems to be likewiſe ſubdivided into three Protuberances, one anterior, one middle or lateral, and one poſterior; but they are not in all Subjects equally diſtinguiſhed either by their Convexity or Limits; but they may always be diſtinguiſhed by the Direction of their Strata, thoſe of the middle and anterior Protuberance being leſs tranſverſe than in the poſterior.

96. When we ſeparate the two lateral Portions or Lobes, having firſt made a pretty deep Inciſion, we diſcover firſt of all the poſterior Portion of the Medulla Oblongata, of which hereafter; and in the poſterior Surface of this Portion, from the Tubercula Quadrigemina, all the Way to the poſterior Notch in the Body of the Cerebellum, and a little below that *Fourth Ventricle.*

that Notch, we obſerve an oblong Cavity which terminates backward like the Point of a writing Pen. This Cavity is what is called the fourth Ventricle.

97. At the Beginning of this Cavity, immediately behind the ſmall common Canal which lies under the Tubercles, we meet with a thin medullary Lamina, which is looked upon as a Valve between that Canal and the fourth Ventricle. A little behind this Lamina, the Cavity grows wider towards both Hands, and then contracts again to its firſt Size. It is lined interiorly by a thin Membrane, and ſeems oftentimes to be diſtinguiſhed into two lateral Parts, by a Kind of ſmall Groove, from the Valvular Lamina to the Point of the Calamus Scriptorius.

98. This Membrane is a Continuation of that which lines the ſmall Canal, the third Ventricle, Infundibulum, and the two great Ventricles. To be able to ſee the fourth Ventricle in its natural State, in which it is narroweſt, it muſt be laid open while the Cerebellum remains in the Cranium, and in order to that, the Os Occipitis muſt be ſawed very low down.

99. On each Side of this Ventricle the Medullary Subſtance forms a Trunk which expands itſelf in Form of Laminæ through the Cortical Strata. We diſcover theſe Medullary Laminæ according to their Breadth, by cutting the Cerebellum in Slices almoſt parallel to the Baſis of the Cerebrum; but if we cut one Lobe of the Cerebellum vertically from above downward, the Medullary Subſtance will appear to be diſperſed in Ramifications through the Cortical Subſtance. Theſe Ramifications have been named Arbor Vitæ, and the two Trunks from whence theſe different Laminæ ariſe, are called Pedunculi Cerebelli.

100. We cannot go on with the Deſcription of the other middle Parts of the Baſis of the Cerebellum, before that of the middle Parts of the Baſis of the Cerebrum, becauſe theſe two Kinds of Parts are united, and jointly form the Medulla Oblongata. I ſhall only add here that the Strata of both Subſtances of the Cerebellum are not always of the ſame Extent in the ſame Portions or Protuberances of each Lobe. This appears merely by viewing the convex or outer Surface of the Cerebellum; for there we ſee at different Diſtances, ſome Cortical Strata ſhorter than others, and likewiſe that the Extremities of the ſhort Strata diminiſh gradually in Thickneſs till they are quite loſt between two long ones.

101. If we make a ſmall Hole in the external Lamina of the Pia Mater over one of the Lobes of the Cerebellum, without touching the inner Lamina, and then blow into the Cellular Subſtance by which theſe two Laminæ are connected, through a ſmall Pipe introduced into the Hole; the Air will gradually ſwell that Subſtance, and ſeparate the Strata more or leſs equally from each other, through their whole Extent, and we will ſee at the ſame Time the Diſpoſition of all the Membranous Septa or Duplicatures of the internal Lamina of the Pia Mater, with the numerous Diſtribution of the fine Blood-Veſſels which run upon it, eſpecially after a lucky Injection, or in an inflammatory State of theſe Membranes.

§. 5.

§. 5. *Medulla Oblongata.*

102. The Medulla Oblongata is a Medullary Subſtance ſituated from before backward in the middle Part of the Baſes of the Cerebrum and Cerebellum without any Diſcontinuation, between the lateral Parts of both theſe Baſes; and therefore it may be looked upon as one middle Medullary Baſis common to both Cerebrum and Cerebellum, by the reciprocal Continuity of their Medullary Subſtances, through the great Notch in the tranſverſe Septum of the Dura Mater; which common Baſis lies immediately on that Portion of the Dura Mater which lines the Baſis of the Cranium. The Medulla Oblongata is therefore juſtly eſteemed to be a third general Part of the whole Maſs of the Brain, or as the common Production or united Elongation of the whole Medullary Subſtance of the Cerebrum and Cerebellum.

103. It is extremely difficult, if not altogether impoſſible, to examine or demonſtrate it as we ought, in its natural Situation; but we are obliged to do both on a Brain inverted; and in this Inſtance, the Direction I gave in the Deſcription of the Skeleton, No. 186, 187. concerning the Method of examining and demonſtrating the Baſis Cranii, cannot have Place. However to prevent falſe Ideas either in viewing ourſelves, or in ſhewing to others, the Medulla Oblongata thus inverted, it is very neceſſary often to call to Mind that all that appears ſuperior in that Situation, is inferior in the natural State.

104. The lower Side of the Medulla Oblongata in an inverted Situation, preſents to our View ſeveral Parts which are in general either Medullary Productions, Trunks of Nerves, or Trunks of Blood-Veſſels.

105. The chief Medullary Productions are theſe: The large or anterior Branches of the Medulla Oblongata; which have likewiſe been named Crura Anteriora, Femora and Brachia Medullæ Oblongatæ, and Pedunculi Cerebri: The tranſverſe Protuberance called likewiſe Proceſſus Annularis or Pons Varolii: The ſmall or poſterior Branches called Pedunculi Cerebelli or Crura Poſteriora Medullæ Oblongatæ: The Extremity or Cauda of the Medulla Oblongata, with two Pairs of Tubercles, one of which is named Corpora Olivaria, the other Corpora Pyramidalia; and to all theſe Productions we muſt add a Production of the Infundibulum and two Medullary Papillæ.

106. The great Branches of the Medulla Oblongata are two very conſiderable Medullary Faſciculi, the anterior Extremities of which are ſeparated, and the poſterior united, ſo that taken both together, they repreſent a *Roman* V. Theſe Faſciculi are flat, much broader before than behind; their Surfaces being compoſed of ſeveral longitudinal and diſtinctly prominent Medullary Fibres. Their anterior Extremities ſeem to be loſt at the lower Part of the Corpora Striata; and it is for that Reaſon that they are looked upon as the Pedunculi of the Cerebrum.

107. The tranſverſe, annular, or rather ſemi-annular Protuberance is a Medullary Production, which ſeems at firſt Sight to ſurround the poſterior Extremities of the great Branches; but the Medullary Subſtance of this Protuberance is in Reality intimately mixed with that of the two former. *Varolius*, an ancient *Italian* Author, viewing thoſe Parts in an inverted Stuation, compared the two Branches to two Rivers, and the Protuberance to a Bridge over them both, and from thence it has the Name of Pons Varolii. Its Surface is tranſverſely ſtreaked, and it is divided into two lateral Parts, by a very narrow, longitudinal Depreſſion, which does not penetrate into its Subſtance.

108. The ſmall Branches of the Medulla Oblongata are lateral Productions of the tranſverſe Protuberance, which by their Roots ſeem to encompaſs that Medullary Portion in which the fourth Ventricle or Calamus Scriptorius is formed. They form in the Lobes of the Cerebellum on each Side, theſe Medullary Expanſions, a vertical Section of which ſhews the white Ramifications, commonly called Arbor Vitæ, and they may be juſtly enough ſtiled Pedunculi Cerebelli.

109. The Extremity is no more than the Medulla Oblongata contracted in its Paſſage backward to the anterior Edge of the great Foramen of the Os Occipitis, where it terminates in the Medulla Spinalis; and in this Part of it ſeveral Things are to be taken Notice of. We ſee firſt of all, four Eminences, two named Corpora Olivaria, and the other two Corpora Pyramidalia. Immediately afterwards, it is divided into two lateral Portions by two narrow Grooves, one on the upper Side, the other on the lower. They both run into the Subſtance of the Medulla, as between two Cylinders, flatted on that Side, by which they are joined together.

110. When we ſeparate theſe Ridges with the Fingers, we obſerve a crucial Intertexture of ſeveral ſmall Medullary Cords which go obliquely from the Subſtance of one lateral Portion into the Subſtance of the other. *M. Petit*, Member of the Royal Academy of Sciences and Doctor of Phyſick, is the Author of this Diſcovery, by which we are enabled to explain ſeveral Phænomena both in Phyſiology and Pathology, of which in another Place.

111. The Corpora Olivaria and Pyramidalia are whitiſh Eminences ſituated longitudinally near each other on the lower Side of the Extremity or Cauda, immediately behind the tranſverſe or annular Protuberances. The Corpora Olivaria are in the Middle, ſo that the Interſtice between them, which is only a Kind of ſuperficial Groove, anſwers to the inferior Groove of the following Portion.

112. The Corpora Pyramidalia are two lateral Eminences depending on the Olivaria. *Willis* gave the Name of Pyramidalia to what I have called Olivaria, after the late *M. Duverney* in his Treatiſe of the Organ of Hearing. Theſe four Eminences are ſituated on the lower Half of the Medulla; which Obſervation I here repeat to make it be remembered that in all the Figures and Demonſtrations, theſe Parts are repreſented as ſupe-

rior, which in their natural Situation are inferior. Thus these Eminences are under the fourth Ventricle, and under the Pedunculi Cerebelli.

113. The Tubercula Mamillaria, which are situated very near the Production of the Infundibulum, have been taken for Glands, probably because of their greyish inner Substance, which however does not seem to be any ways different from that of several other Eminences of the Medulla Oblongata. And for that Reason I choose rather to call them from their Figure Tubercula Mamillaria, than Papillæ Medullares.

114. These Tubercles seem to have some immediate Relation to the Roots or Bases of the anterior Pillar of the Fornix; so that they might be named, as M. *Santorini* has done, the Bulbs of these Roots, though they appear to be likewise partly a Continuation of other Portions of the Cortical and Medullary Substance of a particular Texture.

115. The Beak or Tube of the Infundibulum is a very thin Production from the Sides of that Cavity; and it is strengthened by a particular Coat given to it by the Pia Mater. It is bent a little from behind forward, toward the Glandula Pinealis, and afterwards expands again round this Gland.

116. The Membrana Arachnoides, or external Lamina of the Pia Mater, appears to be very distinctly separated from the internal Lamina in the Interstices between all these Eminences on the lower Side of the Medulla Oblongata, without any visible Cellular Substance between them. The internal Lamina adheres much more to the Surface of these Interstices than to that of the Eminences. The external Lamina is as it were buoy'd up by the Eminences, and equally stretched between their most prominent Parts, to which it sticks very close; and in this Respect the Roots or great Cornua of the Optic Nerves may be joined to these Eminences.

117. We must observe in general concerning the Eminences of the Medulla Oblongata, that those which are medullary on their Outsides or Surfaces, are interiorly either entirely cortical, or partly cortical and partly medullary, or formed by a singular Mixture of these two Substances, which still remains to be unfolded, as well as many other Particularities observable in examining the internal Structure of the Brain.

118. From this common Portion of the Cerebrum and Cerebellum, arise almost all the Nerves which go out of the Cranium through the different Foramina by which its Basis is perforated. It likewise produces the Medulla Spinalis, which is no more than a common Elongation of the Cerebrum and Cerebellum, and of their different Substances; and therefore the Medulla Oblongata may justly be said to be the first Origin or primitive Source of all the Nerves which go out through the Spina Dorsi, and consequently of all the Nerves of the Human Body.

§. 6. *Medulla Spinalis.*

119. The Medulla Spinalis is only an Elongation of the Extremity of the Medulla Oblongata, and it has its Name from its being contained in the bony Canal of the Spina Dorſi. It is conſequently a Continuation or common Appendix of the Cerebrum and Cerebellum, as well becauſe of the two Subſtances of which it is compoſed, as becauſe of the Membranes by which it is inveſted.

120. In the Deſcription of the Freſh Bones, N° 316, 317, 318, 319, I mentioned a Ligamentary Tube, which lines the inner Surface of this bony Canal from the great Occipital Foramen to the Os Sacrum, repreſenting a very long flexible Funnel. I likewiſe mentioned the yellowiſh and very elaſtic Ligaments that lie in the great poſterior Notches of all the Vertebræ, and adhere very cloſely to the Ligamentary Tube.

121. The Dura Mater, after it has lined the whole internal Surface of the Cranium, goes out by the great Occipital Foramen, and forms a Kind of Funnel in its Progreſs downward through the bony Canal of the Vertebræ. As it goes out at the Occipital Hole it joins the Beginning of the Ligamentary Funnel already mentioned, and adheres very ſtrongly to it. That Portion of the Pericranium which terminates exteriorly at the Edge of the great Foramen, joins the Funnel likewiſe, which by all theſe Acceſſions becomes very ſtrong and capable of reſiſting the greateſt Violences.

122. This Adheſion of the Dura Mater to the Ligamentary Funnel is gradually diſcontinued below the firſt Vertebra, and from thence the Dura Mater forms a ſeparate Tube, which runs down in the bony Canal all the Way to the Os Sacrum, the Capacity of it anſwering to that of the Canal; but it does not adhere cloſely to the Sides as it does to that of the Cranium. It is ſurrounded by a ſlimy Subſtance, which near the lower End of the Canal reſembles Fat.

123. The Spinal Marrow is made up of a Cortical and Medullary Subſtance, as the Cerebrum and Cerebellum, but with this Difference, that the Aſh-coloured Subſtance lies within the other; and in a tranſverſe Section of this Medulla the inner Subſtance appears to be of the Figure of an Horſeſhoe, or of the Os Hyoides, the convex Side being turned forward, and the Extremities or Cauda backward.

124. The Body of the Medulla Spinalis runs down all the Way to the firſt Vertebra of the Loins, where it terminates in a Point. The Size of it is proportionable to that of the bony Canal, ſo that it is larger in the Vertebræ of the Neck than in thoſe of the Back. It is a little flatted on the fore and back Sides, ſo that we may diſtinguiſh in it two Sides, one anterior, the other poſterior, and two Edges. It is likewiſe in a Manner divided into two lateral Halves by a Groove, which runs along the Middle of each Side, being a Continuation of thoſe in the Extremity of the Medulla Oblongata.

125. Each

125. EACH lateral Portion ſends off from both the fore and back Sides between the Grooves and the Edges, at different Diſtances, flat Faſciculi of nervous Filaments turned toward the neareſt Edge. The anterior and poſterior Faſciculi having got a little beyond the Edge of the Medulla, unite in Pairs, and form on each Side a Kind of Knots, called Ganglions by Anatomiſts, each of which produces a nervous Trunk. Theſe Ganglions are made up of a Mixture of Cortical and Medullary Subſtance, accompanied by a great Number of ſmall Blood-Veſſels.

126. THE Dura Mater, which inveſts the Medulla, ſends out on each Side the ſame Number of Vaginæ as there are Ganglions and nervous Trunks. Theſe Vaginæ are Productions of the external Lamina, the internal Lamina, which is very ſmooth and poliſhed on the Inſide, being perforated by two ſmall Holes very near each other, where each Vagina goes off, through which Holes the Extremities of each anterior and poſterior Faſciculus are tranſmitted; and immediately after their Paſſage through the internal Lamina, hey unite.

127. THE triangular Spaces left between the anterior and poſterior Faſciculi and Edge of the Medulla, are filled from one Extremity to the other by an indented Ligament very thin and ſhining, having the ſame Number of Indentations as there are Pairs of Faſciculi. It is fixed at different Diſtances to the Edge of the Medulla, from whence it ſends Filaments to the internal Lamina of the Dura Mater, by which the anterior Faſciculi are diſtinguiſhed from the poſterior.

128. THE Membrana Arachnoides is here very diſtinct from the internal Lamina of the Pia Mater, ſo that by blowing through a Hole made in the Arachnoides, it will ſwell from one End to the other like a tranſparent Gut. The internal Lamina, called in this Place ſimply the Pia Mater, adheres very cloſely to the Medulla Spinalis, and ſends many Productions and Septa through its Subſtance. When we blow through a Hole made in the Pia Mater through the Subſtance of one lateral Portion of the Medulla, the Air penetrates through the whole, and the Pia Mater which covers the other lateral Portion is ſeparated from it.

129. THE Membrana Arachnoides adheres more cloſely to the Pia Mater at the lower than at the upper Part, being in a Manner ſuſpended by the indented Ligament which runs along both Edges of the Medulla, and is fixed by a Filament to the internal Lamina of the Dura Mater in each Interſtice between the nervous Faſciculi, as has been already ſaid. It alſo gives off Elongations in the ſame Manner as the Dura Mater to each nervous Trunk or Rope, as we ſhall ſee hereafter.

§. 7. *The Nerves of both Medullæ from their Origin to their going out of the Cranium.*

130. I obſerved in the Beginning of the Deſcription of the Nerves, that they ariſe either from the Medulla Oblongata or Spinalis; that they go out in Faſciculi diſpoſed in Pairs; that ten Pairs are reckoned to belong to the Medulla Oblongata, of which nine go out through the Foramina of

the Cranium, and the tenth ariſes from the Extremity of this Medulla as it paſſes through the great Occipital Hole; and laſtly, that about thirty Pairs were reckoned to belong to the Medulla Spinalis, of which ſeven paſs through the lateral Notches of the Vertebræ Cervicis, twelve through thoſe of the Back, five through thoſe of the Loins, and five or ſix through the anterior Holes of the Os Sacrum, and one at the Sides of the Os Coccygis.

131. My Deſign is here principally to mention ſome particular Obſervations about the Nerves while they remain within the Cranium, the reſt of their Courſe through the whole Body being already ſufficiently deſcribed; and I beg the Reader firſt of all to review the Idea I gave in that Deſcription of the general Diviſion and original Diſpoſition of all the Nerves which come either from the Medulla Oblongata or Spinalis.

Nerves of the Medulla Oblongata.

132. The firſt Pair of Nerves that ariſe from the Medulla Oblongata are the Olfactory, anciently called Proceſſus Mamillares. Theſe are two very flat and ſoft medullary Ropes, each ariſing firſt by medullary Fibres from the Outſide of the lower Part of the Corpora Striata, between the anterior and middle Lobe on each Side of the Cerebrum, and afterwards by another Filament more internally, and by a third which is more poſterior, and very long. They run under the anterior Lobes of the Cerebrum, being lodged in two ſuperficial Grooves in the Baſis of theſe Lobes, and lying immediately on the Dura Mater, from the Clinoide Apophyſes to the Os Ethmoides.

133. They are firſt of all conſiderably incurvated from without inwards or toward each other, and having reached near the Backſide of the Os Ethmoides, they run for a ſmall Space parallel to and at ſome Diſtance from each other. Backward they are very thin, but they gradually encreaſe in Bulk in their Courſe forward, toward each Side of the Criſta of the Ethmoidal Bone, where they terminate in elongated Papillæ, the Subſtance of which appears to be ſofter and leſs white than that of the Ropes.

134. These Papillæ lie on the two Sides of the Lamina Cribroſa, and ſend down a nervous Filament into each Hole of that Lamina. At the ſame Place the Dura Mater ſends off the ſame Number of Vaginæ which inveſt and accompany the nervous Filaments and their Ramifications on the internal Parts of the Noſe.

135. I have already related the Origin of the ſecond Pair or Optic Nerves from the Eminences called Thalami Nervorum Opticorum; and I have deſcribed their great Curvature, and traced them all the Way to their Reunion, which happens immediately before the ſuperior Part of the Glandula Pituitaria, and conſequently before the Beak or Production of the Infundibulum. The internal Carotids run upon the Outſides of theſe Nerves immediately after their Union, and before they paſs through the Foramina Optica.

136. Besides their Origin from the Optic Thalami, theſe Nerves have likewiſe a Kind of Communication with the Tubercula Quadrigemina Anteriora by very fine Filaments, one Extremity of which is loſt in the Tubercles,

bercles, the other in the Roots of the great Arches or Bodies of the Optic Nerves. The internal Structure of these Nerves seems to change at their Entrance into the Optic Holes, as we shall see in another Place.

137. The Union of these Nerves by the small Curvatures of their Cornua, is very difficult to be unfolded in Human Bodies. This Union is commonly found to be very close, but in some Subjects it seems to be no more than a strong Adhesion, in others to be partly made by an Intersection or Crossing of Fibres. They have been found quite separate; and in other Subjects one of them has been observed to be very much altered both in Size and Colour through its whole Passage, the other remaining in its natural State.

138. The third Pair, called Nervi Motores Oculi Communes, Oculares Communes, and Oculo-Musculares, arise from the Union of the anterior Edge of the great transverse Protuberance, with the two great Branches of the Medulla Oblongata. They pierce the Dura Mater behind the lateral Parts of the posterior Apophysis of the Sella Sphenoidalis, and pass afterwards each in the neighbouring Sinus Cavernosi, by the Side of the Carotid Artery, and all the Way to the broad Portion of the superior Orbitary Fissure, where they are divided in the Manner already said in describing the Nerves.

139. The fourth Pair, called Nervi Trochleares, Musculares Obliqui Superiores, and most commonly Pathetici, are very small and tender, and in Proportion very long. They arise each behind the Tubercula Quadrigemina, and from the lateral Part of the Valviform Expansion at the Entry of the fourth Ventricle. From thence they take their Course forward all the Way to the Edge of the anterior Extremities of the transverse Sinus, where on each Side they enter the Duplicature of the Dura Mater, and advancing into the Sinus Cavernosi, they accompany the third Pair to the superior Orbitary Fissure.

140. The fifth Pair, called Nervi Innominati, or Trigemini, are at first large Trunks arising chiefly from the lateral and posterior Parts of the great transverse Protuberance, and a little from the Corpora Olivaria and Pyramidalia. They run down obliquely forward on the Extremity of the upper or anterior Side of the Apophysis Petrosa, very near the Side of the Sella Sphenoidalis, where they enter the Duplicature of the Dura Mater and Sinus Cavernosi.

141. At their Entry into the Sinus, they form a Kind of flat irregular Ganglion, from which some Filaments are sent off to the Dura Mater; and immediately afterward, each of them is divided into three great Branches, one superior or anterior, one middle, and one inferior or posterior. The first Branch, which may be termed Ocularis or Ophthalmicus, accompanies the Nerves of the third and fourth Pairs, to the superior Orbitary Fissure. The second, called Maxillaris Superior, goes out by the superior Maxillary Hole; and the third, named Maxillaris Inferior, by the inferior Maxillary Hole. As the great Trunk of this Nerve runs down, it perforates the Membrana Arachnoides, which at this Place forms a Kind of Cieling.

142. The ſixth Pair, named Motores Oculorum Externi, Oculares or Ophthalmaci Externi, and Oculo-Muſculares Externi, are ſmall Nerves, but ſtill not ſo ſmall as the fourth Pair; and I have ſometimes found them double. They ariſe partly from the oblong inferior Eminences immediately behind the tranſverſe Protuberance, and partly from this Protuberance; and paſſing immediately under it, they pierce the Dura Mater behind the Occipital Symphyſis of the Sphenoidal Bone.

143. They run on each Side in the Duplicature of the Dura Mater to the cavernous Sinus; and having entered that Sinus, each of them accompanies the firſt Branch of the fifth Pair to the ſuperior Orbitary Fiſſure. In this Courſe they communicate with the firſt Branch juſt mentioned, and are increaſed on the Forepart by a Filament or two, which ariſe from the great Sympathetic Nerve, and run up with the Carotid.

144. The ſeventh Pair, named Auditorii, ariſe from the lateral and poſterior Part of the tranſverſe Protuberance, near the Pedunculi of the Cerebellum, by two Cords, one ſmall and ſolid, the other large and ſoft, which from thence is called Portio Mollis, and the firſt, Portio Dura, or as I have named it, Nervus Sympatheticus Minimus. The two Nerves on each Side accompany each other very cloſely, all the Way to the internal Foramen Auditorium.

145. The eighth Pair, named Par Vagum, Nervi Vagi, or Sympathetici Medii, ariſe from the poſterior Extremities of the large Branches or Crura of the Medulla Oblongata, from the tranſverſe Protuberance, and from the anterior Part of the inferior oblong Eminences behind the tranſverſe Protuberances, by numerous Filaments, which all together make a broad Band on each Side, which runs toward the Foramen Lacerum, where it pierces the Dura Mater, and goes out through the anterior Part of that Hole, having been firſt joined by a nervous Portion that runs up from the Medulla Spinalis through the great Occipital Foramen, by the Name of Nervus Acceſſorius Octavi Paris, or Nervus Spinalis. This additional Nerve goes out with that of the eighth Pair through the Foramen Lacerum, lying behind it, but diſtinguiſhed from it by a Membranous Septum.

146. The ninth Pair, called Nervi Hypogloſſi Externi, Hypogloſſi Majores, and commonly Guſtatorii, ariſe each from the lateral Part of the Extremity of the Medulla Oblongata, between the oblong inferior Eminences, by ſeveral Filaments, which uniting together, form commonly two ſmall Ropes on each Side, which pierce the Dura Mater ſeparately, and preſently afterwards form one Rope, which goes out of the Cranium through the anterior Condyloide Hole.

147. The tenth Pair, called Nervi Sub-Occipitales, ariſe under the ninth Pair, chiefly from the anterior and a little from the lateral Part of the Extremity of the Medulla Oblongata, oppoſite to the poſterior Part of the Condyloide Apophyſis of the Occipital Bone, by a ſingle Plane or Faſciculus of ſmall Filaments which pierce the Dura Mater directly from within

within outward, at the ſame Place where the Vertebral Arteries perforate it from without inwards.

148. THE Nerves formed by the lateral Union of the anterior and poſterior Filaments of the Medulla Spinalis, go out of the bony Canal of the Spina Dorſi, toward each Side, through the Intervertebral Holes, through the anterior Holes of the Os Sacrum, and the lateral Notches of the Os Coccygis; and from thence they have the general Name of Nervi Vertebrales. They are divided in the ſame Manner as the Vertebræ, into ſeven Pair of Cervical Nerves, twelve Pair of Dorſal, five Pair of Lumbar, and five or ſix Pair of Nervi Sacri. *Nerves of the Mudulla Spinalis.*

149. I obſerved in the particular Deſcription of the Nerves, that I begin the Enumeration of the Vertebral Nerves by thoſe which go out between the firſt and ſecond Vertebra; and that the Situation of the Dorſal or Coſtal Nerves, which are true Intercoſtals, determined me to this Diſpoſition, the firſt Pair of theſe Nerves paſſing between the firſt and ſecond true Ribs.

150. As the Spinal Marrow, which furniſhes all theſe Nerves, ſeldom goes lower than the firſt or ſecond Vertebra of the Loins, as I have already ſaid, the Situation of the Faſciculi of nervous Filaments muſt be different from that of the Holes through which they paſs; and ſeveral of theſe Faſciculi both anterior and poſterior muſt be longer than the reſt. This we find from Experience to be the Caſe in the following Manner.

151. THE Faſciculi of nervous Filaments of the Medulla Spinalis, which produce the Cervical Nerves, run more or leſs tranſverſely toward each Side from their Origin to their Paſſage through the Intervertebral Holes. The Faſciculi which form the Dorſal Nerves, run a little obliquely downward from their Origin to the Intervertebral Holes; and thoſe which form the Lumbar Nerves, run down more and more longitudinally from the Medulla to the Holes by which they go out.

152. THEREFORE the Cervical Faſciculi are very ſhort in the Spinal Canal; the Dorſal Faſciculi are longer, and the Faſciculi from the Loins and Os Sacrum very long. It muſt likewiſe be obſerved that the Faſciculi of the four loweſt Pairs of the Cervical Nerves, and firſt Pair of the Dorſal Nerves, are broader and more compounded than the following, becauſe the Brachial Nerves are a Continuation of theſe. The Filaments belonging to the Lumbar Nerves, and thoſe of the Os Sacrum, are likewiſe very broad, and made up of numerous Filaments, as being the Roots of the large Nerves which go to the lower Extremities. The Dorſal Filaments are very ſmall.

153. THE Cervical and Lumbar Faſciculi are not only broader and made up of more Filaments than the Dorſal, but alſo ſituated much cloſer to each other, the Lumbar Faſciculi being ſtill more ſo than the Cervical, whereas in the Dorſal a conſiderable Interſtice is left between the Faſciculi.

154. THESE Lumbar Faſciculi, from their Origin to the Extremity of the Os Sacrum, form, through the whole Canal of the Lumbar Vertebræ

and of the Os Sacrum, a large Bundle of nervous Ropes called by Anatomiſts, Cauda Equina, becauſe of ſome Reſemblance which it bears to a Horſe's Tail, eſpecially when taken out of the Canal and extended in clear Water.

155. Though the Medulla Spinalis ends at the firſt Vertebra of the Loins, the Vagina of the Dura Mater, by which it is inveſted, is continued through the reſt of the bony Canal all the Way to the Extremity of the Os Sacrum, and involves the great Bundle or Cauda Equina, the Cords of which pierce it on each Side nearly oppoſite to the Places where they paſs through the Intervertebral Holes, and the anterior Holes of the Os Sacrum, almoſt in the ſame Manner as was ſaid above, in deſcribing the general Formation of the Vertebral Nerves.

156. This Vagina of the Dura Mater being ſeparated from the Canal of the Vertebræ, and the lateral Elongations which ſerve for particular Vaginæ to the Cords, being cut off, it preſently ſhrinks up and contracts in the ſame Manner as all the other elaſtic Parts of the Human Body; for Inſtance, as an Artery does when cut tranſverſely ſoon after Death. Therefore its true Length muſt be taken while it is *in Situ*, and likewiſe the true Situation of the lateral Elongations.

157. From all this a Concluſion may be drawn of great Importance, not only in Anatomical and Philoſophical Inquiries, but alſo for underſtanding local Diſeaſes, Wounds, &c. which is, that when we have Occaſion to conſider any particular Nerves near the Vertebræ of the Back or Loins, or near the Os Sacrum, we muſt remember that in the Spina Dorſi the Origin of theſe Nerves is not even with their Paſſage out of the Spine; but proportionably higher. If, for Inſtance, we inquire about any of the loweſt Nervi Sacri near the Os Coccygis, we muſt not ſtop at the Extremity of the Os Sacrum, but trace its Origin as high as the laſt Vertebra of the Back, or firſt of the Loins.

158. The Membrane Arachnoides accompanies the original Faſciculi ſeparately, to their Paſſage through the lateral Elongations of the Dura Mater, forming a Kind of Duplicature, Breaks, or Diſcontinuations between the Cords which run in the Vagina of the Dura Mater. The internal Lamina of the Pia Mater, or the Pia Mater ſimply, as it is here reckoned, adheres very cloſely both to the Faſciculi and Filaments of which they are compoſed.

159. Among the original Productions of the Nerves of the Medulla Spinalis, we ought ſtill to reckon the Formation of the Nervi Acceſſorii of the eighth Pair, or of thoſe that I call Sympathetici Medii. They ariſe from the lateral Parts of this Medulla by ſeveral Filaments, about the third or fourth Vertebræ of the Neck, and ſometimes lower. And, if my Memory does not fail me, I once traced them to the Middle of the Back. They run up on each Side between the anterior and poſterior Ranks of the nervous Faſciculi, increaſing gradually in Size by the Acceſſion of new Filaments from the poſterior Faſciculi.

160. Having

160. HAVING reached above the first Vertebra of the Neck, they have a Kind of Adhesion or Communication with the neighbouring Ganglions of the Nervi Sub-Occipitales, or those of the tenth Pair. Above this Adhesion they receive two Filaments each, from the Backside of the Medulla, and afterwards continue their Course towards the great Occipital Foramen. As they enter the Cranium, they communicate with the Nerves of the ninth and tenth Pairs; and at the Foramen Lacerum, they join those of the eighth Pair, with which they return out of the Cranium.

161. IN the posterior Part of the Medulla Spinalis, near its lower Extremity, there is in some Subjects a longitudinal Depression in which several transverse Fibres are situated, which though I have not examined any further, I thought it proper to mention this Observation, as I found it in my Anatomical Common-Place Book.

§. 8. *Blood-Vessels of the Brain and Medulla Spinalis.*

162. THE Arteries which supply the Cerebrum, Cerebellum and Medulla Oblongata, come partly from the Carotids which enter the Cranium through the Canals in the Apophyses Petrosæ of the Ossa Temporum, and partly from the Vertebrales which enter by the great Occipital Foramen, and send off the Arteriæ Spinales into the Canal of the Spine for the Medulla lodged there. *Arteries.*

163. ALL these Arteries are divided into several Branches which send out a great Number of Ramifications distributed through both Substances of the Brain, and through the whole Extent of the Pia Mater. The Dura Mater both of the Cerebrum and Cerebellum has Arteries peculiar to it, which have been already described.

164. THE internal Carotid on each Side enters the Cranium by the great Canalis Petrosus, in an angular or winding Course, as was observed in the Description of the Skeleton. The inner Surface of this Canal is lined by a Production common to the Dura Mater and inferior Pericranium; to which the Artery adheres only by a loose Filamentary Substance, in which the Plexiform Filaments run, that belong to the great Sympathetic Nerve, commonly called the Intercostal.

165. HAVING passed through the bony Canal, it immediately bends upward toward a Notch in the Sphenoidal Bone, and through that Notch it enters the Cranium. Immediately after this, it penetrates the Cavernous Sinus on the Side of the Sella Sphenoidalis, where having formed a third Curvature, it goes out from it, from below, upwards, and is bent a fourth Time round the anterior Clinoide Apophysis, from before backward. By this Course it is in a Manner bathed in the Blood of the Cavernous Sinus, together with the third, fourth, fifth and sixth Pairs of Nerves.

166. AFTER this fourth Curvature the internal Carotid having now reached the Side of the Infundibulum, and consequently being very near its Fellow, these two Arteries communicate sometimes by a very short transverse arterial Production. At this Place each of them divides into two principal

principal Branches, one anterior, the other posterior; and sometimes into three, in which Case there is a middle Branch between the two former.

167. The anterior Branch runs first of all forward under the Basis of the Cerebrum, separating a little from the same Branch of the other Carotid. They approach each other again under the Interstice between the two Olfactory Nerves, communicating by a very short Anastomosis, and sending small Twigs to that Pair of Nerves. They afterwards separate, being each divided into two or three Rami.

168. The first Ramus of the anterior Branch goes to the anterior Lobe of the Cerebrum. The second, which is sometimes double, is inverted on the Corpus Callosum to which it gives Ramifications, as also to the Falx of the Dura Mater and middle Lobe of the Cerebrum. The third, which is sometimes a distinct Branch, sometimes only an additional Ramus to the second, goes to the posterior Lobe of the Cerebrum. This third Ramus is sometimes so considerable as to deserve to be reckoned the middle Branch of the three principal ones.

169. The posterior Branch communicates first of all with the Vertebral Artery of the same Side, and then is divided into several Rami on the superficial Circumvolutions of the Cerebrum, and between these Circumvolutions all the Way to their Bottom. The anterior and middle Branches, when there are three, distribute the same Kind of Ramifications to the Circumvolutions and to their Interstices.

170. All these different Ramifications run in the Duplicature of the Pia Mater, from which they receive a Kind of additional Coats, and the Capillaries being distributed upon it in a reticular Manner, do afterwards penetrate the Cortical and Medullary Substance, in which last they terminate insensibly.

171. The Vertebral Arteries enter through the great Occipital Foramen, having first pierced on each Side the Elongations of the Dura Mater at the same Place where the Sub-Occipital Nerves, or those of the tenth Pair, pierce it, as they go out; the Arteries in this Place lying above the Nerves.

172. At their Entry into the Cranium they send each several Ramifications to the Cauda of the Medulla Oblongata, and to the Corpora Olivaria and Pyramidalia, which Ramifications are distributed on the Sides of the fourth Ventricle, produce the Plexus Choroides, are spread on the whole Surface of the Cerebellum, insinuate themselves between the Strata, always invested by the Duplicature of the Pia Mater, and are at length lost in both Substances of the Cerebellum.

173. Afterwards the two Vertebral Arteries turn toward each other, for the most Part immediately under the posterior Edge of the great transverse or semi-annular Protuberance of the Medulla Oblongata, where they unite and form one common Trunk. This Trunk passes directly from behind forward, under the Middle of the great Protuberance, and partly in the middle Groove or convex Surface of that Protuberance, at the anterior Edge of which it terminates.

174. In

174. In its Paſſage through the Groove this Trunk ſends off ſeveral ſmall Branches on each Side, which ſurround tranſverſely the lateral Portions of the Protuberance, being partly lodged in the ſmall lateral Grooves of theſe Portions. Theſe lateral Branches are afterwards diſtributed to the neighbouring Parts of the Cerebrum, Cerebellum, and Medulla Oblongata.

175. This common or middle Trunk of the Vertebral Arteries having reached the Edge of the great Protuberance, is divided again into two ſmall Branches, each of which ſoon communicates with the Trunk of the internal Carotid on the ſame Side. Inſtead of this Bifurcation the two laſt or moſt anterior lateral Branches ſend each ſometimes a ſmall Branch forward, which form the Anaſtomoſes with the internal Carotids.

176. The principal Arteries of the Medulla Spinalis, called commonly Arteriæ Spinales, are two in Number, one anterior and one poſterior, lodged in the Grooves by which the Medulla is divided into lateral Portions on both Sides. They ariſe from the Vertebral Arteries, a little above the great Occipital Foramen, where theſe Arteries ſend each a ſmall Ramus downward as ſoon as they enter the Cranium, and having got under the Extremity of the Medulla Oblongata, they ſend off two other Branches backward.

177. The firſt two Branches uniting ſoon after their Origin, form the Arteria Spinalis Anterior, which runs down within the Canal of the Vertebræ along the anterior Groove of the Medulla. The other two ſmall Branches are inverted on the Sides of the Medulla Oblongata, and from thence running backward, they unite much in the ſame Manner with the firſt two, and form the Arteria Spinalis Poſterior, which runs down along the poſterior Groove of the Medulla Spinalis.

178. The two Spinal Arteries in their Courſe downward along the Medulla, ſend off on each Side lateral Ramifications, by which they frequently communicate with each other; and likewiſe with the Vertebral Arteries of the Neck, with the Intercoſtals, and ſometimes they are in a Manner ſplit for a little Way, and then unite again.

179. The Veins of the Cerebrum and Cerebellum, *&c.* may in general be looked upon as Branches not only of the longitudinal Sinus of the Dura Mater, and of the two great lateral Sinuſes, but alſo of all the inferior Sinuſes of that Membrane, in all which Sinuſes the Veins terminate by different Trunks in the Manner already ſaid in the Deſcription of the great ſuperior Sinus. Their principal Ramifications accompany all the Cortical Circumvolutions of the Cerebrum, and Directions of the Strata of the Cerebellum, running always in the Duplicature of the Pia Mater. The Veins of the Plexus Choroides in general are of the Number of theſe already mentioned.

180. The Veins of the Medulla Spinalis are Branches partly of the ſuperior Extremities of the two Vertebral Veins, partly of the two Venal Ropes termed Sinus Venoſi, which run down both Ways laterally on the anterior convex Side of the Production of the Dura Mater, and form at

different Distances reciprocal Communications by semi-annular Arches, as by so many subordinate Sinuses. The two longitudinal Sinuses communicate likewise in their Passage with the Vertebral Veins, in the same Manner as the neighbouring Arteries.

§. 9. *Uses of the Brain, and of its Appendages in general.*

181. We are obliged to the great *Malpighi* for the first and best Instructions concerning the Manner of examining the Structure of the Brain, especially that of the two Substances of which it is made up, and for putting us in a Condition to be able to conjecture something about its Uses. The Experiments and Observations of that illustrious and faithful Searcher into Nature having been repeated by several excellent Philosophers, and confirmed by comparative Anatomy, leave us no Room to doubt but that the Brain is a Secretory Organ, or, as it is called by Anatomists, a Gland.

182. It is to no Purpose to dispute about Words when we are agreed as to the Things themselves. Anatomists have for many Years past understood by the Word Gland, an Organ fitted to separate some particular Fluid from the Mass of Blood, as universally as they mean by the Word Muscle, all Sorts of fleshy Fibres capable of Contraction; and this last Term might be cavilled at and rejected as justly as the other.

183. The whole Matter of Secretions must be owned to be very obscure; but it is to be hoped that the Brain and Liver will some Time or other lead us so far to the Knowledge of it as at least to be able to distinguish Truth from Falshood.

184. The greyish or Ash-colour of the Cortical Substance is not the Effect of a particular Mixture of Red and White, at least we have no Experiment to prove it. The Blood indeed gives this Substance a slight reddish Cast; but the Ash-colour, which seems to be the Characteristic of the Structure of these Secretory Organs, is not owing to that.

185. We learn from M. *Ruysch*'s Anatomical Injections, that the Cortical Substance is chiefly composed of Vessels, that by making these Vessels swim in a clear pellucid Liquor, their Extremities represent an infinite Number of fine Brushes or Vascular Tufts, and that his Injection fills even the smallest Filaments of these Tufts. He tells us likewise, that in these last Filaments the Structure is altered, and that by the Mechanism of this Change, the Functions attributed to Glands may be performed.

186. But still these Injections and Preparations do not unravel the Mystery, neither is the Existence of these Pencils or Tufts sufficiently demonstrated, for they are only the last Extremities of the small Arteries macerated in Water, or some other Liquor, after being injected, and then artfully separated from the other essential Parts of the Organ.

187. In the first Place they are separated from the Venal Extremities, which must answer to these Tufts in what Manner soever that be brought about. Secondly, they are separated from the membranous Filaments of the Pia Mater, which in the natural State tie these Arterial Extremities to each

each other, and give them a different Diſpoſition from that of Tufts or Pencils. Thirdly, by this Preparation, the arterial Extremities are ſeparated from their Connexions with the Medullary Subſtance; which both Experiments and comparative Anatomy ſhew to be fibrous.

188. It is no ways ſurpriſing that theſe Capillary Extremities thus ſtript ſhould float looſely and freely when moved in a Fluid, and that they ſhould put on the Appearance of Pencils or Tufts, being in this State only the truncated Extremities of ſmall Veſſels. When we conſider theſe Circumſtances attentively, we find ourſelves obliged to return to the ſmall Glandular Bodies and Folliculi, &c. of *Malpighi*, of which in another Place; and at the ſame Time we muſt acknowledge that *Ruyſch*'s fine Injections have diſcovered theſe minute Bodies to be of a Vaſcular Subſtance, the Structure of which we are ſtill ignorant of.

189. In a Word *Malpighi* has diſcovered the Glandular Tubercles and Folliculi without deſtroying their natural Connexions. *Ruyſch* has diſcovered a conſiderable Part of their Structure by deſtroying their Connexions. We are therefore very much beholden to both theſe illuſtrious Anatomiſts, and it is only by joining their Obſervations to each other, that we can ever be able to form an Idea of the Secretory Organs, which will anſwer all the Phænomena concerning the different Secretions in the Human Body.

190. The infinite Number of theſe ſmall Secretory Cluſters ſtrain or filter the Maſs of Blood carried to them by the numerous Ramifications already mentioned, and ſeparate from it an exceſſively fine Fluid; the remaining Blood being conveyed back by the ſame Number of Venal Extremities, into the Sinuſes of the Dura Mater, and from thence into the Jugular and Vertebral Veins.

191. This ſubtle Fluid, commonly called Animal Spirit, Nervous Juice or Liquor of the Nerves, is continually forced into the Medullary Fibres of the white Portion of the Cerebrum, Cerebellum, Medulla Oblongata, and Medulla Spinalis; and by the Intervention of theſe Fibres ſupplies and fills the Nerves, which are a Continuation of them.

192. All the Nervous Ropes, as they paſs through the Foramina of the Cranium and Vertebræ, are accompanied by particular Elongations of the Pia and Dura Mater. Thoſe of the Dura Mater ſerve them for Vaginæ in their Paſſage through the Bony Openings. Thoſe of the Pia Mater not only accompany and inveſt each Nervous Rope, but alſo form internal Septa between all the Filaments of which each Rope conſiſts. It is known from many Experiments, that the Nerves are the primitive or original Organs of all Muſcular Motion and of all Animal Senſation; and that theſe two Functions depend in general on the Brain; but we are ignorant of the Nature of this Dependance, and of the particular Uſes of the Medullary Fibres, of the Nervous Fluid, and of the Membranous Productions which accompany the Fibres and Nerves.

193. Neither is there any Thing certain in what has been ſaid concerning the Deſign or particular Uſes of the ſuperficial Conformation of the

Cerebrum and Cerebellum, or of the different Configuration of their Turnings, Circumvolutions, Eminences, Depreſſions, Expanſions, and various Folds. It may be affirmed in general, that by this Structure the Extent of the Secretory Organ of the Nervous Fluid is increaſed very conſiderably, and the particular Functions of each Nervous Rope diſtinguiſhed, and likewiſe their general and reciprocal Correſpondence, both in regard to the Exquiſiteneſs of the Organs of Senſation, and the Activity of the Organs of Motion.

194. The Falx of the Dura Mater hinders one Portion of the Cerebrum from preſſing on the other, when we lie on one Side. The tranſverſe Septum ſerves for a Tent to the Cerebellum, and defends it from a mortal Compreſſion which it muſt otherwiſe be liable to from the Cerebrum, eſpecially when we walk or jump.

195. The Septum and Productions of the Pia Mater connect and ſtrengthen all the Circumvolutions, Diviſions and Ridges of the Cerebrum, Cerebellum, &c. and ſuſtain in a general and almoſt incomprehenſible Manner all the Branches and Ramifications of the Blood-Veſſels, all the Medullary Filaments, and all the Elongations and Ropes that depend on theſe.

§. 10. *A Diſſertation on the Anatomy of the Brain by* M. Steno, *read in the Aſſembly held at* M. Thevenot's *Houſe in the Year* 1668.

Gentlemen,

Instead of promiſing that I ſhall ſatisfy your Curioſity in what relates to the Anatomy of the Brain, I begin by publickly and frankly owning that I know nothing of the Matter. I wiſh I were the only Perſon under a Neceſſity of talking in this Manner, becauſe I might in Time become acquainted with what others know; and it would be a great Bleſſing to Mankind if this moſt delicate Part, and which is liable to ſo many dangerous Diſeaſes, were as well underſtood as the Generality of Anatomiſts and Philoſophers imagine it to be. In this, few imitate the Sincerity of *Silvius*, who never talks poſitively concerning the Brain, though he has been at more Pains about it than any Man that I know. The Number of thoſe who think every Thing eaſy is infinitely the greateſt; and they give us the Hiſtory of the Brain and Diſpoſition of its Parts with the ſame Confidence and Aſſurance as if they had been preſent at the Formation of this ſurpriſing Machine, and had been let into all the Deſigns of the Great Architect. Though the Number of theſe poſitive Gentlemen be very great, and though I cannot pretend to anſwer for the Sentiments of all the reſt, I am nevertheleſs very much convinced that they who ſearch for ſolid Knowledge, will find nothing ſatisfactory in all that has been written about the Brain. It is very certain that it is the principal Organ of the Soul, and the Inſtrument by which it works very wonderful Effects. The Soul which imagines it can penetrate into every Thing without it, and that nothing in the World

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can ſet Bounds to its Knowledge, is nevertheleſs utterly at a Loſs to deſcribe its own Habitation, and is no where more to ſeek than at Home. We need only view a Diſſection of that large Maſs the Brain, to have Ground to bewail our Ignorance. On the very Surface you ſee Varieties which deſerve your Admiration; but when you would look into its inner Subſtance you are utterly in the dark, being able to ſay nothing more than that there are two Subſtances, one greyiſh, the other white, which laſt is continuous with the Nerves diſtributed all over the Body; that the greyiſh Subſtance ſerves in ſome Places for a Cortex to the white, and that in other Places it ſeparates the white Filaments from each other.

If we are aſked what theſe Subſtances are, in what Manner the Nerves are joined in the white Subſtance, or how far their Extremities penetrate into it; all we can do is to own our Ignorance, except we be reſolved to encreaſe the Number of thoſe who prefer the Applauſe of the Public to Sincerity and Truth. For to ſay that the white Subſtance is only an uniform Body like Wax, without any Art concealed in it, would be to think too meanly of this great Maſter-piece of Nature. We are ſure that wherever there are Fibres in the Body they always obſerve a certain regular Order, more or leſs complex, in Proportion to the Functions for which they are appointed. If this Subſtance is every where fibrous, as it appears in many Places to be, you muſt own that theſe Fibres are diſpoſed in the moſt artful Manner, ſince all the Diverſity of our Senſations and Motions depends upon them. We admire the Contrivance of the Fibres of every Muſcle, and ought ſtill more to admire their Diſpoſition in the Brain, where an infinite Number of them, contained in a very ſmall Space, do each execute their particular Offices without Confuſion or Diſorder.

The Ventricles or Cavities of the Brain are no leſs unknown than its Subſtance. They who place the Animal Spirits there, think they are as much in the right as they who make them the Receptacles of the Excrements; but they are both equally puzzled when they are deſired to explain the Origin of theſe Spirits and Excrements. Theſe may come from the Veſſels found in theſe Cavities, as well as from the Subſtance of the Brain; and it is equally difficult to determine how they get out.

Among thoſe who place the Animal Spirits in the Ventricles, ſome make them paſs from the anterior to the poſterior Ventricles, there to meet with the Entries of the Nerves, while others affirm that theſe Entries are in the anterior Ventricles. Some imagine that the Excrements of the Brain are contained in the Ventricles, becauſe they think they ſee ſomething like Excrements there; but they own that there is as ready a Paſſage for them from the Brain down to the Medulla, as into the Infundibulum; and ſuppoſing they go into the Infundibulum, they may be carried from thence into the Sinuſes of the Dura Mater; and there is ſome Reaſon to believe that they may have an immediate Paſſage into the Eyes, Nares, and Mouth.

We are ſtill more uncertain about what relates to the Animal Spirits. Are they Blood, or a particular Subſtance ſeparated from the Chyle by

the Glands of the Meſentery? Or may they not be derived from a Lymphatic Serum? Some compare them to Spirit of Wine, and it may be doubted whether they are not the Matter of Light. Our common Diſſections cannot clear up any of theſe Difficulties.

THE true Manner of diſſecting the Brain is as little known as its Subſtance. I need not mention the Method of cutting it into Slices, becauſe it is owned by every Body that nothing can be learned that Way. The ſecond Method of unfolding all the Plicæ is ſomething more artful; but it only ſhews us the outer Surface of what we want to know, and even that very imperfectly.

THE third Method of unfolding the Plicæ, and ſeparating the two Subſtances, goes no further than the Surface of the Medulla. Theſe three Methods have been differently combined, and they may be ſtill more diverſified, according as they are executed longitudinally, tranſverſely, &c.

As for my own Part, it is my Opinion that the true Method of Diſſection would be to trace the Nervous Filaments through the Subſtance of the Brain, to ſee which Way they paſs, and where they end; but this Method is accompanied with ſo many Difficulties, that I know not whether we may hope ever to ſee it executed without a particular Manner of preparing. The Subſtance of the Brain is ſo ſoft, and the Fibres ſo tender, that they can hardly be touched without breaking. Since therefore Anatomy has not hitherto arrived to that Degree of Perfection as to make the true Diſſection of the Brain, let us without flattering ourſelves any longer freely acknowledge our Ignorance, that we may not firſt deceive ourſelves, and others afterwards, by promiſing to ſhew them the true Structure of this Organ.

I SHOULD tire your Patience inſtead of entertaining you, were I to mention particularly all the Diſputes that have ariſen about the Brain: Books are but too full of them; and therefore I ſhall only relate the principal Miſtakes that ſtill ſubſiſt among Anatomiſts, and which may be corrected by Anatomy, and they may be reduced to theſe Heads. Some pretend to ſhew Parts in the Brain as ſeparate, which are only a Continuation of the ſame Subſtance; and others would perſuade us that theſe Parts touch each other without any Connexion, though they are viſibly joined together by Filaments or Veſſels. Some ſituate the Parts in the Manner which is moſt agreeable to the Syſtems they have framed, without conſidering that they are quite otherwiſe ſituated by Nature. They ſhew you the Pia Mater, for Inſtance, in Places where it never was, and do not ſee the Dura Mater in Places where it is very viſible; and in Caſe of Need they will make the very Subſtance of the Brain paſs for a Membrane.

I HAVE too good an Opinion of Men of Learning in general, to believe that they do this with a Deſign to deceive others, but the Principles which they have eſtabliſhed, and the Method of Diſſection to which they have accuſtomed themſelves, oblige them to it. All Anatomiſts would demonſtrate the Parts the ſame Way, if they made Uſe of the ſame Method; and therefore we ought not to be ſurpriſed if their Syſtems are very ill founded.

The Ancients were so far prepossessed about the Ventricles as to take the Anterior for the Seat of Common Sense, the Posterior for the Seat of Memory, that the Judgement, which they said was lodged in the Middle, might more easily reflect on the Ideas which came from either Ventricles. I would only ask those who are still of the same Opinion, to give us the Reason why we should believe them, for there is nothing satisfactory in all that has been hitherto said in Favour of it; and as that fine arched Cavity of the third Ventricle where they placed the Throne of Judgement does not so much as exist, we may easily see what Judgement is to be pronounced on the rest of this System.

Willis is the Author of a very singular Hypothesis. He lodges Common Sense in the Corpora Striata, the Imagination in the Corpus Callosum, and the Memory in the Cortical Substance: But without being at Pains to enter into the Detail of his whole Hypothesis, we need only make the following Remarks upon it. He describes the Corpus Striatum, as having two Sorts of Striæ, one ascending, the other descending; and yet if you separate the Cortical from the white Substance, you will perceive that these Striæ are all of the same Nature, that is, that they are Part of the Substance of the Corpus Callosum which runs towards the Medulla Spinalis, parted into different Lamellæ by the Intervention of the Ash-coloured Substance.

How can he then be sure that these three Operations are performed in the three Bodies which he pitches upon? Who is able to tell us whether the Nervous Fibres begin in the Corpora Striata, or if they pass through the Corpus Callosum all the Way to the Cortical Substance? We know so little of the Structure of the Corpus Callosum, that a Man of a tolerable Genius may say about it, whatever he pleases.

M. Descartes knew too well how imperfect an History we have of the Human Body, to attempt an Exposition of its true Structure; and accordingly in his *Tractatus de Homine*, his Design is only to explain a Machine capable of performing all the Functions done by Man. Some of his Friends have indeed expressed themselves on this Subject differently from him; but it is evident from the Beginning of that Work, that he intended no more than what I have said; and in this Sense, it may justly be said that *M. Descartes* has gone beyond all the other Philosophers. He is the only Person who has explained mechanically all the human Actions, and especially those of the Brain. The other Philosophers describe to us the Human Body itself. *M. Descartes* speaks only of a Machine, but in such a Manner, as to convince us of the Insufficiency of all that had been said before him, and to teach us a Method of enquiring into the Uses of the Parts with the same Evidence with which he demonstrates the Parts of his Machine called a Man, which none had done before him.

We must not therefore condemn *M. Descartes*, though his System of the Brain should not be found altogether agreeable to Experience; his excellent Genius, which shines no where more than in his *Tractatus de Homine*, casts a Veil over the Mistakes of his Hypotheses, especially since even *Vesalius* himself, and other Anatomists of the first Rank, are not altogether free from such

ſuch Miſtakes. And ſince we can forgive theſe great Men their Errors, who paſſed the greateſt Part of their Lives in diſſecting, why ſhould not *Deſcartes* meet with the ſame Indulgence, who has happily employed his Time in other Speculations?

The Reſpect which I and all the World owe to ſuch ſuperior Geniuſes, would have inclined me to continue only to admire this Treatiſe as containing the Deſcription of a fine Machine invented by the Author, if I had not met with ſeveral Perſons who would make us believe that it is a faithful Relation of the moſt ſecret Springs of the real Human Body. Since theſe Perſons are not convinced by *Silvius*'s repeated Demonſtrations that *M. Deſcartes*'s Deſcriptions do not agree with what appears in diſſecting the Human Body, I find myſelf obliged to point out ſome Parts of his Syſtem, without relating the whole, in which they muſt ſee, if they have a Mind to be inſtructed, the vaſt Difference there is between *Deſcartes*'s imaginary Machine, and the real Machine of the Human Body.

The Glandula Pinealis has lately been the Subject of the greateſt Diſputes touching the Anatomy of the Brain; but before I enter upon that Matter, or endeavour to determine the Place where it lies, I muſt firſt give *Deſcartes*'s own Opinion in his own Words, contained in the following Paſſages, to which I have added ſeveral others taken from the ſame Treatiſe, at the End of this Diſcourſe.

"The Surface of the Glandula Pinealis has a Relation to the inner Surface of the Brain.

"In the Concavity of the Brain, the Pores are directly oppoſite to thoſe of the ſmall Gland.

"The Spirits run from all Sides of the Gland into the Concavities of the Brain.

"The Gland may perform its Functions, though it be inclined ſometimes to one Side, ſometimes to the other.

"The ſmall Tubes on the Surface of the Concavities are always turned to the Gland, and may eaſily be turned toward the different Points of this Gland."

From all theſe Paſſages, it is certain that he believed the Glandula Pinealis to lie intirely in the Cavities of the Brain. And though in ſome other Places, he ſays, that it is ſituated at the Entry of theſe Cavities, yet we are not to think that this is contrary to what he advances in the Paſſages here quoted; for as it is but a very ſmall Body, it may lie either at the Entry, or in any other Place of the Cavities, and yet ſtill be within them, which he declares to be his Opinion in many other Places.

We are now to examine whether this Opinion be not contrary to Experience. It is very certain that the Baſis of this Gland reaches immediately from the Paſſage of the third Ventricle to the fourth; but the poſterior Part, that is, one Half of the Gland, may evidently be perceived to be altogether without the Cavities, by only removing the Cerebellum, and one or both of the Tubercles of the third Pair, with Dexterity and Care; upon

upon which the posterior Part of the Gland will be brought into View, and yet no Passage will appear, by which the Air or any other Fluid can pass into the Ventricles.

To prove that the anterior Part of the Gland is not in the lateral Cavities, we need only look upon them, after they have been opened either in *Silvius*'s Way, or in that of the Ancients; for the Substance of the Brain will always be found to lie between these lateral Cavities and the Gland. The same Thing may be demonstrated without cutting the Substance of the Brain, by separating from its Basis, the Part which contains these Cavities; for the Gland will then appear to be so far out of the Cavities, that it can have no Manner of Relation to them, being hindered by the Insertions by which this Part is fixed to the Basis. The Ancients knew very well that the Fornix is not continuous with the Basis of the Brain, but that it forms a third Cavity on its under Side, and by forcing in Air through the Fissure between the Tubercles of the second Pair, we raise the Fornix, and thus by breaking the Filaments which connect it to the Basis, a large Cavity is formed; from whence some have imagined that when the Spirits swell the Cavities, the Fornix rises, and that all Sides of the Surface of the Gland are turned toward the Cavities.

I say, some have imagined this, because though the Fornix be raised in the Manner already said, only the anterior Surface of the Gland can be turned towards the lateral Cavities; but no Preparation whatever can turn the posterior Surface toward the posterior Ventricles. But if the Brain has suffered no Violence, either in opening the Cranium, forcing in Air, or by any other Method, the Cavity of this third Ventricle will be found very narrow at the Middle, and to contain nothing but the great Vein which forms the fourth Sinus, and the Glandular Bodies which accompany this Vein.

I own that behind this Fissure, and immediately below its posterior Opening, there is a Cavity lined on the fore and lateral Parts by that Part of the Plexus Choroides which runs up toward the fourth Sinus, and at the Back-part, closed by the Glandula Pinealis, the anterior Portion of which is perfectly continuous; and when the Fornix is removed, this Cavity remains intire under the first, in the Shape of a Kind of inverted Horn.

What *Descartes* says, that the Glandula Pinealis may perform its Functions, though it inclines sometimes to one Side, sometimes to another, Experience shews to be groundless; because it is so hedged in between all the Parts of the Brain, and so fixed to them on all Sides, that it cannot be moved in the least without Violence, and without breaking the Fibres by which it is connected. It is easy to shew likewise that *M. Descartes* has not represented it in its true Situation, which is neither perpendicular, as he represents it, nor inclined forward, as other very great Anatomists believe; but its Point is always turned toward the Cerebellum, and makes nearly half a right Angle with the Basis.

The supposed Connexion of this Gland with the Brain by Means of Arteries, is likewise groundless; for the whole Basis of the Gland adheres

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to the Brain, or rather the Subſtance of the Gland is continuous with that of the Brain, though the contrary be affirmed by *Deſcartes*.

The Hypotheſis of Arteries meeting round the Gland, and from thence running up to the great Euripus, as it is called, is of great Moment in *Deſcartes*'s Syſtem, becauſe the Separation and Motion of the Spirits depend upon it. But if we can believe our Eyes, this is no more than a Collection of Veins from the Corpus Calloſum, from the interior Subſtance of the Brain, from the Plexus Choroides, from different Places of the Baſis of the Brain, and from the Gland itſelf; the Office of which Veins is to carry back the Blood from the Brain to the Heart, and not to bring it from the Heart to the Brain. Some have thought that *M. Deſcartes* deſigned to carry the Nerves to the Gland, but he never had any ſuch Intention.

Such of *M. Deſcartes*'s Friends who look upon his Man only as a Machine, will be ſo good as to believe that I do not here ſpeak againſt his Machine, the Contrivance of which I have always admired; but as for thoſe who pretend to demonſtrate that *M. Deſcartes*'s Man is made like other Men; Anatomical Obſervations may eaſily convince them that this is a fruitleſs Attempt. And if they ſhould plead the ſame Experience on their Side, we may readily anſwer that there is nothing more common than not to perceive the Miſtakes we commit in diſſecting the Brain, as will evidently appear in the Sequel of this Diſſertation.

I deſigned to have mentioned the other Syſtems of the Brain by which the Animal Actions have been accounted for, and the Origin and Compoſition of the Fluids contained in the Brain, been explained; but I conſidered afterwards, that this Undertaking requires more Application and Leiſure than my Journey will allow me.

Diſſections or Preparations being liable to ſo many Miſtakes, and Anatomiſts having hitherto too readily formed Syſtems, and moulded theſe ſoft Parts in the Manner that was moſt agreeable to each, we cannot be ſurprized to find ſo little Exactneſs in their Figures. But this Want of Accuracy in the Figures is not owing to bad Diſſections only. The Ignorance of Drawers has contributed very much, and the Difficulty of expreſſing the ſeveral Eminences and Depreſſions of the Parts, and of underſtanding what the Anatomiſts chiefly inſiſt upon, furniſhes them with a never failing Excuſe. The beſt Figures of the Brain are thoſe of *Willis*; but even theſe contain a great Number of important Miſtakes, and they want many Things to perfect them. In the third Figure he repreſents the ſuperior or Pineal Gland, like a round Ball; and conſequently, according to this Figure, the Apex of that Gland cannot be ſaid to be turned either forward or backward. Beſides, we ſee here nothing of the Subſtance of the Brain on the Foreſide of the Gland, and which goes from one Side to the other; all which the Figure would make us believe to be annihilated. Behind the Gland, a Space appears on the Baſis of the Brain between the two Tubercles of the third Pair, which in the natural State has a quite different Appearance. The thin Expanſion of the white Subſtance of the Cerebrum, which is continued to the Middle of the Cerebellum, where it is very thick,

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is quite wanting; as alſo the Origin of the Nervi Pathetici which go out from this Expanſion. He likewiſe repreſents the ſecond Pair of Tubercles as diſtinct, which commonly adhere to each other. The Underſide of the Fornix appears to be uniform, which is of an uneven and very elegant Structure. When we cut the Corpus Striatum tranſverſely, we ſee Radii very different from what they are exhibited in *Willis*'s eighth Figure. The white Radii appear there to be continuous with the Forepart of the Corpus Striatum, which nevertheleſs is of an Aſh-coloured Subſtance, and as it runs in between the white Radii, does not appear, in that Method of diſſecting, to adhere to any other Body whatever.

In the third Figure the Infundibulum has no Reſemblance to Nature. The Nervi Motores Oculorum are ſtraight, and not oblique, as they ought to be; neither do we ſee the true Origin of the Filaments of which theſe Nerves are compoſed, from the Baſis of the Brain. The Pons Varolii might have been better and more diſtinctly expreſſed; and the anterior Roots of the Fornix are not ſeparated, as in the ſeventh and eighth Figures, but touch each other at the upper Part, and form an acute Angle. The Line marked G. G. G. in the ſeventh Figure appears to be a continued Line, though the Part behind the Roots of the Fornix which is repreſented, has no Connexion with the Extremities; and in the ſame Figure the Glandula Pinealis is connected to the Subſtance of the Brain by two Funiculi. I need ſay nothing of the Figures of *Veſalius*, *Caſſerius*, &c. for ſince theſe, which are the lateſt and beſt, are ſo very imperfect, we may eaſily imagine how little Regard is to be paid to the others.

I have ſeen but three Figures of *Varolius*, which expreſs in a wretched Manner the beſt Obſervations that have ever been publiſhed on the Brain. I do not know whether the Figures of the firſt Edition at *Padua* in 1573, may not be better than thoſe which I have ſeen publiſhed at *Frankfort* in 1591, and again in *Bauhinus*'s Anatomy. Among *Bartholinus*'s Figures, there are three which repreſent the Brain diſſected after *Silvius*'s Method, but the Author himſelf owns that they are faulty. But to paſs over many other Miſtakes in all theſe Figures, there is not one amongſt them which repreſents truly the Situation of the Glandula Pinealis; the Duct of the third Ventricle; the Plexus Choroides; the Ramifications of the Veins contained in the lateral Cavities; the Diſtribution of the Arteries; the Concourſe of the Veins which form the fourth Sinus; or the numerous glandular Bodies lodged there.

From all this you ſee how the Brain has been hitherto diſſected, how little Knowledge has been gained from theſe Methods of Diſſection, and how falſely the Figures repreſent the Parts which they are deſigned for. It is eaſy to conclude from hence how little Regard is to be paid to the Syſtems built on theſe bad Foundations, in framing of which the Authors, by an unaccountable Sort of Misfortune common to this with all other Arts, have employed obſcure Terms, Metaphors and Compariſons, all of them ſo ill choſen, as to be equally puzzling to thoſe who have made ſome Progreſs in this Science, and thoſe who begin to learn it. Beſides, the greateſt

Number of these Terms are so low and so unworthy of the most noble Part of the Body of Man, that I am at a Loss whether I ought most to wonder at the bad Turn of Thought of those who first made use of them, or at the Indolence of their Successors who continue still to retain them. What Necessity could there be to employ the Words Nates, Testes, Anus, Vulva and Penis, which in their common Signification have no Relation at all to the Parts expressed by them in the Anatomy of the Brain? And accordingly what one Author calls Nates, another calls Testes, &c.

The third Ventricle is a very equivocal Term. The Ancients understood by this Word, a Cavity under the Fornix, which they believed to be separated from the Basis of the Brain, and they have represented it with three Legs, that it might support the Brain which lies upon it. *M. Silvius* calls the third Ventricle a Canal found in the Substance of the Basis of the Brain, between the Infundibulum and the Passage which goes under the two posterior Pairs of the Tubercles of the Brain, towards the fourth Ventricle. Some Anatomists having separated the Bodies of this second Pair of Tubercles, take the Space between them, which is owing to their Manner of Dissection, for the third Ventricle, which is consequently sometimes the Fissure above, and sometimes the Canal below; and some will have it to be the Space between the Fissure and Canal, which is likewise owing to the Rupture of the Parts already mentioned. We have therefore three third Ventricles, the second of which alone is the true one; the first and third arising intirely from the Methods of preparing the Parts. To these a fourth third Ventricle might be added, if the small Fissure under the Fornix could be looked upon as a Passage between the two anterior Ventricles and the fourth. But it is so small and so full of the Vessels and Glands of the Plexus Choroides, that I doubt very much whether there can be any Communication that Way, between the anterior and posterior Ventricles, especially since *Silvius*'s third Ventricle is sufficient for that Purpose, and likewise answers the Design so perfectly well, that whatever goes from the lateral to the posterior Ventricle, must first of all fill the Infundibulum and this Canal.

Two Glands are reckoned to belong to the Brain, though we know not if either of them resembles Glands in any Thing more than in the Figure, and even that, when well examined, will be found to be different from what it is in the rest. The superior or Pineal Gland is not like a Pine-Apple, either in Brutes or in Man; and it is not known whether the inferior or Pituitary Gland acts in any Respect on the Pituita.

The Plexus Choroides represents a vascular Texture, in which the Veins are seen very distinct from the Arteries, and the Distribution of each may be traced separately. The Name of Fornix gives the Idea of an arched or vaulted Part, which however is not to be found, when looked for in a proper Manner. The Corpus Callosum in the common Signification means the white Substance of the Brain which comes into View when the two lateral Parts are separated; but as it intirely resembles the rest of the Substance

ſtance of the Brain, there can be no Reaſon for giving a particular Name to one Part of this Subſtance.

THERE are but two Ways of coming at the Knowledge of a Machine, either to be taught the whole Contrivance by the Maker, or to take it quite to Pieces, and to examine each Piece by itſelf, and as it ſtands in Relation to the reſt. Theſe are the only true Ways of learning the Contrivance of any Machine; but the Generality of Inquirers have thought that they had better gueſs at it, than be at Pains to examine it throughly. They have ſatisfied themſelves with obſerving its Motions, and on theſe Obſervations they have built Syſtems which they believed to be true, becauſe by their Help, they imagined they could explain all the Effects which they knew. They never conſidered that the ſame Thing may be explained in different Manners; and that the Senſes alone are capable of informing us whether our Ideas be conformable to Nature. As the Brain is a Machine, we muſt not flatter ourſelves that we can diſcover the Contrivance of it by any other Means than are made uſe of for knowing other Machines; and we have no Way left but to take it to Pieces, and to conſider what every Part is capable of in a ſeparated and in an united State. In this Search, we may truly ſay that few Anatomiſts have diſcovered any great Degree of Curioſity. Chymiſtry has in all Ages found both private Men and Princes very ready to erect Laboratories; but few have purſued Anatomy with equal Ardour. This Neglect is not owing to Princes, among whom, many have had Curioſity enough for ſuch an important Part of Knowledge, to build magnificent Anatomical Theatres, which they have often honoured with their Preſence. But the Diſſecters being always willing to appear compleat Maſters of this Science, never have had the Sincerity to own that any Thing ſtill remained to be known, and to conceal their Ignorance, have contented themſelves with demonſtrating what is to be found in the Writings of the Ancients.

ANATOMISTS might have Reaſon to blame me, if I did not ſhew by a farther Explanation, that they are not ſo much in the wrong as I ſeem to inſinuate, by ſaying, that they do not apply themſelves ſufficiently to Anatomical Inquiries. They that ſtudy Anatomy are generally either Phyſicians or Surgeons, who being both obliged to viſit their Patients, have too little Time left for Study, after they have attained to a tolerable Degree of Reputation. But they ought not to undertake the Cure of a Body, the Make of which they do not know; that is, they ought not to endeavour to rectify a Machine, till they are previouſly acquainted with its Nature. Others who do not viſit ſick Perſons, and have no other Buſineſs but that of teaching Anatomy in publick Schools, do not look upon themſelves as more obliged to purſue Anatomical Inquiries than the practiſing Phyſicians and Surgeons. The Deſign of their Profeſſion is to teach to thoſe who are to practiſe Phyſick and Surgery, the Deſcriptions left us by the Ancients, of the Structure of the Human Body; and when they have clearly demonſtrated all that is contained in the Works of the Ancients, and their Hearers have as diſtinctly underſtood them, they both imagine that they

have done their Duty. The Bounds of these different Professions of teaching and practising have been so very ill settled, that the true Knowledge of the Human Machine, though the most necessary Branch, is neglected, as belonging neither to the Anatomist, Physician, nor Surgeon.

To make the necessary Inquiries for the Discovery of Truth, a Man's whole Time must be taken up; and Professors of Anatomy, who are obliged to make publick Demonstrations, which employ a great deal of Time and Labour, cannot be proper for this Study, for the Reasons already given, and for the following, which are no less evident.

1. There is so much Time and Application required to examine each Part as it ought, that every Thing else must be laid aside, and we must mind nothing but that. Physicians and Surgeons cannot comply with this because of their Practice; nor Professors, because of their publick Demonstrations. Whole Years may sometimes be necessary to discover what may afterwards be demonstrated to others in the Space of an Hour. I do not question but that *Pecquet* was a great while in carrying the Chyle from the Mesentery to the Subclavian Vein; and perhaps I should not be believed, were I to mention what Difficulties I found, before I could shew the true Insertion of *Pecquet*'s Duct, of which *Bilsius* had given us a Figure; whereas at present they may be both prepared and demonstrated in half an Hour.

2. Though Anatomists open a thousand Bodies in the Schools, it is by meer Accident if they ever discover any Thing new. They are obliged to demonstrate the Parts as described by the Ancients, and in doing this it is necessary they should follow a certain Method; whereas Inquiries admit of no settled Method, but must be pursued in every Manner that can be thought of. In the Schools every Thing must be removed that lies in the Way of the Part which they want to shew; but in particular Searches no Part must be cut off till we have first examined it; and if any such Thing were attempted in publick Dissections, the Demonstrator would be looked upon as ignorant; and the Spectators would be often in the right to complain of Loss of Time, because he would not always be sure to find what he proposed to shew them. It is evident from these Considerations, that Professors have not hitherto been obliged to make Inquiries in Anatomy, and even that it is impossible for them to do it, were they ever so willing; so that it is not their Fault that greater Progress has not been made in that Science.

Anatomy in general has, we see, been managed hitherto with very little Success; and the Inquiries into the Brain have succeeded less than any others, because they have not been made with that Care and Diligence which the Difficulty of the Subject requires. Let us now consider the true Method, and examine if any Person has hitherto found it out.

Bilsius applied himself to Anatomy, without having studied the Writings of the Ancients, and I make no Question but that he would have made a greater Progress, if after having learned all that is good in these Writings, he had employed his Time and Application in making new Discoveries. We must own that the Works of our Predecessors contain very fine Experiments,

ments, which we might ſtill have been ignorant of, if they had not handed them down. And they have ſometimes told us Truths, which their Succeſſors, for Want of ſufficient Application, have not been able to ſee. It muſt, however, be owned, that all that both Ancients and Moderns have told us about the Brain is ſo uncertain, that the Books which contain the Anatomy of this Organ may be ſaid to be chiefly a Collection of Doubts, Diſputes and Controverſies; but ſtill a great Advantage may be made of their Labour, and even of their Miſtakes. I here ſpeak of the Authors who have diſſected, for as for thoſe who only copy the Works of others, the beſt that can be ſaid of them is, that it may ſometimes be proper to read their Books by Way of Diverſion. But they would have deſerved a great deal more Commendation, and been more uſeful to thoſe who diſſect, if they had given us only an exact Relation of all that Anatomiſts have wrote about the Brain; if they had explained, according to the Laws of a true Analyſis, all the different Ways of accounting for the Animal Actions mechanically; or if they had made an exact Liſt of all the Propoſitions found in theſe Writings, diſtinguiſhing thoſe which are founded on Facts and Experience, from thoſe which contain Reaſonings and Concluſions drawn from the former. None of theſe Methods have hitherto been purſued by the Compilers, and therefore we muſt confine ourſelves moſtly to the original Authors.

The firſt Thing to be conſidered is the Hiſtory of the Parts; and in this we ought preciſely to determine what is true and certain, that we may be able to diſtinguiſh that, from what is falſe or uncertain. Neither is it ſufficient that we ourſelves are ſatisfied about any Thing; the Evidence of our Demonſtrations ought to be ſo clear as to oblige every Body elſe to aſſent to them, for otherwiſe the Number of Diſputes would rather increaſe than diminiſh. Every Anatomiſt who diſſects the Brain demonſtrates from Experience what he advances. This ſoft and pliable Subſtance ſo readily yields to every Motion of his Hand, that the Parts are imperceptibly formed in the ſame Manner as he had conceived them before Diſſection; while the Spectator, who often ſees two contrary Experiments made on the ſame Part, is either puzzled very much to know which he ought to embrace, or obliged to reject both to make himſelf eaſy. Therefore to prevent this Inconveniency, it is abſolutely neceſſary to carry Diſſections the Length of a convincing Certainty, which, though very difficult, is very far from being impoſſible. For I would not have you imagine from what I have ſaid, that I believe there is nothing certain in Anatomy; or that all who follow that Study, make the Parts appear as they have a Mind, without any Danger of being diſcovered. You may indeed juſtly doubt, if Parts which are ſhewn you ſeparated, were ever united; but it would be impoſſible to ſhew them united together, if they were not naturally ſo. To clear up any Doubt that might ariſe on this Subject, and to be certain whether the Parts which are ſhewn you were naturally joined or not, you need only examine them in their natural State, without uſing any Kind of Violence, but allow thoſe whom you have a Mind to convince, to do all that is in their Power

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to ſhew that they are united. We may come at the ſame Degree of Certainty in other Circumſtances, and particularly when we inquire into the Situation of Parts, provided we touch nothing without having firſt examined it, and ſet down every Moment what we touch. In order to this we muſt not only be very attentive to the Part which we examine, but alſo reflect on all that we did before we reached it, to ſee if theſe Operations may have changed it from its natural State in any Reſpect. For by often handling more exterior Parts, we may eaſily affect thoſe that lie within them, and when theſe come in Sight, we are apt to imagine that they are naturally ſuch as they then appear, without conſidering how far we may have altered their Situation and Connexion with other Parts. The moſt famous Anatomical Diſpute which this Age has produced may ſerve for an Example of what I ſay. They who deny the Continuation of the Glandula Pinealis with the Subſtance of the Brain, and the Adheſion of the Fornix to the Baſis of the Brain, would not talk ſo poſitively concerning a Matter of Fact, if they did not believe it to be proved by inconteſtable Experiments and Obſervations. But in making theſe Experiments they muſt neceſſarily have forgot the Changes which happen in ſeparating the exterior Parts, and that they deſtroy all the Connexions by which the Dura Mater adheres to the Cranium; and I have often obſerved that in raiſing the ſuperior Part of the Cranium, the Middle of the Dura Mater continued ſtill to adhere to it, even after I had opened it ſufficiently to thruſt in three Fingers between the ſeparated Parts of the Cranium. Now, how can the Dura Mater be thus raiſed without making the inferior Parts to which it is fixed ſuffer Violence? The Glandula Pinealis adheres to the fourth Sinus, which is connected with the Falx, ſo that the Dura Mater cannot be raiſed at that Place without affecting the Gland. This Falx receives likewiſe all the Veins which paſs between the Fornix and the Baſis of the Brain, and by which theſe two Parts are connected. There is a pretty ſtrong Connexion between the upper Part of the Brain and the Dura Mater, and when that Membrane is raiſed, the Brain muſt follow it; and the fourth Sinus being carried upward, breaks the Connexion between the Fornix and the Baſis. I have many Times been deceived about this when I firſt began to diſſect the Brain, and I uſed to wonder why theſe Connexions were not always ſenſible. But obſerving afterwards in Horſes, Sheep, Cats, &c. where that Part of the Dura Mater which ſeparates the Cerebrum from the Cerebellum is oſſified, that I deſtroyed a great many of the inner Parts in extracting this Bone; I began to perceive the Cauſe of this Miſtake, and that it was not an eaſy Matter to ſeparate the Cranium as it ought. The common Way is to divide the Cranium by a circular Section, to remove the upper Segment, but if this Segment were again divided by a Section perpendicular to the former, it would be much more eaſily removed without doing any Violence to the Brain; for Sciſſars, Saws and Forceps cannot be handled without ſhaking and diſordering the Parts. A ſmall circular Saw might be contrived which would not ſhake the Parts very much, eſpecially if it were turned upon a proper Axis placed between two pointed Pillars. This Saw might likewiſe be

employed for ſeveral other Purpoſes in ſeparating the Cranium; but if any Liquor could be diſcovered to diſſolve or ſoften the Bones in a ſmall Space of Time, this would be by far the beſt Way of ſeparating the Cranium.

It is not ſufficient to be continually attentive; we muſt likewiſe make uſe of different Methods of Diſſection, which are ſo many different Proofs of the Truth of our Operations, in order to ſatisfy ourſelves and to convince others.

This will appear a very ſtrange Doctrine to thoſe who believe that there are ſtated Laws for the Diſſection of every Part, and that the Anatomical Adminiſtrations taught us by the Ancients, ought to be inviolably obſerved without any Change or Addition. I own that the Ancients might have given us unalterable Rules for the Diſſection of each Part, had they been ſufficiently acquainted with them themſelves; but as they certainly knew leſs about many Parts than we do, they were at leaſt as unfit as we are, to preſcribe Rules which can never be fixed or conſtant till more Diſcoveries have been made. It will here be objected that ſome Method muſt be followed in diſſecting the Parts already known. This I readily grant, and alſo that the Method of the Ancients is to be made Uſe of till a better is found out; but I would not have that Method looked upon as perfect or unalterable. The principal Reaſon why a great many Anatomiſts have remained in their Miſtakes, and why they have gone no greater a Length than the Ancients in Diſſection, is becauſe they believe that every Thing has been already taken Notice of, and that there is nothing left for the Moderns to do; and as they have looked upon the ancient Laws as inviolable Rules in Diſſection, they ſpent their whole Lives in demonſtrating the ſame Parts in the ſame Manner; whereas Anatomy ought to be confined by no Rules, every new Diſſection requiring a different Method. The Advantage of proceeding in this Manner is, that if we miſs of new Diſcoveries, we at leaſt are put in a Condition to find out any Miſtakes that may have happened in former Diſſections, eſpecially in controverted Points, in which the Spectators ought to have the Liberty of preſcribing the Rules of Diſſection.

This Method of Diſſection makes indeed but a very ſmall Shew, and a Man cannot well diſplay his Learning at the ſame Time that he acknowledges his Ignorance; but as for my own Part I much rather chooſe to own what I do not know, than to impoſe upon my Hearers, ancient Opinions, which will ſome Time or other be demonſtrated to be falſe. We have ſeen great Anatomiſts expoſed to this Mortification; and we ſtill ſee many who believe that more Regard will be paid to their Stiffneſs and Poſitiveneſs in Opinion than to ocular Demonſtration. I wiſh theſe Gentlemen much Joy of their Self-conceit; while I endeavour to follow the Laws of Philoſophy, by which we are taught to ſearch after Truth in ſo cautious a Manner, as never to believe we have found it, till it brings Demonſtration along with it.

I cannot prove to you the Neceſſity of often changing the Methods of Diſſection better than by the two following Examples. It is a confirmed

Experiment

Experiment that by blowing into the Beginning of the Fiſſure under the Fornix, the Fornix is ſeparated from the Baſis, and a conſiderable Cavity left between them; and the ſame Thing happens when we ſeparate the Cranium with Violence, as I have already ſaid. This is ſo evident, that both the Diſſector and the Spectators are fully convinced of it; but if any Perſon ſhould ſtill be in Doubt, there is no other Way to clear it up but to endeavour to demonſtrate this Cavity in another Manner. For if it be natural, we muſt always find it the ſame, in whatever Manner we look for it; but if by any other Method you find that it is wanting, and that the Parts between which it ought to lie, are connected together, without leaving any void Space between them, you ought from that Moment to be convinced of the Falſity of the former Demonſtration, and that it was the Force of the Air to which the Appearance of a Cavity was owing.

If the Brain is diſſected according to the Method of *Varolius* or *Willis*, after having taking it out of the Cranium, you will commonly ſee the ſecond Pair of Tubercles ſeparated at the Middle of that white Subſtance which lies before the Glandula Pinealis, and which is very often broken. When we make the Diſſection, leaving the Brain in the Cranium, we ſee both the Tubercles and the white Subſtance intire, and then we ſee plainly that the Cauſe of the firſt Miſtake was owing to the Weight of the lateral Parts which break thoſe in the Middle.

Having made a true and exact Plan of the Parts of the Brain; having diſcovered the Miſtakes and the Cauſes of theſe Miſtakes; and having ſettled the true Method of demonſtrating theſe Parts, with all the neceſſary Precautions; the next Step is to expreſs by good Figures all that we have diſcovered; for we had better be without Figures than not have them true and faithful. When we cannot have Recourſe to the Originals, the Repreſentation ſerves to keep us in Mind of them; and many Perſons never have an Opportunity of ſeeing the Parts in any other Way, their Averſion for Blood hindering them from ſatisfying their Curioſity by examining dead Bodies; and therefore if the Figures are not true, they give falſe Ideas to thoſe who would learn Anatomy by their Help, and puzzle others who make uſe of them only to refreſh their Memory.

We ought therefore to leave nothing undone to procure exact Figures; in order to which a good Drawer is as neceſſary as a good Anatomiſt. We muſt likewiſe apply ourſelves very particularly to ſee in what Manner we ought to diſſect and diſpoſe the Parts ſo as to exhibit all that is to be ſeen in the Brain, there being Difficulties peculiar to this Organ. The other Parts require only a Preparation to compleat the Figures we deſign; whereas the Brain, never ſo well prepared, ſubſides before the Figure can be taken; and we muſt have ſeveral freſh Subjects before one Figure can be finiſhed. To this perhaps it is owing that no Anatomical Figures are ſo imperfect as thoſe of the Brain.

I have hitherto ſaid nothing of the Uſes of the Parts, nor of the Animal Actions, as they are called, becauſe it is impoſſible to explain the Movements of a Machine, till we know the Contrivance of its Parts. A reaſonable

ſonable Man muſt in his own Mind laugh at theſe poſitive Anatomiſts, who having made a long Harangue about the Uſe of Parts, the Structure of which is altogether unknown to them, give this as the only Reaſon of all they advance, that God and Nature do nothing in vain. They deceive themſelves in the Application of this general Maxim; and the Part which they raſhly judge to have been made by God for one End, is afterwards diſcovered to have been made for another. We had therefore much better own our Ignorance, be more reſerved in our Deciſions, and not undertake upon ſuch ſlight Conjectures to explain Matters which are in their own Nature ſo difficult.

All that I have hitherto mentioned is but a very ſmall Part of what ought to be done, in order to acquire the Knowledge of the Brain. We ought moreover to examine the Heads of all Animals, and in all the different States of each Animal. In the Fœtus of Animals we ſee how the Brain is gradually formed; and what could not be ſeen in a ſound healthy Brain, may perhaps be diſcovered in one that is diſeaſed.

In living Animals we ought to conſider every Thing that may cauſe the leaſt Alteration in the Actions of the Brain, whether the Cauſes be external, as from Liquors, Wounds, Medicines, &c. or internal, as a great Number of Diſeaſes reckoned up by Phyſicians. There is likewiſe this Advantage attending the Diſſection of the Brains of Animals, that we may manage them as we pleaſe. We may learn to trepan, or to perform any other ſurgical Operation upon them; we may examine whether the Brain has any Motion in theſe Operations, and whether the Application of any Medicine to the Dura Mater, or to the Subſtance or Ventricles of the Brain, may not produce ſome particular Effects.

We might likewiſe make different Trials without opening the Cranium, by applying Medicines exteriorly, by mixing them with the Food, and by Injections into the Veſſels, in order to diſcover what diſturbs the Animal Actions, and what is moſt proper to reſtore them when diſordered.

The Brain is different in different Animals; and this is another Reaſon why we ſhould examine them all. The Brains of Birds and Fiſhes are not at all like that of Man; and even in Animals where there is the greateſt Likeneſs to the Human Brain, I have always found a very great Variety. Whatever this Difference be, it may always afford us ſome new Light, and teach us what it is abſolutely neceſſary we ſhould know. In ſome Animals the Fibres are more eaſily ſeen than in Men; and the Parts which in the Human Brain are mixed and joined together, are ſometimes diſtinct and ſeparate in Animals; and we often meet with the Subſtance more or leſs ſolid, and the Size and Situation different.

I need not inſiſt any longer on this Subject, becauſe I believe we are all convinced that we are indebted to the Diſſection of Animals for almoſt all the new Diſcoveries of this Age; and that there are many Parts which would never have been found in the Human Brain if they had not firſt been obſerved in Animals.

WHAT I have hitherto ſaid concerning the Inſufficiency of all the Syſtems of the Brain, concerning the Want of a true Method in diſſecting it, concerning the infinite Number of Inquiries that ought to be made about it in Man and in Brutes, in all their different States, concerning the Barrenneſs of all the Writers on this Subject, and concerning the Precautions that muſt be uſed in handling theſe tender Parts, ought certainly to undeceive thoſe who ſatisfy themſelves with what they find in the Books of the Ancients. We muſt always remain in Ignorance if we ſit down with what the Ancients have taught us, and if Men capable of making ſuch Inquiries do not contribute their Labour, Induſtry, and Study, in order to arrive at the Knowledge of Truth, which is the principal Aim of all who ſearch for it ſincerely.

The Paſſages from Deſcartes *referred to in this Diſſertation are theſe.*

Page 11. FOR we muſt know that the other Veſſels which bring the Blood from the Heart, having been divided into an infinite Number of ſmall Branches diſpoſed in a reticular Manner, and which are ſpread like a thin Web in all the Cavities of the Brain, are collected round a certain ſmall Gland ſituated almoſt in the Middle of the Subſtance of the Brain at the Entry of the Cavities, and have in this Place a great Number of ſmall Holes, through which the moſt ſubtle Parts of the Blood which they contain may be conveyed to the Gland, becauſe they are too ſmall to allow the groſſer Parts to paſs. Theſe Arteries do not terminate here, but ſeveral of them being united into one, run up in a ſtraight Courſe to that great Veſſel, which like an Euripus ſupplies all the exterior Surface of the Brain.

Page 12. THE Gland is to be looked upon as a rich Source, from which the fineſt and moſt agitated Parts of the Blood run on all Hands into the Cavities of the Brain.

Page 63. IMAGINE the Surface which is turned toward the Cavities, to be a Piece of cloſe Network or Plexus, all the Meſhes of which are ſo many ſmall Holes through which the Animal Spirits may paſs, and being turned toward the Gland from which all theſe Spirits proceed, they can eaſily be directed toward all the different Points of this Gland.

Page 65. THE Spirits do not ſtop any where, but in Proportion as they enter the Cavities of the Brain by the Holes of the ſmall Gland, they run directly toward thoſe of the ſmall Tubes which are over againſt them.

Page 72. IN explaining how Figures are marked in the Spirits on the Surface of the Gland, he determines plainly enough the Relation which he ſuppoſes to be between the inner Surface of the Brain and that of the Gland.

Page 77. IT ought likewiſe to be conſidered that the Gland is compoſed of a ſoft Matter, and that it is not all united to the Subſtance of the Brain, but only connected to ſmall Arteries (the Coats of which are very looſe

and

and pliable) and ſupported in its Situation by the Force of the Blood in theſe Arteries; ſo that a very ſmall Matter may incline it to either Side, and by ſo doing diſpoſe the Spirits which it contains to run toward one Part of the Brain rather than to another . . . . . If the Spirits were of equal Force, the Gland would always be kept in an immoveable erect Poſture in the Center of the Head.

Page 77. As the Spirits flow out more readily from one Part of the Brain than from another, they may have Force enough to turn the ſmall Tubes in the inner Surface of the Brain into which they run, towards the Place from whence they flow out, if they do not find them in that Direction.

§. 11. *Pericranium.*

196. Besides the external Integuments of the Head, the Skin, Hair, and Cellular Subſtance, there is an Aponeurotic Expanſion which covers the Head like a Cap, and is ſpread round the Neck and on the Shoulders like a Riding-Hood; and for this Reaſon I give it in general the Name of Hood, and I call the upper Portion of it the Aponeurotic Cap.

197. This Aponeuroſis is very ſtrong on the Head, and it appears to be made up at leaſt of two Strata of Fibres croſſing each other. As it is ſpread on the Neck it becomes gradually thinner, and ends inſenſibly on the Clavicles. It ſends out a Production on each Side from above downward, and from without inward, which having paſſed over the ſuperior Extremity of the Muſculus Sterno-Maſtoidæus, runs behind that Muſcle toward the tranſverſe Apophyſes of the Vertebræ of the Neck, where it communicates with the Ligamenta Intertranſverſalia.

198. The external Surface of all the Bones of the Head, as well as of all the other Bones of the Human Body, except the Teeth, is covered by a particular Membrane, of which that Portion which particularly inveſts the Cranium is named Pericranium, and that which inveſts the Bones of the Face is ſimply termed Perioſteum.

199. The Pericranium is made up of two Laminæ cloſely united together. The internal Lamina, which has by ſome been taken for a particular Perioſteum, covers immediately all the bony Parts of this Region; and the external Lamina has been looked upon as a Membrane diſtinct from the internal, and named Pericranium particularly.

200. The external Lamina of the Pericranium parts from the other at the ſemi-circular or ſemi-oval Plane mentioned in the Deſcription of the Skeleton N° 182. and becomes a very ſtrong Aponeurotic or Ligamentary Tent, which covers the Temporal Muſcle, and is afterwards fixed in the external angular Apophyſis of the Os Frontis, in the poſterior Edge of the ſuperior Apophyſis of the Os Malæ, and in the ſuperior Edge of all the Zygomatic Arch, as far as the Root or Baſis of the Maſtoide Apophyſis.

201. In the Interſtice between the two Laminæ at this Place lies a large Portion of the Muſculus Temporalis, being inſerted in each Lamina in the Manner already ſaid in the Deſcription of the Muſcles. The reſt which does not give Inſertion to this Muſcle, that is, between the lower Portion of the Muſcle and Zygomatic Arch, is filled by a cellular and fatty Subſtance. At this Place the Aponeurotic Hood is ſeen to join the external Lamina of the Pericranium, and they both communicate with particular Aponeurotic Expanſions of the neighbouring Muſcles, the Sterno-Maſtoidæus, Maſſeter, Zygomaticus, &c.

ART. II.

The Eye.

§. 1. *The Eye in general.*

Situation and Compoſition.

202. THE Eyes are commonly two in Number, ſituated at the lower Part of the Forehead, one at each Side of the Root of the Noſe; and they are made up of hard and ſoft Parts. The hard Parts are the Bones of the Cranium and Face, which form two Pyramidal or Conical Cavities, like Funnels, to which we give the Name of Orbits. The ſoft Parts are of ſeveral Kinds.

203. The principal and moſt eſſential ſoft Part in each Organ is the Globe or Ball of the Eye; the others are partly external and partly internal. The external Parts are the Supercilia or Eye-Brows, the Palpebræ or Eye-Lids, the Caruncula Lacrymalis, and the Puncta Lacrymalia; and the internal Parts are the Muſcles, Fat, Lacrymal Gland, Nerves and Blood-Veſſels.

The Orbits.

204. Seven Bones are concerned in the Compoſition of each Orbit, viz. the Os Frontis, Os Sphenoidale, Os Ethmoides, Os Maxillare, Os Malæ, Os Unguis, and Os Palati. In each Orbit we are to conſider the Edge, Sides and Bottom. The Edge is formed by the Os Frontis, Os Maxillare, and Os Malæ; the Bottom by the Os Sphenoides and Os Palati; and all theſe Bones, except the Os Palati, contribute to form the Sides. The Bottom is perforated by the Foramen Opticum of the Os Sphenoides; and the external Side near this Foramen, by two orbitary Fiſſures, one ſuperior, called Sphenoidalis, the other inferior, called Spheno-Maxillaris, as has been already ſaid in the Deſcription of the Skeleton.

205. All the Cavity of the Orbit is lined by a Membrane, which is an Elongation or Production of the Dura Mater; and it comes partly through the Foramen Opticum of the Os Sphenoides, and partly through the Sphenoidal or ſuperior Orbitary Fiſſure. This Membrane, which may be looked upon as the Perioſteum of the Orbit, communicates with the Perioſteum of the Baſis Cranii by the inferior Orbitary Fiſſure, and with the Perioſteum

teum of the Face at the Edge of the Orbit. At the upper Part of the Edge of the Orbits, the two Perioſtea form a Kind of broad Ligament, and a narrow one at the lower Part of this Edge, which I ſhall call Ligaments of the Palpebræ.

206. The particular Situation of the Orbits repreſents nearly two Funnels, placed laterally at a ſmall Diſtance from each other, in ſuch a Manner as that their Apices are almoſt joined, their neareſt Sides almoſt parallel, and the other Sides turned obliquely backward; and for this Reaſon, the Middle of the great Circumference or Edge of each Orbit is at a much greater Diſtance from the Septum Narium, than the Bottom or Apex; and the Edge or great Circumference is very oblique, the temporal or external Angle of the Orbit lying more backward than the naſal or internal Angle.

§. 2. *The Globe or Ball of the Eye.*

207. The Globe of the Eye being the moſt eſſential of all the ſoft Parts belonging to the Organ of Sight, and being likewiſe a Part which we are obliged to mention as often as we ſpeak of the other ſoft Parts, muſt be firſt deſcribed. It is made up of ſeveral proper Parts, ſome of which being more or leſs ſolid, repreſent a Kind of Shell formed by the Union of ſeveral Membranous Strata called the Coats of the Globe of the Eye; and the other Parts being more or leſs fluid, and contained in particular Membranous Capſulæ, or in the Interſtices between the Coats, are termed the Humours of the Globe of the Eye. Theſe Capſulæ are likewiſe termed Coats. *Compoſition.*

208. The Coats of the Globe of the Eye are of three Kinds. Some form chiefly the Shell of the Globe; ſome are additional, being fixed only to a Part of the Globe, and ſome are capſular, which contain the Humors. The Coats which form the Shell are three in Number. The external, to which the Convexity of the Globe is owing, is termed Tunica Sclerotica or Cornea; the middle Coat is named Choroides, and the third or innermoſt, Retina. The additional Coats are two, one called Tendinoſa or Albuginea, which forms the White of the Eye, and the other, Conjunctiva. The Capſular Tunicæ are likewiſe two, the Vitrea and Cryſtallina.

209. The Globe of the Eye thus formed, ſends out backward a pretty large Pedicle, which is the Continuation of the Optic Nerve. It is ſituated about the Middle of the Orbit in the Manner which we ſhall afterwards ſee; and it is tied to it by the Optic Nerve, by ſix Muſcles, by the Tunica Conjunctiva, and by the Palpebræ. The Backpart of the Globe, the Optic Nerve and Muſcles, are ſurrounded by a ſoft fatty Subſtance, which fills the ſtre of the Bottom of the Orbit.

210. The Humors are three in Number, the Aqueous, Vitreous and Cryſtalline. The firſt may properly enough be called an Humor, and is contained in a Space formed in the Interſtices of the anterior Portion of the

the Coats. The ſecond or Vitreous Humor is contained in a particular Membranous Capſula, and fills above three Fourths of the Shell or Cavity of the Globe of the Eye. It has been named Vitreous from its ſuppoſed Reſemblance to melted Glaſs, but it is really more like the White of a new laid Egg.

211. The Cryſtalline Humor is ſo called from its Reſemblance to Cryſtal, and is often named ſimply the Cryſtalline. It is rather a Gummy Maſs than an Humor, of a lenticular Form, more convex on the Back than on the Foreſide, and contained in a fine Membrane called Membrana or Capſula Cryſtallina. What I have here ſaid is ſufficient to give a general Idea of the three Humors of the Globe of the Eye.

§. 3. *The Coats of the Eye in particular.*

Tunica Sclerotica.

212. The moſt external, thickeſt and ſtrongeſt Coat of the Eye is the Sclerotica or Cornea, and it inveſts all the other Parts of which the Globe is compoſed. It is divided into two Portions, one called Cornea Opaca, the other Cornea Lucida, which is only a ſmall Segment of a Sphere, ſituated anteriorly.

213. The Cornea Opaca is made up of ſeveral Strata cloſely connected together, and is of an hard compact Texture reſembling Parchment. About the Middle of its poſterior convex Portion where it ſuſtains the Optic Nerve, it is in a Manner perforated, and thicker than any where elſe; its Thickneſs diminiſhes gradually toward the oppoſite Side, and its Subſtance is penetrated obliquely in ſeveral Places by ſmall Blood-Veſſels. The Courſe of the Nervous Filaments through this Coat is very ſingular; they enter the convex Side at ſome Diſtance from the Optic Nerve, and running from thence through its Subſtance, they pierce the concave Side near the Cornea Lucida.

214. The Cornea Lucida called likewiſe ſimply Cornea, the opaque Portion being named Sclerotica, is made up in the like Manner of ſeveral Strata or Laminæ cloſely united, and appears to be a Continuation of the opaque Portion or Sclerotica, though of a different Texture. When macerated in cold Water, it ſwells.

215. This Portion is ſomething more convex than the Cornea Opaca, ſo that it repreſents the Segment of a ſmall Sphere added to the Segment of a greater; but this Difference is not equally great in all Perſons. The Circumference of the convex Side is not circular as that of the concave Side, but tranſverſely oval; for the ſuperior and inferior Portions of the Circumference terminate obliquely; but this Obliquity is more apparent in Oxen and Sheep than in Man.

216. The Cornea Lucida is perforated by a great Number of imperceptible Pores, through which a very fine Fluid is continually diſcharged, which ſoon afterwards evaporates; but we diſcover it evidently by preſſing the Eye ſoon after Death, having firſt wiped it very clean, for we then ſee a gradual Collection of a very ſubtle Liquor, which forms itſelf into little

Drops; and this Experiment may be ſeveral Times repeated on the ſame Subject. It is this Dew that forms a Kind of Pellicle on the Eyes of dying Perſons, which ſometimes cracks ſoon after, as is obſerved in the Memoirs of the Academy for 1721.

Tunica Choroides.

217. THE ſecond Coat of the Globe of the Eye is the Choroides, which is of a blackiſh Colour, more or leſs inclined to red, and adheres, by Means of a great Number of ſmall Veſſels, to the Cornea Opaca, from the Inſertion of the Optic Nerve all the Way to the Union of the two Corneæ, where it leaves the Circumference of the Globe and forms a perforated Septum, by which the ſmall Segment of the Globe is ſeparated from the greater. This Portion goes commonly by the particular Name of Uvea, which was formerly given to the whole ſecond Coat; and as it is of different Colours in ſeveral Subjects, it has likewiſe got the Name of Iris, which Term, however, agrees more preciſely to the coloured Surface of this Portion, and would even be very improper for this Surface in Perſons where it is uniformly brown, black, or blackiſh.

218. THE external Lamina of the Choroides is ſtronger than the internal, and both appear blackiſh becauſe of their Tranſparency. At a very ſmall Diſtance from the Union of the two Corneæ, this Lamina is moſt cloſely united to the Cornea Opaca. Round this Adheſion it changes Colour and forms a whitiſh Ring of the ſame Breadth with the Adheſion; and near the Edge of the Sclerotica this Ring is ſtronger and of a different Texture from what it is any where elſe. It adheres ſo cloſely to the Sclerotica, that if we blow through a ſmall Hole made therein without touching the Choroides, the Air will penetrate every where between the two Coats, but cannot deſtroy this Adheſion, or paſs to the Cornea Lucida. This Adheſion has been improperly named Ligamentum Ciliare. On the inner Surface of this Lamina we diſcover a great Number of flat Lines in a vortical Diſpoſition, which are the Veſſels named by *Steno* Vaſa Vorticoſa, or Vortices Vaſculoſi, of which hereafter.

219. THE internal Lamina of the Choroides is thinner than the external; and its Surface, together with the correſponding Surface of the other Lamina, is covered by a blackiſh Subſtance with ſome Mixture of red, which eaſily ſeparates when touched, and immediately tinges the Water in which the Choroides is dipt. The Origin of this Subſtance has not as yet been diſcovered; but after a nice Anatomical Injection, I have obſerved a great Number of vaſcular Stars on the inner Surface of this Lamina. In *M. Ruyſch*'s Works, it is termed Membrana Ruyſchiana.

Uvea, Iris, Pupilla, and Proceſſus Ciliares.

220. THE anterior Portion or perforated Septum of the Choroides has the Name of Uvea, and the Hole near the Center of this Septum is called Pupilla. The anterior Lamina of the ſame Septum is termed Iris, and the radiated Plicæ of the poſterior Lamina, Proceſſus Ciliares. Between the two Laminæ of the Uvea we find two very thin Planes of Fibres which appear to be fleſhy, the Fibres of one Plane being orbicular, and lying round the Circumference of the Pupilla, and thoſe of the other be-

being

ing radiated, one Extremity of which is fixed to the orbicular Plane, the other to the great Edge of the Uvea.

221. The Plicæ or Proceſſus Ciliares are ſmall radiated and prominent Duplicatures of the poſterior Lamina of the Uvea, and their Circumference anſwers partly to that of the white Ring of the external Lamina. They are oblong thin Plates; their poſterior Extremities, or thoſe next the Choroides, being very fine and pointed; the others, or thoſe next the Pupilla, broad, prominent, and ending in acute Angles. In the Duplicature of each Ciliary Fold we find a fine reticular Texture of Veſſels; and ſome pretend to have ſeen fleſhy Fibres in the ſame Place, lying in ſmall Grooves of the Membrana Vitrea, as we ſhall ſee hereafter.

222. The Space between the Cornea Lucida and Uvea contains the greateſt Part of the Aqueous Humor, and communicates by the Pupilla with a very narrow Space behind the Uvea, or between that and the Cryſtalline. Theſe two Spaces have been termed the two Chambers of the Aqueous Humor, one anterior, the other poſterior, as I ſhall obſerve in deſcribing this Humor in particular.

Retina.

223. The third Coat of the Eye is of a very different Texture from that of the other two Coats. It is white, ſoft, and tender, and, in a Manner, Medullary, or like a Kind of Paſte ſpread upon a fine reticular Web. It appears to be thicker than the Choroides, and reaches from the Inſertion of the Optic Nerve, to the Extremities of the Ciliary Radii, being equally fixed to the Choroides through its whole Extent. At the Place which anſwers to the Inſertion of the Optic Nerve, we obſerve a ſmall Depreſſion, in which lies a Sort of medullary Button terminating in a Point; and from this Depreſſion Blood-Veſſels go out, which are ramified on all Sides through the Subſtance of the Retina.

224. It is commonly ſaid that the Retina is a Production or Expanſion of the Medullary Subſtance of the Optic Nerve; the Sclerotica, of the Dura Mater, and the Choroides, of the Pia Mater, which accompanies this Nerve. But this Opinion is not agreeable to what we obſerve in examining the Optic Nerve, and its Inſertion in the Globe of the Eye. If we take a very ſharp Inſtrument and divide this Nerve through its whole Length, between where it enters the Orbit and where it enters the Globe, into two equal lateral Parts, and then continue this Section through the Middle or Center of its Inſertion, the following Phænomena will appear.

225. That the Nerve contracts a little at its Inſertion into the Globe; that its outer Covering is a true Continuation of the Dura Mater; that this Vagina is very different from the Sclerctica both in Thickneſs and Texture, the Sclerotica being thicker than the Vagina, and of another Structure; that the Vagina from the Pia Mater forms, through the whole Medullary Subſtance of the Nerve, ſeveral very fine Cellular Septa, and that where it enters the Globe of the Eye, the Pia Mater does not directly anſwer to the Choroides.

226.

226. LASTLY, That as the Medullary Subſtance of the Nerve enters the Globe it is very much contracted, and ſeems to terminate only in the ſmall Tubercle or Button already mentioned, and that the Retina is too thick to be taken for an Expanſion of the Medullary Subſtance at this Place.

227. THE Inſertion of the Optic Nerve in the Globe of the Eye is moſt commonly not directly oppoſite to the Pupilla, ſo that the Diſtance between theſe two Parts is not the ſame when meaſured on all Parts of the Globe. The greateſt Diſtance is oftener on the Side next the Temples, and the ſmalleſt, next the Noſe. I have obſerved an Inequality of the ſame Kind in the Breadth of the Uvea, which in many Subjects is leſs near the Noſe than near the Temples; ſo that the Center of the Pupilla is not the ſame with that of the great Circumference of the Iris; and I have ſeen the ſame Difference in the Breadth of the Corona Ciliaris.

§. 4. *The Humours of the Eye and their Capſulæ.*

228. THE Vitreous Humour is a clear and very liquid Gelatinous Fluid, contained in a fine tranſparent Capſula, called Tunica Vitrea, together with which it forms a Maſs nearly of the Conſiſtence of the White of an Egg. It fills the greateſt Part of the Globe of the Eye, that is, almoſt all that Space which anſwers to the Extent of the Retina, except a ſmall Portion behind the Uvea, where it forms a Foſſula, in which the Cryſtalline is lodged. This Humour being dexterouſly taken out of the Globe, preſerves its Conſiſtence for ſome Time in the Capſula, almoſt like the White of an Egg, and then runs off by little and little, till it quite diſappears. *The Vitreous Humour.*

229. THE Tunica Vitrea is compoſed exteriorly of two Laminæ very cloſely connected, which quite ſurround the Maſs of Humour, and are immediately applied to the Retina all the Way to the great Circumference of the Corona Ciliaris; but from thence to the circular Edge of the Foſſula of the Cryſtalline, this Coat is full of radiated Sulci which contain the Proceſſus Ciliares of the Uvea. At the Edge of the Foſſula, the two Laminæ ſeparate and form a particular Capſula which belongs to the Cryſtalline, as we ſhall ſee hereafter.

230. THE internal Lamina of the Tunica Vitrea gives off, through the whole Subſtance of this Humour, a great Number of cellular Elongations, or Septa ſo extremely fine, as not at all to be viſible in the natural State, the whole Maſs appearing then to be uniform and equally tranſparent through its whole Subſtance; but they are diſcovered by putting the whole ſoon after it is taken out of the Body into ſome aceſcent and gently coagulating Liquor.

231. THE radiated Sulci of the Tunica Vitrea, which may be termed Sulci Ciliares, are perfectly black, when the Coat is taken out of the Body. This proceeds from the black Subſtance with which the Laminæ or Proceſſus Ciliares are naturally covered, as well as all the reſt of the Choroides, and which remains in the Bottom of the Sulci, after the Laminæ have been

taken out. We obſerve very fine Veſſels in this Humour, which ſhall be ſpoken to hereafter.

The Cryſtalline Humour.

232. The Cryſtalline is a ſmall Lenticular Body of a pretty firm Conſiſtence, and tranſparent like Cryſtal. It is contained in a tranſparent Membranous Capſula, and lodged in the anterior Foſſula of the Vitreous Humour, as has been already ſaid. It is very improperly called an Humour, becauſe it may be handled and moulded into different Shapes by the Fingers, and ſometimes almoſt diſſolved by different reiterated Compreſſions, eſpecially when taken out of the Capſula.

233. The Figure of the Cryſtalline is lenticular, but its poſterior Side is more convex than the anterior, the Convexity of both Sides being very rarely equal. The internal Structure of this Maſs has not been hitherto ſufficiently diſcovered, to be deſcribed with Certainty, eſpecially in Man, where I could never find that contorted Diſpoſition of Cryſtalline Tubes which ſome pretend to have ſeen in the Eyes of large Animals.

234. The Colour and Conſiſtence of the Cryſtalline vary in different Ages, as was diſcovered by *M. Petit* the Phyſician, and demonſtrated by him in the Academy of Sciences from a great Number of Human Eyes; and his Obſervations are inſerted in the Memoirs for 1726. Till the Age of Thirty, it is very tranſparent, and almoſt without any Colour. It afterwards becomes yellowiſh, and that Yellowneſs gradually increaſes. The Conſiſtence varies almoſt in the ſame Manner, being of an uniform Softneſs till the Age of Twenty, and afterwards growing gradually more ſolid in the Middle of the Maſs; but in this there are Varieties explained in the Memoirs for 1727.

235. The Cryſtalline Capſula or Coat is formed by a Duplicature of the Tunica Vitrea, as I have already ſaid. The external Lamina covers the anterior Side of the Cryſtalline Maſs; the internal Lamina covers the Backſide, and likewiſe the Foſſula Vitrea in which the Cryſtalline is lodged. The anterior Portion of the Cryſtalline Capſular is thicker than the poſterior, and in a Manner elaſtic; and both its Thickneſs and Elaſticity may be diſcovered in Diſſection, without any other Artifice.

236. The anterior Portion ſwells when macerated in Water, and then appears to be made up of two Pelliculæ, united by a fine ſpungy Subſtance. I demonſtrated this Duplicature very plainly in the Eye of an Horſe by the Knife alone, and I even carried the Separation of the two Laminæ as far as the Vitreous Coat. Having made a ſmall Hole in the Middle of the Capſula, and blown into it through a Pipe, ſome Part of the Air remained between the Edge of the Cryſtalline Maſs and that of the Capſula in Form of a tranſparent Circle. This Experiment was made with an Ox's Eye above ten Years ago.

237. In examining the Human Eye, I have found that the Retina having reached the great Circumference of the Corona Ciliaris becomes very thin, and is continued between the Laminæ or Proceſſus Ciliares of the Uvea, and the Ciliary Sulci of the Tunica Vitrea, all the Way to the Circumference of the Cryſtalline. It is perhaps this Continuation which makes

makes the Proceſſus Ciliaris to be covered by a whitiſh Pellicle, and likewiſe increaſes the Thickneſs of the anterior Portion of the Capſula Cryſtallina.

238. The Aqueous Humour is a very limpid Fluid, reſembling a Kind of Lympha or Serum with a very ſmall Degree of Viſcidity; and it has no particular Capſula like the Cryſtalline and Vitreous Humours. It fills the Space between the Cornea Lucida and Uvea, that between the Uvea and the Cryſtalline, and the Hole of the Pupilla. Theſe two Spaces are called the Chambers of the Aqueous Humour, and they are diſtinguiſhed into the Anterior and Poſterior.

239. These two Chambers are not of the ſame Extent. The anterior, which is viſible to every Body between the Cornea Lucida and Uvea, is the largeſt; the other between the Uvea and Cryſtalline is very narrow, eſpecially near the Pupilla, where the Uvea almoſt touches the Cryſtalline. This Proportion between the two Chambers has been ſufficiently proved, contrary to the Opinion of many ancient Writers, by *M. Heiſter*, *Morgagni*, and ſeveral Members of the Royal Academy; but none has treated theſe Matters at ſo great a Length as *M. Petit* the Phyſician, as appears by the printed Memoirs of that Society.

§. 5. *The Tunica Albuginea and Muſcles of the Globe of the Eye.*

240. The Tunica Albuginea, called commonly the White of the Eye, and which appears on all the anterior convex Side of the Globe, from the Cornea Lucida to the Beginning of the poſterior Side, is formed chiefly by the tendinous Expanſion of four Muſcles, in the Manner preſently to be deſcribed. This Expanſion adheres very cloſe to the Sclerotica, and makes it appear very white and ſhining, whereas the reſt of it is of a dull whitiſh Colour. It is very thin near the Edge of the Cornea, in which it ſeems to be loſt, terminating very uniformly.

241. There are commonly ſix Muſcles inſerted in the Globe of the Human Eye, and they are divided, on account of their Direction, into four Recti and two Obliqui. The Recti are again divided, from their Situation, into Superior, Inferior, Internal and External; and from their Functions, into a Levator, Depreſſor, Adductor and Abductor. The two oblique Muſcles are denominated from their Situation and Size, one being named Obliquus Superior, or Major; the other Obliquus Inferior, or Minor. The Obliquus Major is likewiſe called Trochlearis, becauſe it paſſes through a ſmall cartilaginous Ring, as over a Trochlea or Pulley.

242. The Muſculi Recti do not altogether anſwer to that Name, for in their natural Situation they do not all lie in a ſtraight Direction, as they are commonly repreſented in an Eye taken out of the Body. To underſtand this, we ought to have a juſt Idea of the Situation of the Globe in the Orbit, and at the ſame Time to remember the Obliquity of the Orbits, as already explained. The Globe is naturally placed in ſuch a Manner, as that during the Inaction or Equilibrium of all the Muſcles, the Pupilla is turned directly

directly forward; the inner Edge of the Orbit is oppoſite to the Middle of the Inſide of the Globe; the outer Edge of the Orbit, becauſe of its Obliquity, is behind the Middle of the Outſide of the Globe; and laſtly, the greateſt Circumference of the Convexity of the Globe between the Pupilla and the Optic Nerve, runs directly inwards and outwards, upwards and downwards.

243. In this Situation, the internal Rectus alone is in a ſtraight Direction, the other three being oblique; and the external Rectus is the longeſt, the internal the ſhorteſt, and the ſuperior and inferior of the ſame middle Length between the two former. The external Rectus is likewiſe bent round the outer convex Side of the Globe; the ſuperior and inferior are alſo incurvated, but in a leſs Degree, whereas the whole Internus is almoſt ſtraight. Notwithſtanding all this I ſhall ſtill continue to give them all the common Name of Muſculi Oculi Recti.

244. These Muſcles are fixed by their poſterior Extremities at the Bottom of the Orbit near the Foramen Opticum, in the Elongation of the Dura Mater, by ſhort narrow Tendons, in the ſame Order in which I have already named them. From thence they run wholly fleſhy, towards the great Circumference of the Convexity of the Globe between the Optic Nerve and Cornea Lucida, where they are expanded into flat broad Tendons which touch each other, and afterwards unite. Theſe Tendons are fixed firſt of all by a particular Inſertion, in the Circumference juſt mentioned, and afterwards continue their Adheſion all the Way to the Cornea, forming the Tunica Albuginea, as has been already ſaid.

245. The ſuperior oblique Muſcle is fixed to the Bottom of the Orbit, by a narrow Tendon, in the ſame Manner as the Recti, between the Rectus Superior and Internus. From thence it runs on the Orbit oppoſite to the Interſtice between theſe two Muſcles, toward the internal angular Apophyſis of the Os Frontis, where it terminates in a thin Tendon, which having paſſed through a Kind of Ring as over a Pulley, runs afterwards in a Vagina obliquely backward under the Rectus Superior, that is, between that Muſcle and the Globe; and increaſing in Breadth it is inſerted poſteriorly and laterally in the Globe, near the Rectus Externus.

246. The Ring through which the Muſcle paſſes, is partly cartilaginous and partly ligamentary. The cartilaginous Portion is flat, of a conſiderable Breadth, and like half a Ring. The ligamentary Portion adheres ſtrongly to the two Ends of the Cartilage, and is fixed in the ſmall Foſſula which lies in the Orbit, on the angular Apophyſis of the Os Frontis. By means of this Ligament, the Ring is in ſome Meaſure moveable, and yields to the Motions of the Muſcle. To the anterior Edge of the Ring, a ligamentary Vagina is fixed which inveſts the Tendon all the Way to its Inſertion in the Globe.

247. The Obliquus Inferior is ſituated obliquely at the lower Side of the Orbit, under the Rectus Inferior, which conſequently lies between this Muſcle and the Globe. It is fixed by one Extremity, a little tendinous, to the Root of the Naſal Apophyſis of the Os Maxillare, near the Edge of the

the Orbit between the Opening of the Ductus Naſalis and the inferior Orbitary Fiſſure.

248. From thence it paſſes obliquely, and a little tranſverſely backward, under the Rectus Inferior, and is fixed in the poſterior lateral Part of the Globe by a flat Tendon, oppoſite to and at a ſmall Diſtance from the Tendon of the Obliquus Superior, ſo that theſe two Muſcles do in ſome Meaſure ſurround the outer poſterior Part of the Globe.

249. The Rectus Superior moves the anterior Portion of the Globe upward when we lift up our Eyes; the Rectus Inferior carries this Portion downward; the Internus toward the Noſe; and the Externus toward the Temples. *Uſes of theſe Muſcles.*

250. When two neighbouring Recti act at the ſame Time, they carry the anterior Portion of the Globe obliquely toward that Side which anſwers to the Diſtance between theſe two Muſcles; and when all the four Muſcles act ſucceſſively, they turn the Globe of the Eye round, which is what is called rolling the Eyes.

251. It is to be obſerved, that all theſe Motions of the Globe of the Eye are made round its Center, ſo that in moving the anterior Portion, all the other Parts are likewiſe in Motion. Thus when the Pupilla is turned toward the Noſe, or upward; the Inſertion of the Optic Nerve is at the ſame Time turned toward the Temple, or downward.

252. The Uſe of the oblique Muſcles is chiefly to counterbalance the Action of the Recti, and to ſupport the Globe in all the Motions already mentioned. This is evident from their Inſertions, which are in a contrary Direction to thoſe of the Recti, their fixed Points with Relation to the Motions of the Globe being placed forward, and thoſe of the Recti backward, at the Bottom of the Orbit. The ſoft Fat which lies behind the Globe, is altogether inſufficient to ſupport it; neither is the Optic Nerve more fit for this Purpoſe; for I have ſhewn that this Nerve follows all the Motions of the Globe, which would be impoſſible were not the Fat very pliable, and without Reſiſtance. And to this we muſt add, that the Optic Nerve, at its Inſertion in the Globe, has a particular Curvature, which allows it to be elongated, and conſequently prevents it from ſuffering any Violence in the different Motions of the Eyes.

253. The Obliquity of theſe two Muſcles does not hinder them from doing the Office of a Fulcrum, becauſe this is not a Fulcrum diſtinct from the Part moved, or on which the Globe of the Eye ſlides like the Head of one Bone in the articular Cavity of another, but being fixed to the Part it eaſily accommodates itſelf to all the Degrees of Motion thereof. Had theſe Muſcles lain in a ſtraight Direction, they would have incommoded the Recti, but their Obliquity may be ſaid to be in ſome Meaſure rectified by the inner Surface of the Orbit, and by the Rectus Externus.

254. The inner Surface of the Orbit ſerves for a Kind of collateral Fulcrum, which hinders the Globe from falling too far inward, as the joint Action of the two Obliqui prevents it in Part from falling too far outward. The Rectus Externus, by being bent on the Globe, not only hinders it

it from being carried outward, but alſo prevents the indirect Motions of the Obliqui from thruſting it out of the Orbit toward the Temples. The other Uſes attributed to theſe Muſcles ſeem to me to be without Foundation, from the Conſideration of their Inſertions, and of the Structure of the Parts with which they are concerned; both which Reaſons are explained in the Memoirs of the Academy for 1721.

§. 6. *The Supercilia and Muſculi Frontales, Occipitales and Superciliares.*

Supercilia.

255. The Supercilia, or Eye-Brows, are the two hairy Arches ſituated at the lower Part of the Forehead, between the Top of the Noſe and Temples, in the ſame Direction with the bony Arches which form the ſuperior Edges of the Orbits. The Skin in which they are fixed does not ſeem to be much thicker than that of the reſt of the Forehead; but the Membrana Adipoſa is thicker than on the neighbouring Parts. The Extremity of the Eye-Brows next the Noſe is called the Head, as being larger than the other Extremity, which is named their Tail. Their Colour is different in different Perſons, and often in the ſame Perſon, different from that of the Hair on the Head; neither is the Size of them always alike. The Hairs of which they conſiſt are ſtrong and pretty ſtiff, and they lie obliquely, their Roots being turned to the Noſe, and their Points to the Temples.

256. The Supercilia have Motions common to them with thoſe of the Skin of the Forehead, and of the hairy Scalp. By theſe Motions the Eye-Brows are lifted up, the Skin of the Forehead is wrinkled more or leſs regularly and tranſverſely; and the Hair and almoſt the whole Scalp is moved, but not in the ſame Degree in all Perſons; for ſome by this Motion alone can move their Hat, and even throw it off from their Head. The Eye-Brows have likewiſe particular Motions which contract the Skin above the Noſe; and all theſe different Motions are performed by the following Muſcles.

Muſculi Frontales.

257. The Frontal Muſcles are two thin, broad, fleſhy Planes of unequal Lengths, lying immediately behind the Skin and Membrana Adipoſa on the anterior Parts of the Forehead, which Parts they cover from the Root of the Noſe, and through about two Thirds of the Arch of the Eye-Brows on each Side, all the Way to the lateral Parts of the Hair on the Forehead. At the Root of the Noſe they touch each other as if they were but one Muſcle, and at this Place their Fibres are ſhort and longitudinal or vertical.

258. The next Fibres on each Side become gradually longer and more oblique, the moſt anterior being always the ſhorteſt and ſtraighteſt; and the lateral, the longeſt and turned moſt obliquely toward the Temples at their upper Extremities. By this Diſpoſition an angular Interſtice is formed between the Place where the two Muſcles join, and the Hair on the Middle of the Forehead; but this Diſpoſition is not the ſame in all Subjects, no more than the Wrinkles and Bounds of the Hair on the Forehead.

259. These Muſcles are fixed by the inferior Extremities of their fleſhy Fibres immediately in the Skin, running through the Membrana Adipoſa. They cover the Muſculi Superciliares, and adhere cloſely to them by a Kind of Intertexture. By the ſame Fibres they ſeem to be inſerted in the angular Apophyſes of the Os Frontis, and to be blended a little with the Muſcles of the Palpebræ and Noſe. The upper Extremities of their fleſhy Fibres are fixed in the external or convex Surface of the Pericranium. Each of their lateral Portions covers a Portion of the Temporal Muſcle on the ſame Side, and adheres very cloſely to it. The ſuperior and inferior Inſertions are graduated.

260. The Occipital Muſcles are two ſmall, thin, broad, and very ſhort fleſhy Planes, ſituated on the lateral Parts of the Occiput at ſome Diſtance from each other. They are inſerted by the inferior Extremities of their fleſhy Fibres in the ſuperior tranſverſe Line of the Os Occipitis, and alſo a little above it. From thence they run up obliquely from behind forward, and are fixed in the inner or concave Surface of the Pericranium. *Muſculi Occipitales.*

261. The Breadth of theſe Muſcles reaches from the poſterior middle Part of the Occiput, toward the Maſtoide Apophyſis, and they diminiſh unequally in Length as they approach theſe Apophyſes. From this Inequality in Length each of them appears as if it were double in ſome Subjects; and in others they are ſo thin and pale, that they ſeem to be wanting. They are ſometimes covered by an Aponeurotic Expanſion of the Trapezii.

262. The Occipital and Frontal Muſcles appear to be true Digaſtrici, both in regard to their Inſertions in the Pericranium, and in regard to their Action. Their Inſertions in the Pericranium are oppoſite, one being on the Outſide, the other on the Inſide; ſo that this Membrane or Aponeuroſis may be conſidered as a middle Tendon of four ſingle Muſcles, that is, which have their fleſhy Fibres fixed only to one Side of their Tendons. The fixed Inſertions of the Occipitales at the lower Part of the Occiput, and the moveable Inſertions of the Frontales in the Skin of the Forehead and of the Supercilia, being well conſidered, together with their reciprocal Inſertions in the ſame Aponeuroſis, ſeem to be a very convincing Proof that they are Digaſtric Muſcles.

263. These four Muſcles ſeem always to act in Concert, the Occipitales being only Auxiliaries or Aſſiſtants to the Frontales, the Office of which is to raiſe the Supercilia, by wrinkling the Skin of the Forehead; theſe Wrinkles following the Direction of the Eye-Brows pretty regularly in ſome Subjects, and very irregularly in others.

264. To be convinced of the Co-operation of theſe four Muſcles, we need only hold the Hand on the Occipitales, while we raiſe the Eye-Brows and wrinkle the Forehead ſeveral times; and we will perceive the Occipitales to move each Time, though not in the ſame Degree in all Subjects. In ſome Perſons the Occipitales ſeem to be relaxed, while the Frontales being in Contraction, move the whole Scalp and Pericranium forward, and then contract to bring them back to their natural Situation.

265.

Muſculi Superciliares.

265. The Muſculi Superciliares are fleſhy Faſciculi ſituated behind the Supercilia, and behind the inferior Portion of the Muſculi Frontales, from the Root of the Noſe to above one Half of each Superciliary Arch. They are ſtrongly inſerted partly in the Synarthroſis of the Oſſa Naſi with the Os Frontis, where they come very near the proper Muſcles of the Noſe, and partly in a ſmall neighbouring Portion of the Orbit. From thence they firſt run up a little, and afterwards more or leſs in the Direction of the Eye-Brows. They are made up of ſeveral ſmall Faſciculi of oblique Fibres, all fixed by one End in the Manner already ſaid, and by the other partly in the lower Extremity of the Muſcles by which they are covered, and partly in the Skin of the Supercilia. This laſt Portion is eaſily confounded with a Portion of the Muſculus Orbicularis Palpebrarum.

266. The Action of theſe Muſcles is to depreſs the Eye-Brows, to bring them cloſe together, and to contract the Skin of the Forehead immediately above the Noſe, into longitudinal and oblique Wrinkles, and the Skin which covers the Root of the Noſe into irregular tranſverſe Wrinkles. This Action, as well as that of the Frontales, and of the Muſcles of the Noſe and Lips, is not always arbitrary, but ſometimes mechanical and involuntary. Theſe Muſcles may perhaps likewiſe ſerve to keep the Muſculi Frontales in Equilibrio during their Inaction, they being moveable by both Extremities.

§. 7. *The Palpebræ and Membrana Conjunctiva.*

Palpebræ.

267. The Palpebræ are a Kind of Veils or Curtains placed tranſverſely above and below the anterior Portion of the Globe of the Eye: and accordingly there are two Eye-Lids to each Eye, one ſuperior, the other inferior. The ſuperior is the largeſt and moſt moveable in Man; the inferior the ſmalleſt and leaſt moveable. They both unite at each Side of the Globe, and the Places of their Union are termed Angles, one large and internal, which is next the Noſe, the other ſmall or external, which is next the Temples.

Structure of the Palpebræ.

268. The Palpebræ are made up of common and proper Parts. The common Parts are the Skin, Epidermis, and Membrana Adipoſa. The proper Parts are the Muſcles, the Tarſi, the Puncta or Foramina Lacrymalia, the Membrana Conjunctiva, the Glandula Lacrymalis, and the particular Ligaments which ſuſtain the Tarſi. The Tarſi and their Ligaments are in ſome Meaſure the Baſis of all theſe Parts.

Tarſi.

269. The Tarſi are thin Cartilages forming the principal Part of the Edge of each Palpebra; and they are broader at the Middle than at the Extremities. Thoſe of the ſuperior Palpebræ are ſomething leſs than half an Inch in Breadth; but in the lower Palpebræ they are not above the ſixth Part of an Inch; and their Extremities next the Temples are more ſlender than thoſe next the Noſe.

270. These Cartilages are ſuited to the Borders and Curvature of the Eye-Lids. The lower Edge of the ſuperior Cartilage and the upper Edge

of the inferior, terminate equally, and both may be termed the Ciliary Edges. The oppoſite Edge of the upper Tarſus is ſomething ſemi-circular between its two Extremities; but that of the inferior Tarſus is more uniform, and both are thinner than the Ciliary Edges. Their inner Sides or thoſe next the Globe are grooved by ſeveral ſmall tranſverſe Channels, of which hereafter; and the Extremities of both Cartilages are connected by a Kind of ſmall Ligaments.

271. The broad Ligaments of the Tarſi are membranous Elongations formed by the Union of the Perioſteum of the Orbits and Pericranium along both Edges of each Orbit. The ſuperior Ligament is broader than the inferior, and fixed to the ſuperior Edge of the upper Cartilage, as the inferior is to the lower Edge of the lower Cartilage, ſo that theſe Ligaments and the Tarſi, taken alone or without the other Parts, repreſent Palpebræ. This Diſcovery I firſt communicated in my private Courſes. *Ligamenta Tarſorum Lata.*

272. The Membrana Conjunctiva is generally deſcribed among the Coats of the Globe of the Eye; and I alſo mentioned it there, but have referred the Deſcription of it to that of the Palpebræ. It is a thin Membrane, one Portion of which lines the inner Surface of the Palpebræ, that is, of the Tarſi and their broad Ligaments. At the Edge of the Orbit it has a Fold, and is continued from hence on the anterior Half of the Globe of the Eye, adhering to the Tunica Albuginea; ſo that the Palpebræ and the Forepart of the Globe of the Eye are covered by one and the ſame Membrane, which does not appear to be a Continuation of the Pericranium, but has ſome Connexion with the broad Ligaments of the Tarſi. *Membrana Conjunctiva.*

273. The Name of Conjunctiva is commonly given only to that Part which covers the Globe, the other being called ſimply the internal Membrane of the Palpebræ; but we may very well name the one Membrana Oculi Conjunctiva, and the other Membrana Palpebrarum Conjunctiva. That of the Palpebræ is a very fine Membrane adhering very cloſe and full of ſmall Capillary Blood-Veſſels. It is perforated by numerous imperceptible Pores, through which a Kind of Serum is continually diſcharged; and it has ſeveral very evident Folds, which ſhall be ſpoken to hereafter.

274. The Conjunctiva of the Eye adheres by the Intervention of a Cellular Subſtance, and is conſequently looſe, and as it were, moveable; and it may be taken hold of and ſeparated in ſeveral Places from the Tendinous Coat. It is of a whitiſh Colour, and being tranſparent, the Albuginea makes it appear perfectly white; theſe two Coats together forming what is called the White of the Eye. The greateſt Part of the numerous Veſſels which run upon it contain naturally only the ſerous Part of the Blood, and conſequently are not diſcoverable, except by Anatomical Injections, Inflammations, Obſtructions, &c. With the Point of a good Knife we continue the Separation of this Membrane over the Cornea Lucida.

275. The Lacrymal Gland is white, and of the Number of thoſe called Conglomerate Glands. It lies under that Depreſſion obſervable in the Arch *Glandula Lacrymalis.*

of the Orbit near the Temples, mentioned in the Deſcription of the Skeleton N° 199. and laterally above the Globe of the Eye. It is a little flatted, and divided as it were into two Lobes, one of which lies toward the Inſertion of the Muſculus Rectus Superior; the other toward the Rectus Externus. It adheres very cloſely to the Fat which ſurrounds the Muſcles, and poſterior Convexity of the Eye, and it was formerly named Glandula Innominata.

276. From this Gland ſeveral ſmall Ducts go out, which run down almoſt parallel to each other, through the Subſtance of the Tunica Interna or Conjunctiva of the ſuperior Palpebra, and afterwards pierce it inwardly near the ſuperior Edge of the Tarſus. Theſe Ducts are very difficult to be found; but the beſt Way to diſcover them is to let the ſuperior Palpebra lie for a little while in cold Water, and then without wiping it, to blow on ſeveral Places of the Surface of the Membrane, through a ſmall Tube held very near, but ſo as not to touch it, that the Air may fill ſome of the Orifices of the Ducts and ſo to diſcover them.

277. The Borders of each Palpebra taken all together are formed by the Edge of the Tarſus, and by the Union of the internal Membrane with the Skin and Epidermis. This Border is flat and of ſome ſenſible Breadth, from within about a Quarter of an Inch of the internal Angle all the Way to the external Angle, near which the Breadth diminiſhes. This Breadth is owing only to the Thickneſs of the Palpebræ, which at this Place have their Edges oblique or ſlaunting, in ſuch a Manner as when the two Palpebræ touch each other ſlightly, a triangular Space or Canal is formed between them and the Globe of the Eye.

Cilia. 278. The flat Edge of each Palpebra is adorned with a Row of Hairs called Cilia, or the Eye-Laſhes. Thoſe belonging to the ſuperior Palpebra are bent upward, and longer than thoſe of the lower Palpebra, which are bent downward. Theſe Rows are placed next the Skin, and are not ſingle, but irregularly double or triple. The Hairs are longer near the Middle of the Palpebræ than toward the Extremities, and for about a Quarter of an Inch from the inner Angle, they are quite wanting.

Glandulæ Ciliares. 279. Along the ſame Border of the Palpebræ near the internal Membrane, or toward the Eye, we ſee a Row of ſmall Holes which may be named Foramina, or Puncta Ciliaria. They are the Orifices of the ſame Number of ſmall oblong Glands which lie in the Sulci, Channels, or Grooves on the inner Surface of the Tarſus. Theſe little Glands are of a whitiſh Colour, and when examined through a Microſcope, they appear like Bunches of Grapes, thoſe of each Bunch communicating together. And when they are ſqueezed between two Nails, a ſebaceous Matter, like ſoft Wax, is diſcharged through the Puncta Cilaria.

Puncta Lacrymalia. 280. Near the great or internal Angle of the Palpebræ, the flat Portion of their Edges terminates in another which is rounder and thinner. By the Union of theſe two Edges an Angle is formed, which is not perfectly pointed like a true Angle, but rounded, and yet it ought not to be termed an obtuſe Angle, becauſe that Expreſſion in the Mathematical Stile means

ſomething

ſomething different. For the ſame Reaſon the Name of great Angle is improper; and we had better call it the internal or Naſal Angle.

281. At this Place, the Extremity of the flat Portion is diſtinguiſhed from the round Portion by a ſmall Protuberance or Papilla, which is obliquely perforated by a ſmall Hole in the Edge of each Palpebra. Theſe two ſmall Holes are very viſible, and often more ſo in living than in dead Bodies, and they are commonly named Puncta Lacrymalia, being the Orifices of two ſmall Ducts which open beyond the Angle of the Eye into a particular Reſervoir, termed Sacculus Lacrymalis, which ſhall be deſcribed in the Article of the Noſe.

282. The Puncta Lacrymalia are oppoſite to each other, and ſo they meet when the Eye is ſhut. Round the Orifice of each of theſe Points, we obſerve a whitiſh Circle, which ſeems to be a cartilaginous Appendix of the Tarſus, and which keeps the Orifice always open. Theſe two oblique Circles are ſo diſpoſed, that when the Eye is but ſlightly ſhut they touch each other only toward the Skin, and not toward the Globe of the Eye. The fine Membrane which covers theſe Circles, and paſſes through the Puncta into the Ducts, ſeems ſometimes to run into Gathers when it is touched with a Stilet. This Obſervation was firſt made by the late *M. Saint Yves*, a *Pariſian* Oculiſt.

283. The Caruncula Lacrymalis is a ſmall reddiſh, granulated, oblong Body, ſituated preciſely between the internal Angle of the Palpebræ and Globe of the Eye, but it is not fleſhy as its Name would inſinuate. The Subſtance of it ſeems to be wholly glandular; and it appears through a ſingle Microſcope in the ſame Manner as the other Conglomerate Glands. We diſcover upon it a great Number of fine Hairs, covered by an oily yelloviſh Matter; and on the Globe of the Eye, near this glandular Body, we ſee a ſemilunar Fold formed by the Conjunctiva, the concave Side of which is turned to the Uvea, and the convex Side to the Noſe. This Fold appears moſt when the Eye is turned toward the Noſe. *Caruncula Lacrymalis.*

§. 8. *The Muſcles of the Palpebræ.*

284. The Muſcles of the Palpebræ are commonly reckoned to be two, one peculiar to the upper Eye-Lid, named Levator Palpebræ Superioris; the other, common to both, called Muſculus Orbicularis Palpebrarum, which has been ſubdivided in different Manners, as we ſhall ſee preſently.

285. The Levator Palpebræ Superioris is a very thin Muſcle ſituated in the Orbit above and along the Rectus Superior Oculi. It is fixed to the Bottom of the Orbit, by a ſmall narrow Tendon, near the Foramen Opticum, between the poſterior Inſertions of the Rectus Superior and Obliquus Superior. From thence its fleſhy Fibres run forward on the Rectus, increaſing gradually in Breadth, and terminate by a very broad Aponeuroſis, in the Tarſus of the ſuperior Palpebra. *Levator Prius.*

Orbicularis Palpebrarum.

286. By the Muſculus Palpebrarum Obliquus we underſtand all that Extent of fleſhy Fibres, which by a thin Stratum ſurrounds the Edge of each Orbit, and from thence, without any Interruption, covers the two Palpebræ all the Way to the Cilia. The Fibres which run upon the Edge of the Orbit are nearly orbicular; but moſt of thoſe which cover the Palpebræ are tranſverſely oval.

287. Almost all of them have a common Tendon ſituated tranſverſely between the internal Angle of the Eye, and the Naſal Apophyſis of the Os Maxillare. This is a ſlender Ligamentary Tendon, ſtrongeſt where it is fixed in the Bone, and diminiſhing gradually as it approaches the Angle of the Palpebræ, where it terminates at the Union of the Points, or at the Extremities of the two Tarſi. The fleſhy Fibres are fixed to it anteriorly, ſo that at firſt Sight it appears to be no more than a Linea Alba.

288. From thence one Portion of the Fibres is turned upward, the other downward, and both meet again at the external Angle, being united by a particular Kind of Intertexture, very difficult to be explained. When having inverted this Portion of the Muſcle, we examine its poſterior Surface, we obſerve a ſmall thin Tendinous Rope which runs through the fleſhy Fibres, and divides them all the Way from the Union of the two Tarſi, to the Temporal Edge of the Orbit, where it diſappears; the Fibres which lie beyond it, appearing to continue the main Circuit of the Muſcle.

289. I divide this Muſcle into four Portions, whereof the firſt is that which ſurrounds the Orbit, and which does not appear to be interrupted toward the Temples; the upper Part of it lying between the Supercilia, and the lower Part of the Muſculi Frontales. The ſecond Portion is that which lies between the upper Edge of the Orbit and the Globe of the Eye, and which covers the inferior Edge of the Orbit below, ſome of its Fibres being fixed to both Edges of the Orbit. *Riolan* divided this into two ſemicircular Portions, one ſuperior, the other inferior; the firſt lying between the Muſculus Superciliaris and the lower Part of the Muſculus Frontalis, to both which it adheres very much.

290. The third Portion ſeems to belong more particularly to the Palpebræ, and the greateſt Part of it is ſpent in the Palpebra Superior. The Fibres of this Portion meet at the two Angles of the Eye, where they appear to make very acute Inflexions without any Diſcontinuation; but when examined on the other Side next the Globe of the Eye, they have in ſome Subjects appeared to me to be diſtinguiſhed into ſuperior and inferior. The greateſt Part of theſe Fibres form a tranſverſely oval Circumference, the ſhorteſt Diameter of which is longer when the Eyes are open than when ſhut.

291. The fourth Portion is an Appendix to the third, from which it differs chiefly in this, that its Fibres do not reach to the Angles, and form only ſmall Arches, the Extremities of which terminate in each Palpebra. This Portion is really divided into two, one for the Edge of the upper

Eyelid, the other for that of the lower. *Riolan* names this Portion, Muſculus Ciliaris.

292. All theſe different Portions of the Orbicular Muſcle adhere to the Skin, which covers it from the upper Part of the Noſe to the Temples, and from the Supercilium to the upper Part of the Cheek. When they contract, ſeveral Wrinkles are formed in the Skin, which vary according to the different Direction of the Fibres; thoſe under the lower Palpebra are very numerous, and run down very obliquely from before backward.

293. The Skin of the ſuperior Palpebra is folded archwiſe, almoſt in a parallel Direction to that of the ſemioval Fibres, the Plicæ interſecting the Levator; whereas the other Folds only interſect the Orbicularis. The radiated and oblique Plicæ ſeldom appear in young Perſons, except when the firſt and ſecond Portions of the Orbicularis are in Action; but in aged Perſons the Marks thereof are viſible at all Times.

294. In Man, the ſuperior Palpebra has much more Motion than the inferior. The ſmall ſimple Motions called Twinkling, which frequently happen, though not equally often in all Subjects, are performed in the upper Palpebra, by the alternate Contraction of the Levator and ſuperior Palpebral Portion of the Muſculus Orbicularis; and in the lower Palpebra at the ſame Time or alternately, by the inferior Palpebral Portion of the Orbicularis; but as there is but a ſmall Number of Fibres in this Portion, theſe Motions are but very inconſiderable in this Eyelid.

295. These ſlight Motions, eſpecially thoſe of the upper Palpebra, are not very eaſy to be explained according to the true Structure of the Part. The Motions which wrinkle the Palpebræ, and which are commonly performed to keep one Eye very cloſe ſhut, while we look ſtedfaſtly with the other, are explicable by the ſimple Contraction of all the Portions of the Orbicularis. Theſe Motions likewiſe depreſs the Supercilia, which conſequently may be moved in three different Manners, upwards by the Muſculi Frontales, downward by the Orbiculares, and forward by the Superciliares. I ſhall take another Occaſion to explain the Difficulties here mentioned.

§. 9. *The Veſſels of the Eye and of its Appendages.*

296. The external Carotid Artery, by Means of the Arteria Maxillaris Externa, and the Temporal and Frontal Arteries give ſeveral Ramifications to the Integuments which ſurround the Eye, and to all the Portions of the Muſculus Orbicularis; and theſe Ramifications communicate with thoſe which are diſtributed to the Membrana Conjunctiva Palpebrarum, and to the Caruncula.

297. The ſame external Carotid, by Means of the Arteria Maxillaris Interna, ſends a conſiderable Branch into the Orbit through the inferior Orbitary or Spheno-Maxillary Fiſſure; which is diſtributed to the Periosteum of the Orbit, to the Muſcles of the Globe of the Eye, to the Levator Palpebræ Superioris, to the Fat, Glandula Lacrymalis, Membrana Conjunctiva

junctiva both of the Eye and Palpebræ, the Caruncula, &c. It communicates with the internal Carotid, and ſends a ſmall Artery to the Ethmoidal Cells of the Noſe, through the ſmall, internal, poſterior Orbitary Hole.

298. The internal Carotid Artery having entered the Cranium, ſends off ſmall Rami, which accompany the Optic Nerve, and thoſe which paſs through the Fiſſura Spheno-Maxillaris. One of theſe ſmall Arterial Branches runs into the Subſtance of the Optic Nerve, and produces on the Retina, the ſmall Arteries which appear very plainly on the inner Sides of that Membrane. The reſt join the Ramifications of the external Carotid already mentioned, and having penetrated into the Subſtance of the Tunica Sclerotica on the Backſide, and run for a little Way through that Subſtance, they perforate this Coat inwardly in five or ſix Places, at an equal Diſtance from the Optic Nerve and the Pupilla.

299. Afterwards they perforate the external Lamina of the Choroides in the ſame Number of Places, and form between that and the internal Lamina, the Vaſa Vorticoſa of *Steno*, and the Vaſcular Stellæ mentioned in the Deſcription of this internal Lamina. Some ſmall Vaſcular Filaments from theſe Ramifications, are likewiſe obſerved to adhere very cloſely to the Tunica Vitrea; and before they form the Vaſa Vortica, they ſend ſmall Arteries in a direct Courſe to the Circumference of the Uvea, where they form a Vaſcular Circle, which ſends out Capillaries as far as the Membrana Cryſtallina, which are very eaſily injected in new born Children.

300. The Veins of all theſe Parts anſwer nearly to the Arteries. The internal Veins unload themſelves, partly into the internal Jugular Vein, by the Sinus Orbitarii, Cavernoſi, and Petroſi, and partly into the external Jugular Vein by the Vena Angularis, or Maxillaris Externa, the Maxillaris Interna, Temporalis, &c.

301. Beſides the Capillary Veſſels, eaſily diſtinguiſhable by the red Colour of the Blood, there are great Numbers of thoſe which admit nothing but the ſerous and lymphatic Parts of the Blood, and conſequently do not appear in the natural State. They become viſible in ſome Places by Inflammations and Injections, as on the Membrana Conjunctiva of the Eye; but theſe Contrivances do not diſcover them every where in aged Perſons. In a Fœtus and in new born Children a fine Injection has ſucceeded ſo well as to diſcover the Veſſels of the Membrana Cryſtallina and Vitrea; and in a Fœtus of about ſix Months, the injected Liquor ſeemed to me to have penetrated a Part of the Cryſtalline and Vitreous Humour.

§. 10. *The Nerves of the Eye and of its Appendages.*

302. I ſhall in this Paragraph repeat and illuſtrate what has been already ſaid in the Deſcription of the Nerves, concerning thoſe of the Eye. Beſides the Optic Nerve already deſcribed, the Globe of the Eye receives ſeveral ſmall ones, which run on each Side along and about the Optic Nerve, from its Entry into the Orbit to its Inſertion in the Globe. Theſe Filaments come

chiefly from a ſmall Lenticular Ganglion, formed by very ſhort Rami of the Orbitary or Ophthalmic Branch of the fifth Pair, and by a Branch of the third Pair, or Motores Oculi.

303. These Nervous Filaments of the Lenticular Ganglion having reached the Globe of the Eye, are divided into five or ſix Faſciculi, which having ſurrounded the Optic Nerve, and penetrated and perforated the Cornea Opaca or Sclerotica, run at Diſtances more or leſs equal, between the Sclerotica and Choroides towards the Uvea. There each of them is divided into ſeveral ſhort Filaments, which terminate in the Subſtance of the Uvea. Theſe ſmall Nerves, which run from behind forward between the Sclerotica and the Choroides, have formerly been taken for particular Ligaments, by very great Anatomiſts.

304. The Nerves which go to the other Parts belonging to the Eye, come from the third, fourth, ſixth and firſt two Branches of the fifth Pair of Nerves of the Medulla Oblongata, and likewiſe from the Portio Dura of the ſeventh Pair. The third, fourth and ſixth Pairs give Nerves to the Muſcles of the Globe of the Eye. The two Branches of the fifth Pair, and the Portio Dura of the ſeventh, give Nerves not only to the other Parts which ſurround the Globe, but alſo to the Muſculi Frontales and internal Parts of the Noſe.

305. The Trunk of the third Pair of Motores Oculi, having entered the Orbit through the ſuperior Orbitary or Sphenoidal Fiſſure, produces four Branches. The firſt runs upward and divides into two, one for the Muſculus Rectus Superior, and the other for the Levator Palpebræ Superioris. The Trunk continuing its Courſe, gives off the ſecond ſhort Branch to the Rectus Inferior. The third Branch is long and goes to the Obliquus Inferior, contributing likewiſe to the Formation of the Lenticular Ganglion already mentioned. The fourth Branch is large and ſupplies the Rectus Internus.

306. The firſt Branch of the fifth Pair, commonly termed Nervus Ophthalmicus, divides into three Rami, as it enters the Orbit; and ſometimes only into two, one of which is afterwards ſubdivided. Of theſe three Branches one is ſuperior, which I term Nervus Superciliaris; one internal, termed Naſalis, and one external, to which the Name of Temporalis agrees better than that of Lacrymalis, which may occaſion a Miſtake.

307. The ſuperior or Superciliary Ramus runs along the whole Perioſteum of the Orbit, and having paſſed through the Superciliary Notch or Foramen of the Os Frontis, is diſtributed to the Muſculus Frontalis, Superciliaris, and ſuperior Portion of the Orbicularis Palpebrarum; and it communicates with a ſmall Branch of the Portio Dura of the ſeventh Pair.

308. The internal or Naſal Branch paſſes under the Ramification of the Nerve of the third Pair, and running toward the Noſe, is diſtributed thereto, and to the neighbouring Parts of the Orbicularis, the Caruncula, &c. This Branch ſends off a Filament, which paſſing through the internal, anterior, Orbitary Hole, enters the Cranium, and preſently returns again through one of the Ethmoidal Holes, to the internal Parts of

of the Noſe. I have ſometimes obſerved this Naſal Ramus to communicate with the Ramus Superciliaris by a particular Arch, before it enters the Orbitary Hole.

309. The external or Temporal Ramus, which is ſometimes a Subdiviſion of the Superciliaris, is diſtributed to the Glandula Lacrymalis, and ſends off a Filament which pierces the Orbitary Apophyſis of the Os Malæ.

310. The ſecond Branch of the fifth Pair, called Nervus Maxillaris Superior, ſends off a Ramus through the bony Canal of the lower Part of the Orbit, which going out at the anterior inferior Orbitary Hole, is diſtributed to the neighbouring Portion of the Muſculus Orbicularis, and communicates with a Ramus of the Portio Dura. I ſhall here ſay nothing of the other Diſtributions of this Branch of the Maxillaris Superior.

311. The Portio Dura of the ſeventh Pair or Auditory Nerve, which I call Nervus Sympatheticus Minor, gives Branches to the ſuperior, inferior, and external lateral Parts of the Orbicularis Palpebrarum, one of which communicates with the Nervus Superciliaris, and another with the Sub-Orbitarius, as I obſerved in the Deſcription of the Nerves.

§. 11. *The Uſes of the Eye and of its Appendages in general.*

312. Every Body knows that the Eye is the Organ of Viſion. The tranſparent Parts of the Globe modify the Rays of Light, by different Refractions; the Retina and Choroides receive the different Impreſſions of theſe Rays; and the Optic Nerve carries theſe Impreſſions to the Brain. When Objects are at a great Diſtance or obſcure, the Pupilla is dilated; and it is contracted when Objects are near, or placed in a great Light. The Muſcles of the Globe of the Eye and of the Palpebræ perform the Motions already deſcribed.

313. The Glandula Lacrymalis continually moiſtens the Forepart of the Globe of the Eye; and the Lacrymal Serum is equally ſpread over that Globe by the Motions of the ſuperior Palpebra, the inner Surface of which is in a ſmall Meaſure villous. The Union of the two Palpebræ directs this Serum towards the Puncta Lacrymalia; and the unctuous Matter diſcharged through the Foramina Ciliaria hinders it from running out between the Palpebræ. The large Size and viſcid Surface of the Caruncula prevents it from running beyond the Puncta, and thus forces it into them.

314. The Supercilia may hinder Sweat from falling on the Eyes. The ſuperior Cilia which are longer than the inferior may have the ſame Uſe, and they both ſerve to prevent Duſt, Inſects, &c. from entering the Eyes when they are only a little open.

ART. III.

The Noſe.

315. THE Parts of which the Noſe is made up, may be divided two different Ways, viz. from their Situation, into internal and external Parts; and from their Structure, into hard and ſoft Parts.

316. THE external Parts are the Root of the Noſe, the Arch, the Back, or Spine of the Noſe, the Sides of the Noſe or the Arch, the Tip of the Noſe, the Alæ, the external Nares, and the Part under the Septum.

317. THE internal Parts are the internal Nares, the Septum Narium, the Circumvolutions, the Conchæ Superiores, the Conchæ Inferiores, the poſterior Openings of the internal Nares, the Sinus Frontales, Sinus Maxillares, Sinus Sphenoidales, the Ductus Lacrymales, and Ductus Palatini.

318. THE firm or hard Parts are moſtly bony, and the reſt cartilaginous, viz. the Os Frontis, Os Ethmoides, Os Sphenoides, Oſſa Maxillaria, Oſſa Naſi, Oſſa Unguis, Oſſa Palati, Vomer, Conchæ Inferiores, and the Cartilages. To theſe we may add the Perioſteum and Perichondrium, as Parts belonging to the Bones and Cartilages.

319. THE ſoft Parts are the Integuments, Muſcles, Sacculus Lacrymalis, Membrana Pituitaria, Veſſels, Nerves, and Hairs of the Nares. The bony Parts have been all explained in the Deſcription of the Skeleton; and therefore I need only in this Place ſet down the Diſtribution and Diſpoſition thereof, for the Formation of ſome of the principal Parts. The Septum is formed by the deſcending Lamina of the Os Ethmoides, and by the Vomer; and it is placed in the Groove framed by the Criſtæ of the Oſſa Maxillaria, and riſing Edges of the Oſſa Palati deſcribed in Sect. 1. N° 279, 316. The Back of the Noſe is formed by the Oſſa Naſi, and the Sides by the ſuperior Apophyſes of the Oſſa Maxillaria.

320. THE internal Nares, or the two Cavities of the Noſe, comprehend the whole Space between the external Nares and poſterior Openings, immediately above the Arch of the Palate, from whence theſe Cavities reach upward as far as the Lamina Cribroſa of the Os Ethmoides, where they communicate forward, with the Sinus Frontales, and backward, with the Sinus Sphenoidales. Laterally, theſe Cavities are bounded on the Inſide by the Septum Narium, and on the Outſide, or that next the Cheeks, by the Conchæ, between which they communicate with the Sinus Maxillaris.

321. THE particular Situation of theſe Cavities deſerves our Attention. The Bottom of them runs directly backward, ſo that a ſtraight and pretty large Stilet may eaſily be paſſed from the external Nares, under the great Apophyſis of the Occipital Bone. The Openings of the Maxillary Sinuſes are nearly oppoſite to the upper Edge of the Oſſa Malarum. The Openings of the Frontal Sinuſes are more or leſs oppoſite to, and between

the Pulleys or Rings of the Muſculi Trochleares; and by theſe Marks the Situation of all the other Parts may be determined.

322. The inferior Portion of the external Noſe is compoſed of ſeveral Cartilages, which are commonly five in Number, and of a pretty regular Figure. The reſt are only additional, ſmaller, more irregular, and the Number of them more uncertain. Of the five ordinary Cartilages one is ſituated in the Middle, the other four laterally. The middle Cartilage is the moſt conſiderable, and ſupports the reſt, being connected immediately to the bony Parts; but the other four are connected to the middle Cartilage, and to each other, by Means of Ligaments.

323. The principal Cartilage of the Noſe conſiſts of three Parts, one middle and two lateral. The middle Portion is a broad cartilaginous Lamina, joined by a Kind of Symphyſis to the anterior Edge of the middle Lamina of the Os Ethmoides, to the anterior Edge of the Vomer, and to the anterior Part of the Groove formed by the Oſſa Maxillaria, as far as the Naſal Spines of theſe Bones. This Lamina compleats the Septum Narium, and indeed forms the principal Part thereof.

324. The lateral Portions are oblique and narrow, ſuited to the correſponding Parts of the bony Arch. Where they join the middle Lamina, a ſuperficial Groove is obſervable, which makes them ſometimes appear like two diſtinct Pieces, ſeparated from the Lamina, though they are really continuous. This ſhallow Groove terminates below by a ſmall Criſta.

325. The lateral Cartilages are two on each Side of the inferior Part of the Lamina, one anterior, the other poſterior. The two anterior Cartilages are very much bent forward, and form what is called the Tip of the Noſe; the Space between their incurvated Extremities being commonly filled with a Kind of fatty Subſtance. The two poſterior Cartilages form the Alæ of the Nares, being pretty broad and of an irregular Figure.

326. The Spaces left between ſome Portions of the anterior and poſterior Cartilages, thoſe between the poſterior Cartilages and the neighbouring Parts of the Oſſa Maxillaria, and laſtly, thoſe between theſe four lateral Cartilages and the principal Lamina, vary in different Subjects, and are filled by ſmall additional Cartilages, the Number, Size and Figure of which are as variable as the Interſtices in which they lie.

327. The Sub-Septum, or Portion under the Septum Narium, is a Pillar of Fat applied to the inferior Edge of the Cartilaginous Partition, in Form of a ſoft moveable Appendix. The Thickneſs of the Alæ Narium, and eſpecially that of their lower Edges, is not owing to the Cartilages, which are very thin, but to the ſame Kind of ſolid Fat with which theſe Cartilages are covered. The great Cartilage is immoveable by Reaſon of its firm Connexion to the bony Parts of the Noſe; but the lateral Cartilages are moveable, becauſe of their Ligamentary Connexions, and they are moved in different Manners by the Muſcles belonging to them.

328. The external Noſe is covered by the common Integuments, the Skin, Epidermis, and Fat. Theſe which cover the Tip of the Noſe and Alæ

Alæ Narium are a great Number of glandular Bodies, called Glandulæ Sebaceæ by *M. Morgagni*, the Contents of which may eaſily be ſqueezed out by the Fingers. All theſe bony and cartilaginous Parts have likewiſe the common Perioſteum or Perichondrium.

329. Six Muſcles are commonly reckoned to belong to the Noſe; two Recti, called alſo Pyramidales or Triangulares; two Obliqui or Laterales, and two Tranſverſi or Myrtiformes. In very muſcular Bodies there are likewiſe ſome ſupernumerary Muſcles or ſmall Acceſſorii. The Noſe may alſo be moved in ſome Meaſure by the Muſcles of the Lips, which in many Caſes become Aſſiſtants to the proper Muſcles of this Organ. *Muſcles of the Noſe.*

330. The Muſculus Pyramidalis or Anterior on each Side is inſerted, by one Extremity, in the Synarthroſis of the Os Frontis and Oſſa Naſi, where its fleſhy Fibres mix with thoſe of the Muſculi Frontales and Superciliares. It is very flat, and runs down on the Side of the Noſe, increaſing gradually in Breadth, and terminating by an Aponeuroſis, which repreſents the Baſis of a Pyramid, and is inſerted in the moveable Cartilage which forms the Ala of the Nares.

331. The oblique or lateral Muſcle is a thin, fleſhy Plane, lying on the Side of the former, and in ſome Subjects appearing to form one broad Muſcle with it. This is probably the Reaſon why the anterior Muſcle has been termed Triangularis. The lateral Muſcle is fixed by its upper Extremity to the Apophyſis Naſalis of the Os Maxillare, below its Articulation with the Os Frontis, and ſometimes a little lower than the Middle of the inner Edge of the Orbit. From thence it runs toward the Ala Narium, and is inſerted in the moveable Cartilage, near the Os Maxillare, being covered laterally by a Portion of the neighbouring Muſcle of the upper Lip, with which, in ſome Subjects, it appears to be confounded.

332. The tranſverſe or inferior Muſcle, called alſo Myrtiformis, is inſerted by one End in the Os Maxillare, near the lower Edge of the Orbit, much about the Place which anſwers to the Extremity of the Socket of the Dens Caninus on the ſame Side. From thence it runs almoſt tranſverſely upward, and is fixed in the lateral Cartilages of the Noſe, over which, in ſome Subjects, it ſeems to run to the Alæ of the great Cartilage, and to be inſerted there.

333. The firſt two Pairs of theſe Muſcles raiſe and dilate the Alæ of the Nares, when they act; and at the ſame Time raiſe the upper Lip, by Reaſon of their Connexion with the Muſcles of that Part. They likewiſe wrinkle the Skin on the Sides of the Noſe.

334. The Membrana Pituitaria is that which lines the whole internal Nares, the Cellular Convolutions, the Conchæ, the Sides of the Septum Narium, and by an uninterrupted Continuation, the inner Surface of the Sinus Frontales and Maxillares, and of the Ductus Lacrymales, Palatini and Sphenoidales. It is likewiſe continued down from the Nares to the Pharynx, Septum Palati, &c. as we ſhall ſhew hereafter. *Membrana Pituitaria.*

335. It is termed Pituitaria, becauſe through the greateſt Part of its large Extent, it ſerves to ſeparate from the Arterial Blood, a Mucilaginous

Lympha, called Pituita by the Ancients, which in the natural State is pretty liquid; but it is ſubject to very great Changes, becoming ſometimes glutinous or ſnotty, ſometimes limpid, &c. neither is it ſeparated in equal Quantities through the whole Membrane.

336. When we carefully examine this Membrane, it appears to be of a different Structure in different Parts. Near the Edge of the external Nares it is very thin, appearing to be the Skin and Epidermis in a degenerated State. All the other Parts of it in general are ſpongy and of different Thickneſſes. The thickeſt Parts are thoſe on the Septum Narium, on the whole lower Portion of the internal Nares, and on the Conchæ; and if we make a ſmall Hole in it, at any of theſe Places, and then blow through a Pipe, we diſcover a very large Cellular Subſtance. In the Sinuſes it appears to be of a more ſlender Texture.

337. On the Side next the Periоſteum and Perichondrium, it is plentifully ſtored with ſmall Glands, the Excretory Ducts of which are very long near the Septum Narium, and their Orifices very viſible; and by applying a Pipe to any of theſe Orifices, the Ducts may be blown up almoſt through their whole Extent; but in order to this, the Parts muſt firſt be very well cleaned and waſhed in lukewarm Water.

338. In theſe Places eſpecially, we likewiſe diſcover a very fine Villous Subſtance, when the Parts are examined in clear Water in the Manner which I have deſcribed in another Place, and which I have uſed in my public Courſes, for above twenty Years paſt. *Riolan* made Uſe of this Method in examining ſmall Fœtuſes.

Sinus. 339. The Frontal, Maxillary and Sphenoidal Sinuſes open into the internal Nares, but in different Manners. The Frontal Sinuſes open from above downward, anſwering to the Infundibula of the Os Ethmoides, deſcribed in the Hiſtory of the Skeleton. The Sphenoidales open forwards oppoſite to the poſterior Orifices of the Nares, and the Maxillares open a little higher, between the two Conchæ. Therefore the Sinus Frontales diſcharge themſelves moſt readily when we ſtand or ſit; and the Sphenoidales, when the Head is inclined forward.

340. The Sinus Maxillares cannot be emptied wholly, or both at the ſame Time in any one Situation. Their Opening, which in ſome Subjects is ſingle, in others double, &c. lies exactly between the two Conchæ, about the Middle of their Depth; ſo that when the Head is held ſtraight, or inclined forward or backward, they can only be half emptied; but when we lie on one Side, the Sinus of the oppoſite Side may be wholly emptied, the other remaining full.

341. It is proper here to obſerve the whole Extent of the Maxillary Sinus. Below, there is but a very thin Partition between it and the Dentes Molares, the Roots of which do, in ſome Subjects, perforate that Septum. Above, there is only a very thin tranſparent Lamina between the Orbit and the Sinus. Backward, above the Tuberoſity of the Os Maxillare, the Sides of the Sinus are very thin, eſpecially at the Place which lies before the Root of the Apophyſis Pterygoides, through which the inferior Maxillary

Maxillary Nerve ſends down a Ramus to the Foramen Palatinum Poſterius, commonly called Guſtatorium. Inward, or toward the Conchæ Narium, the bony Part of the Sinus is likewiſe very thin.

342. The Lacrymal Sacculus is an oblong membranous Bag into which the ſerous Fluid is diſcharged from the Eye through the Puncta Lacrymalia, already deſcribed, and from which the ſame Fluid paſſes to the lower Part of the internal Nares. It is ſituated in a bony Groove and Canal, formed partly by the Apophyſis Naſalis of the Os Maxillare and Os Unguis, partly by the ſame Os Maxillare and lower Part of the Os Unguis, and partly by this lower Portion of the Os Unguis, and a ſmall ſuperior Portion of the Concha Narium Inferior. This Groove and Canal are the bony Lacrymal Duct, about which I would adviſe Beginners to conſult what was ſaid in the Deſcription of the Skeleton. *Sacculus Lacrymalis.*

343. I have an Obſervation or two to add in this Place concerning the Situation of this bony Duct. It runs down for a little Way obliquely backward, toward the lower and lateral Part of the internal Nares on each Side, where its lower Extremity opens on one Side of the Sinus Maxillaris under the inferior Concha, nearly at the Place from which a perpendicular Line would fall in the Interſtice between the ſecond and third Dentes Molares. The upper Part of this Duct is only an half Canal or Groove; the lower is a compleat Canal narrower than the former.

344. The Sacculus Lacrymalis may be divided into a ſuperior or Orbitary Portion, and an inferior or Naſal Portion. The Orbitary Portion fills the whole bony Groove, being ſituated immediately behind the middle Tendon of the Muſculus Orbicularis. About one fourth of its Length is above this Tendon, and the reſt below. The Naſal Portion lies in the bony Canal of the Noſe, being narrower and ſhorter than the former.

345. The Orbitary Portion is diſpoſed at its upper Extremity, much in the Manner of an Inteſtinum Cæcum, and at the lower Extremity is continued with the Portio Naſalis. Towards the internal Angle of the Eye, behind the Tendon of the Orbicular Muſcle, it is perforated by a ſmall ſhort Canal formed by the Union of the Lacrymal Ducts.

346. The Naſal Portion having reached the lower Part of the bony Duct under the inferior Concha, terminates in a ſmall flat membranous Bag, the Bottom of which is perforated by a round Opening, as I have always found it upon a careful Examination, but which at firſt Sight appears oblong.

347. I uſed to attribute this Difference to the Force which I was obliged to uſe in ſeparating the Concha Inferior, in order to ſee this Opening, which I have often found more backward than the Middle of the Bag at the Extremity of this Portion; and therefore when I would either ſee or ſhew this Opening in its natural State, I do not ſeparate the inferior Concha, but cut it gently with a ſharp Knife, or with Sciſſars. If a tranſverſe Line be drawn between the lower Part of the Noſe and Os Malæ, and another Line be drawn directly upward, oppoſite to the third Dens Molaris

or

or oppoſite to the ſecond and third, theſe two Lines will interſect each other nearly at the lower Extremity of this Sacculus.

348. I have ſometimes found the upper Extremity of this Bag divided into an anterior and poſterior Part, by a Kind of Valvula Connivens lying in the anterior Portion, a little lower than the Tendon of the Muſculus Orbicularis. The ſmall common Canal of the two Lacrymal Ducts opens in the poſterior Portion, and conſequently behind the Valve.

349. The Subſtance of this Sacculus is ſomething ſpungy or cellulous, and pretty thick, being ſtrongly united by its convex Side to the Perioſteum of the bony Canal, which may be diſtinctly ſhewn. This Subſtance ſeems to be made up of two Laminæ, joined together by a ſpungy Membrane, the outermoſt of which is that which I have mentioned; the other appears to be glandulous, and is in ſome Subjects looſe and pliable, which I look upon as a Diſeaſe.

Ductus Inciſorii.

350. The Ductus Inciſorii, or Naſo-Palatini of *Steno*, are two Canals which go from the Bottom of the internal Nares croſs the Arch of the Palate, and open behind the firſt or largeſt Dentes Inciſorii. Their two Orifices may be diſtinctly ſeen in the Skeleton at the lower Part of the Naſal Foſſæ, on the anterior and lateral Sides of the Criſtæ Maxillares; and we may likewiſe perceive their oblique Paſſage through the Maxillary Bones, and laſtly their inferior Orifices in a ſmall Cavity or Foſſula, called Foramen Palatinum Anterius. In freſh Subjects they are not ſo apparent, eſpecially in Human Subjects, for in Sheep and Oxen they are eaſily diſcoverable.

351. *Santorini* in his Anatomical Obſervations has deſcribed thoſe of the Human Body in a very pretty Manner, and has given us his Method of diſcovering them, which is nearly the ſame with that which I have always made uſe of in my private Courſes, to ſhew at one View all the external Parts which belong to the Noſe, as may be ſeen in the Works publiſhed by my Scholars, eſpecially Strangers. I ſay his Method is *nearly* the ſame with mine, becauſe inſtead of dividing the Head into two equal lateral Parts, I always direct the Saw a little toward one Side, to preſerve the Septum Narium intire, as well as that of the Sinus Frontales, Sinus Sphenoidales, and Ductus Inciſorii; and on the other Side, to preſerve the Conchæ and Cells of the Os Ethmoides. For this Purpoſe I uſe a very fine Saw made of the Spring of a Watch.

352. By this Method I ſhew on that Side from which all the Septa have been ſawed off, the intire Conchæ, their convex Sides, the particular Thickneſs of the Membrana Pituitaria on their lower Edges, the Orifice or Orifices of the Sinus Maxillaris, the Situation of the Orifice of the Sinus Sphenoidalis, the communicating Ducts that go between the Sinus Frontales and the Ethmoidal Cells, and Interſtices between the two Conchæ, and the Structure of the poſterior Openings of the Nares. I can ſhew likewiſe at the ſame Time the Orifice of the *Euſtachian* Tube behind the poſterior Opening of the Nares, and the Communication of the Noſe with the Mouth.

353.

353. On the ſame Side, I afterwards ſeparate gradually with a very ſharp Knife, or with narrow ſharp pointed Sciſſars, the ſuperior or Ethmoidal Concha, without doing any Violence to the neighbouring Parts; and then I can ſhew on the Parts covered by that Concha, a little oblong or oval Foſſula which runs down obliquely from before backward; at the poſterior and lower Extremity of which, there is an Orifice of about a Quarter of an Inch in Diameter, which opens into the Maxillary Sinus; and another at the anterior or ſuperior Extremity, which opens into the Frontal Sinus.

354. Immediately behind this Foſſula, there are two Openings, one into the Sinus Frontales, the other into the Ethmoidal Cellulæ of the Os Frontis. I ſhew likewiſe in the poſterior Part of the Os Ethmoides, at leaſt two Openings, by which the Cells of that Bone communicate with each other. All this is very different from what we ſee in the Skeleton, or even when theſe Parts are deprived of their Membranes, &c. neither is the Structure always the ſame in freſh Subjects; for in ſome I have obſerved, a little before and above the Opening of the Maxillary Sinus, two ſmall Grooves, which united in their Paſſage to the Frontal Sinuſes, the uppermoſt Groove being a little contorted.

355. In the next Place I remove the Concha Inferior or Maxillaris in the ſame Manner and with the ſame Precautions; and then I obſerve, at the Diſtance of about a Quarter of an Inch from the anterior Extremity of this Concha, a ſmall Opening, the Diameter of which is not above the twelfth Part of an Inch, and is turned obliquely backward. It ſeems to be the Extremity of a Duct of the ſame Diameter, but when it is ſlit with ſharp pointed Sciſſars, we diſcover a flat oval Cavity, the Diameter of which is a Quarter of an Inch in Length, and lies in the ſame Direction with the Septum Narium.

356. This oval Cavity is the lower Extremity of the Sacculus Lacrymalis, which conſequently is only contracted between this inferior Cavity and the Orbitary Portion. Within this narrow or contracted Portion we ſee likewiſe the Opening of a blind Duct, which runs obliquely backward and upward for about a Quarter of an Inch; but I do not know preciſely where it terminates or what it is deſigned for.

357. The Arteries of all theſe Parts come from the external Carotid. Thoſe of the external Parts of the Noſe are chiefly Branches and Rami of the Arteria Maxillaris Externa or Angularis, and of the Temporalis; and the Arteries of the internal Parts are Branches and Ramifications of the Maxillaris Interna. The Veins are almoſt in the ſame Manner, Branches and Ramifications of the external Jugular, and they communicate with the Orbitary Sinus, and by that Means, with the Sinuſes of the Dura Mater, and with the internal Jugularis. *Arteries and Veins.*

358. The principal Nerves belonging to the Noſe are Filaments of the Nervi Olfactorii, which run down through the Holes of the tranſverſe Lamina of the Os Ethmoides, and are diſtributed to the common Membrane of the internal Nares, eſpecially to the villous Portions thereof. The *Nerves.*

inner

inner Ramus of the Orbitary or Ophthalmic Nerve ſends a Filament through the internal anterior Orbitary Hole into the Cranium, which comes out again in Company with one of the Filaments of the Olfactory Nerve through the Ethmoidal Lamina.

359. This internal Ramus advances afterwards towards the Os Unguis, and is diſtributed partly to the Sacculus Lacrymalis, partly to the upper Portion of the Muſculus Pyramidalis, and of the Integuments of the Noſe. The Sub-orbitary Nerve, which is a Branch of the Maxillaris Superior, having paſſed through the inferior Orbitary Hole, ſends Filaments to the lateral external Parts of the Noſe. Another Ramus of the ſuperior Maxillary Nerve goes to the poſterior Opening of the Nares, being ſpent on the Conchæ, and other internal Parts of the Noſe.

Uſes. 360. The Noſe is the Organ of Smelling, by Means of the villous Portion of the internal Membrane, to which the Olfactory Nerves are chiefly diſtributed. It is likewiſe of Uſe in Reſpiration, and the Mucilaginous Fluid ſpread over the whole Pituitary Membrane, prevents the Air from drying that Membrane, and ſo rendering it incapable of being affected. The Noſe ſerves likewiſe to regulate and modify the Voice, and to this the Sinuſes likewiſe contribute. The Sacculus Lacrymalis receives the Serum from the Eyes, and diſcharges it upon the Palate, from whence the greateſt Part of it runs to the Pharynx.

ART. IV.

The Ear.

The Ear in general. 361. EVERY one knows that the Ears are two in Number, that they are ſituated in the lateral Parts of the Head, and that they are the Organs of Hearing. Anatomiſts commonly divide or diſtinguiſh the Ear into external and internal. By the external Ear they mean all that lies without the external Orifice of the Meatus Auditorius in the Os Temporis; and by the internal Ear, all that lies within the Cavities of that Bone, and alſo the Parts that bear any Relation thereto.

362. The greateſt Part of the external Ear conſiſts of a large Cartilage very artificially framed, which is the Baſis of all the other Parts of which this Portion of the Ear is made up. The internal Ear conſiſts chiefly of ſeveral bony Pieces, partly formed in the Subſtance of the Oſſa Temporum, and eſpecially in that Portion of it, called Apophyſis Petroſa, and partly ſeparated from, but contained in a particular Cavity of that Bone. All theſe bony Pieces have been explained in the Deſcription of the Skeleton, to which I muſt therefore refer, deſiring thoſe who have a Mind to underſtand what I am now to ſay about the other Parts of this Organ, carefully to reviſe the Explication there given.

363. The external Ear taken all together reſembles in ſome Degree the Shell of a Muſcle, with its broad End turned upward, the ſmall End downward, the convex Side next the Head, and the concave Side outward. Two Portions are diſtinguiſhed in the external Ear taken all together, one large and ſolid, called in Latin, Pinna, which is the ſuperior, and by much the greateſt Part; the other ſmall and ſoft, called the Lobe, which makes the lower Part. We may likewiſe conſider two Sides in the outward Ear, one turned obliquely forward, and irregularly concave, the other turned obliquely backward, and unequally convex; for all Ears which have not been diſordered by binding the Head too tight in Childhood, are naturally bent forward. *The External Ear.*

364. The Foreſide is divided into Eminences and Cavities. The Eminences are four in Number, called Helix, Anthelix, Tragus, and Antitragus. The Helix is the large folded Border or Circumference of the great Portion of the Ear. The Anthelix is the large oblong Eminence or Riſing ſurrounded by the Helix. The Tragus is the ſmall anterior Protuberance below the anterior Extremity of the Helix, which in an advanced Age is covered with Hairs. The Antitragus is the poſterior Tubercle, below the inferior Extremity of the Anthelix.

365. The Cavities on the Foreſide are four in Number, the Hollow of the Helix, the Depreſſion at the ſuperior Extremity of the Anthelix, called Foſſa Navicularis, the Concha or great double Cavity that lies under the Riſing termed Anthelix, the upper Bottom of which is diſtinguiſhed from the lower by a Continuation of the Helix in Form of a tranſverſe Criſta; and laſtly, the Meatus of the external Ear ſituated at the lower Part of the Bottom of the Concha.

366. The Backſide of the external Ear ſhews only one conſiderable Eminence, which is a Portion of the convex Side of the Concha, the other Portion being hid by the Adheſion of the Ear to the Os Temporis. This Adheſion hinders us likewiſe from ſeeing the Hollow anſwering to the Criſta, by which the Cavity of the Concha is divided.

367. I have already ſaid that the external Ear conſiſts chiefly of a Cartilage, which is the Baſis of all the other Parts. Theſe other Parts are Ligaments, Muſcles, Integuments, Sebaceous and Ceruminous Glands, Arteries, Veins and Nerves; but I do not reckon among them a large Gland, called by the Greeks Parotis, becauſe it lies very near the Ear; the Deſcription of which muſt be referred to that of the Salivary Glands, of which it is the moſt conſiderable.

368. The Cartilage of the outward Ear is nearly of the ſame Extent and Figure with the large ſolid Portion thereof, already mentioned; but it is not of the ſame Thickneſs, being covered by Integuments on both Sides. In the Lobe or ſoft lower Portion of the Ear, this Cartilage is wanting. On the Backſide, it ſhews all the Eminences and Cavities on the Foreſide in an oppoſite Situation with Reſpect to each other, except the Fold of the great Circumference; and it conſiſts only of one Piece from that Circumference all the Way to the Meatus Externus, except at the two Extremi-

ties of the folded Part of the Helix, where there are two ſmall ſeparate Portions connected to the great Cartilage only by the Integuments.

369. The cartilaginous Portion of the external Meatus Auditorius does not make a compleat Circle; but rather a ſhort Tube, in one Side of which there is a Break, and which terminates in an oblique Border fixed to the Edge of the bony Canal by ſeveral ſmall Inequalities, as by a Kind of Ingrailing; and from this Obliquity it is, that the cartilaginous Border terminates downward in a Kind of Apex or Point. The lateral Break in this Cartilage is between the upper and Backpart of its Circumference; and on each Side thereof the cartilaginous Edges are rounded. There are likewiſe two or three other ſmall Inciſures in this Circumference, which, in Regard to the Meatus, repreſent obliquely tranſverſe Fiſſures. The anterior Fiſſure is in a Manner quadrangular; neither are the intermediate Parts always oppoſite to each other, for the uppermoſt is a little further from the Os Temporis than the poſterior.

370. The external Ear is fixed to the Cranium, not only by the cartilaginous Portion of the Meatus already mentioned, but alſo by Ligaments, which are two in Number, one anterior, the other poſterior. The anterior Ligament is fixed by one Extremity to the Root of the Apophyſis Zygomatica of the Os Temporis, at the anterior and a little toward the ſuperior Part of the Meatus Oſſeus, cloſe to the Corner of the Glenoide Cavity; and by the other Extremity, to the anterior and ſuperior Part of the cartilaginous Meatus.

371. The poſterior Ligament is fixed by one End to the Root of the Maſtoide Apophyſis, and by the other, to the poſterior Part of the Convexity of the Concha, ſo that it is oppoſite to the anterior Ligament. There is likewiſe a Kind of ſuperior Ligament, which ſeems to be only a Continuation of the Aponeuroſis of the Frontal and Occipital Muſcles.

372. Of the Muſcles of the external Ear, ſome go between the Cartilages and the Os Temporis, others are confined to the Cartilages alone. Both Kinds vary in different Subjects, and are ſometimes ſo very thin, as to look more like Ligaments than Muſcles. The Muſcles of the firſt Kind are generally three in Number, one ſuperior, one poſterior, and one anterior, and they are all very thin. The ſuperior Muſcle is fixed in the Convexity of the Foſſa Navicularis, and of the ſuperior Portion of the Concha; from whence it runs up to the ſquamous Portion of the Os Temporis, expanding in a radiated Manner, though not in the ſame Degrees in all Subjects, and is inſerted principally in the ligamentary Aponeuroſis which covers the poſterior Portion of the Temporal Muſcle.

373. The anterior Muſcle is ſmall, more or leſs inverted, and like an Appendix to the ſuperior. It is fixed by one Extremity above the Root of the Zygomatic Apophyſis, and by the other, in the anterior Part of the Convexity of the Concha.

374. The poſterior Muſcle is almoſt tranſverſe, and of a conſiderable Breadth, being fixed by one End to the poſterior Part of the Convexity of the Concha, and by the other, in the Root of the Maſtoide Apophyſis.

It

It covers the posterior Ligament, but the Division of it into several Portions mentioned by some Authors, seems to be merely artificial, that is, owing to Dissection.

375. The small Muscles which are confined to the Cartilages are only small Strata of Fibres found on both Sides of the Cartilages. In many Subjects they are of so pale a Colour, as not to look at all like muscular Fibres. Of this Number are those which *Valsalva* discovered in the different Cavities on the Backside of the Cartilage, and those found by *Santorini* on the Tragus, and along the convex Part of the anterior Portion of the Helix.

376. The Skin of the external Ear is, in general, a Continuation of that which covers the neighbouring Parts of the Temporal Region. The Skin on the Foreside of the Ear is accompanied by a very small Quantity of cellular Substance, and therefore we find all the Eminences and Cavities of that Side distinctly marked upon it, as far as the Bottom of the external Meatus Auditorius. In what I have said of the Skin the Epidermis is likewise comprehended.

377. The Backside is covered by the Skin continued from the Foreside; but as the Folds are there very close, it only passes over them, except that Portion of the Concha which surrounds the Entry of the Meatus Auditorius, and which is joined to the Os Temporis by Means of the cellular Substance. The Hollow of that common Fold which lies between the Anthelix and Concha does not appear on the Backside, for as it is filled with cellular Substance, the Skin passes over it.

378. The Lobe of the Ear, or that soft Portion which lies under the Tragus, Antitragus, and Meatus Auditorius, is made up of nothing but Skin and cellular Substance. The Meatus Auditorius is partly bony and partly cartilaginous. The bony Portion is the longest, and forms the Bottom of the Canal, as may be seen in the Description of the Skeleton. The cartilaginous Portion is the shortest, and in Adults, forms the external Opening or Orifice of the Canal, as has been already said.

379. These two Portions joined endwise to each other, form a Canal of about three Quarters of an Inch in Length, of different Wideness in its different Parts, and a little contorted. It is lined on the Inside by the Skin and cellular Membrane, through its whole Length; and thus these Integuments make up for the Breaks in the cartilaginous Portion, and form a Kind of cutaneous Tube in the other Portion. The cellular Membrane is confounded with the Perichondrium and Periosteum of the Meatus.

380. The Skin which covers both Sides of the Cartilage contains a great Number of small Glands, which continually discharge an oily whitish Humour collected chiefly near the Adhesions of the Ear to the Head, and under the Fold of the Helix; and these Glands are of the sebaceous Kind. The Skin which lines the Meatus Auditorius contains another Kind of Glands, of a yellowish Colour, and which may be plainly seen on the convex Side of the cutaneous Tube already mentioned.

381. These Glands are diſpoſed in ſuch a Manner as to leave reticular Spaces between them, and they penetrate a little Way into the Subſtance of the Skin. They are called Glandulæ Ceruminoſæ, becauſe they diſcharge that Matter which is named Cerumen, or the Wax of the Ear. The inner Surface of the cutaneous Tube is full of fine Hairs, between which lie the Orifices of the Ceruminous Glands. The firſt Place in which we meet with theſe Glands is on that Part of the convex Side of the cutaneous Tube, which ſupplies the Breaks of the cartilaginous Meatus.

382. The Arteries of the external Ear come anteriorly from the Arteria Temporalis, and poſteriorly from the Occipitalis, which is a Branch of the external Carotid. It is proper to obſerve here that the Occipital Artery communicates with the Vertebralis, and thereby with the internal Carotid. The Veins are Rami of the Jugularis Externa; and the Occipital Vein, one of theſe Rami, communicates not only with the Vena Vertebralis, but with the neighbouring lateral Sinus of the Dura Mater.

383. The Portio Dura of the Auditory Nerve having paſſed out of the Cranium through the Foramen Stylo-Maſtoidæum in the Manner that ſhall be afterwards deſcribed, gives off a Ramus which runs up behind the Ear, to the Backſide of which it ſends ſeveral Filaments; and the Trunk of this Ramus ſends likewiſe Filaments to the Meatus and Foreſide of the Ear. The ſecond Vertebral Pair ſends alſo a Ramus to the Ear, the Ramifications of which communicate with thoſe of the other Ramus from the Portio Dura.

The internal Ear.

384. I muſt here begin by repeating the Advice which I gave above, to read over and retain what has been ſaid about the bony Part of the Organ of Hearing in the Deſcription of the Skeleton from N° 260 to 267. and from N° 392 to 444. It would be too long to repeat all theſe Particulars in this Place, but it is abſolutely neceſſary to have a compleat Idea of all the bony Parts, if we would underſtand the Deſcription of the other Parts of the Ear, to which I am now to proceed.

385. These Parts are chiefly the Membrana Tympani, the Perioſteum of the Barrel, Officula Auditus, Labyrinth, and of all its Cavities, the Membrana Maſtoidæa Interna, the Muſcles of the Officula, the Parts which compleat the Formation of the *Euſtachian* Tube, the Arteries, Veins and Nerves. I find myſelf, however, under a Neceſſity of beginning by the Tuba *Euſtachiana*, for two Reaſons: Firſt, becauſe the bony Parts of that Tube are but of very ſmall Uſe for the Knowledge of its whole Structure and Compoſition; and ſecondly, becauſe we are obliged to mention it in deſcribing the Muſcles.

386. I ſpoke of the *Euſtachian* Tube in the Deſcription of the Skeleton, by the Name of Ductus Auris Palatinus; and I took Notice that in *France*, it goes generally by the Name of the Aqueduct, which, however, muſt not be confounded with the Aqueductus *Fallopii*. In N° 402 of Sect. 1. I obſerved, that it is a Canal or Duct which goes from the Tympanum to the poſterior Openings of the Nares, or Naſal Foſſæ, and toward the Arch of the Palate; that it is dug in the Apophyſis Petroſa, along the

Carotid

Carotid Canal, and that it is lengthened out by the Spinal Apophyſis of the Os Sphenoidale.

387. In its natural State this Duct reaches from the Cavity of the Barrel, to the Root or ſuperior Part of the internal Ala of the Apophyſis Pterygoides; and through this whole Courſe it is made up of two Portions, one intirely bony, and the other partly bony, partly cartilaginous, and partly membranous. That Beginners may not here be miſled, it is very neceſſary to remember the Advice which I gave in the Deſcription of the Skeleton N° 186, &c. that in examining the lower Parts of the Baſis Cranii, the Skull ought to be raiſed up, and viewed from below upwards, &c.

388. The bony Portion lies through its whole Length immediately above the Fiſſure of the Glenoide or Articular Cavity of the Os Temporis, and terminates at the Meeting of the Spinal Apophyſis of the Os Sphenoidale, with the Apophyſis Petroſa of the Os Temporis, that is, between that Spinal Apophyſis and the inferior Orifice of the Carotid Canal.

389. The other or mixed Portion reaches in the ſame Direction from this Place, to the internal Ala of the Apophyſis Pterygoides, or to the poſterior and outer Edge of the Nares. But to form a more exact Idea of it, it will be proper to conſider it as divided into four Parts, two ſuperior and two inferior.

390. The two upper Parts, or Quarters, are bony, and of theſe, the innermoſt is formed by the Side of the Apophyſis Petroſa, the outermoſt, by the Side of the Apophyſis Spinalis of the Os Sphenoides, ſo that the upper Half of this Portion of the Tube is bony. Of the two inferior Parts, the internal is cartilaginous, and the external membranous, ſo that the lower Half of this Portion of the Tube is partly cartilaginous next the Os Sphenoidale, and partly membranous next the Apophyſis Petroſa.

391. The *Euſtachian* Tube thus formed, is very narrow in the bony Part next the Ear. The other Portion grows gradually wider, eſpecially near the poſterior Nares, where the inner cartilaginous Side terminates by a prominent Edge, and the outer Side joins that of the neighbouring Noſtril. The Cavity of the Tube is lined by a Membrane like that of the internal Nares, of which it appears to be a Continuation; and on the prominent Edge, this Membrane is conſiderably increaſed in Thickneſs, repreſenting a Kind of Half-Pad.

392. The Situation of the two Tubes is oblique, their poſterior Extremities at the Ears being at a greater Diſtance than the anterior at the Nares, and the convex Sides of the prominent Edges are turned toward each other. The Openings of the Tubes are oval at this Place, as is likewiſe their whole Cavity, eſpecially that of the mixed Portion.

393. The Membrana Tympani is a thin, tranſparent, flattiſh Pellicle, the Edge of which is round, and ſtrongly fixed in the Orbicular Groove which divides the bony Meatus of the external Ear from the Tympanum or Barrel. This Membrane is very much ſtretched or very tenſe, and yet not perfectly flat; for on the Side next the Meatus Externus it has a ſmall Hollowneſs

lowneſs which is pointed in the Middle, and on the Side next the Tympanum it is gently convex, and alſo pointed in the Middle.

394. This Membrane is ſituated obliquely, the upper Part of its Circumference being turned outward, and the lower Part inward, ſuitably to the Direction of the bony Groove already mentioned. It is made up of ſeveral very fine Laminæ, cloſely united together. The external Lamina is in ſome Meaſure a Production of the Skin and Cuticula of the external Meatus; for they may be pulled at the ſame Time like the Finger of a Glove. The internal Lamina is a Continuation of the Perioſteum of the Tympanum, and when the Membrane has been firſt macerated in Water, each of theſe Laminæ may be ſubdivided into ſeveral others, which I have ſometimes made to amount in all to ſix. In very young Children this Membrane is covered on the Outſide by a thick mucilaginous Web.

395. The Depreſſion in the Middle of the Membrana Tympani is cauſed by the Adheſion of the little Bone called Malleus, the Handle of which is cloſely joined to the Inſide of the Membrane from the upper Part of the Circumference all the Way to the Centre to which the End of the Handle is fixed. This Handle ſeems to lie in a very fine membranous Duplicature, by Means of which it is tied to the Membrana Tympani, and which ſerves it for a Perioſteum.

396. The Perioſteum of the Tympanum or Barrel of the Ear produces that of the ſmall Bones, and it may be made viſible by Means of Anatomical Injections, which diſcover Capillary Veſſels very diſtinctly ramified on the Surface of the Officula, as has been ſhewn in my private Courſes. It is likewiſe continued over the two Feneſtræ, and enters the *Euſtachian* Tube, where it is loſt in the inner Membrane of that Duct.

397. The Cellulæ Maſtoidæi are very irregular Cavities in the Subſtance of the Maſtoide Apophyſis, which communicate with each other, and have a common Opening towards the Inſide, and a little above the poſterior Edge of the Orbicular Groove. Theſe Cells are lined by a fine Membrane, which is partly a Continuation of the Perioſteum of the Tympanum, and partly ſeems to be of a Glandular Structure like a Kind of the Membrana Pituitaria. The Maſtoide Opening is oppoſite to the ſmall Opening of the *Euſtachian* Tube, but a little higher.

398. The Ligaments of the Officula come next in Order, to underſtand which, I ſuppoſe the Reader acquainted with what I ſaid concerning theſe ſmall Bones in the Deſcription of the Skeleton N° 407, &c. The Incus is tied by a ſtrong ſhort Ligament fixed in the Point of the ſhort Leg, to the Edge of the Maſtoide Opening. Between the Incus and Malleus we find a ſmall thin Cartilage. The Malleus is connected through the whole Length of its Handle to the Inſide of the Membrana Tympani, in the Manner already ſaid. I need only add here, that by Help of a Microſcope we diſcover round the Point of the Handle, in the Subſtance of the Membrane, a ſmall Orbicular Plane of a whitiſh Colour, a little inclined to Red.

399. The

399. The Malleus has three Muſcles, one external, one anterior, and one internal; and the Stapes has one Muſcle. The external or ſuperior Muſcle of the Malleus, attributed to *Caſſerius*, and mentioned by *Fabricius ab Aquapendente*, is a thin Faſciculus of fleſhy Fibres lying along the upper Part of the bony Meatus Auditorius, between the Perioſteum and the other Integuments. The outer Part of it is pretty broad, and it contracts by Degrees as it advances towards the upper Part or Break of the Orbicular Groove of the Tympanum, into which it enters by a ſmall Tendon, above the Membrana Tympani, and is inſerted in the Neck of the Malleus, near the ſmall Eminence or ſhort Apophyſis of the Handle. This Muſcle is ſometimes ſo pale as hardly to be diſtinguiſhed.

400. The anterior Muſcle of the Malleus, called by *M. Duvernay* the external, is fleſhy, long and thin. It runs along the Outſide of the *Euſtachian* Tube, to which it adheres very cloſely through its whole Length. Its anterior Extremity is fixed in that Side of the Tube juſt before the Sphenoidal Spine; and the poſterior Extremity ends in a long thin Tendon, which runs in the Articular or Glenoide Fiſſure of the Os Temporis, through a ſmall oblique Notch, in which Fiſſure it enters the Tympanum, and is inſerted in the long thin Apophyſis of the Malleus. It is partly accompanied by a Nerve which forms what is called the Chorda Tympani, as we ſhall ſee hereafter.

401. The internal Muſcle of the Malleus is very fleſhy and diſtinct. It lies along the Inſide of the *Euſtachian* Tube, partly on the cartilaginous, and partly on the bony Portion, being fixed by one Extremity in the Apophyſis Petroſa. Afterwards it runs along the Cavity of the bony Half Canal of the Tympanum, within which Cavity it is inveſted by a Portion of a Membranous or Ligamentary Vagina, which being fixed to the Edges of the Half Canal, forms an intire Tube therewith, and this Vagina muſt be cut open before we can ſee the Muſcle.

402. At the Extremity of this bony Half Canal, where we obſerve the Cavity ſhaped like the Mouth of a Spoon, mentioned in the Deſcription of the Skeleton N° 399. this Muſcle ends in a Tendon, which is bent round the tranſverſe bony or Ligamentary Ridge in the laſt named Cavity, as over a Pulley, and is inſerted in the Neck of the Malleus above the ſmall Apophyſis, advancing likewiſe as far as the Handle. The Extremities of the anterior and internal Muſcles ſometimes meet, and there they cover the mixed Portion of the *Euſtachian* Tube.

403. The Muſcle of the Stapes is ſhort and thick, and lies concealed within the ſmall bony Pyramid at the Bottom of the Tympanum. The Cavity which it fills, touches very nearly the bony Canal of the Portio Dura of the Auditory Nerve; and it terminates in a ſmall Tendon which goes out of the Cavity through the ſmall Hole in the Apex of the Pyramid. As it goes through the Hole it turns forward, and is inſerted in the Neck of the Stapes on the Side of the longeſt and moſt crooked Leg of that Bone.

404. The

404. The three Parts of the Labyrinth, that is, the Veſtibulum, ſemicircular Canals, and Cochlea, are lined by a fine Perioſteum, which is continued over all the Sides of their Cavities, and ſhuts the two Feneſtræ of the Tympanum.

405. In all the Subjects which I ever examined, I have found the ſemicircular Canals ſimply lined by a Perioſteum adhering to their inner Surfaces, without any particular membranous Bands. The two Half Canals of the Cochlea are lined in this Manner: The Perioſteum of the two Sides of the bony Spiral Lamina advances beyond the Edge of that Lamina, and forms a membranous Duplicature, which extending to the oppoſite Side compleats the Spiral Septum.

406. This Septum ſeparates the two Half Canals from the Baſis to the Apex, but there it leaves a ſmall Opening, by which the ſmall Extremities of the Half Canals communicate with each other. The large Extremity of the external Half Canal ends by an oblique Turn, in the Feneſtra Rotunda, which is ſhut by a Continuation of the Perioſteum of that Canal. The large Extremity of the other Half Canal opens into the Veſtibulum; and theſe two Extremities are intirely ſeparated by a Continuation of the Perioſteum.

407. All the Perioſteum of the internal Ear, eſpecially that of the Officula and Tympanum, is in Children no more than a Mucilage; and in them likewiſe the Membrana Tympani is thick, opaque, and covered with a whitiſh ſlimy Matter.

408. Through the whole Extent of the Perioſteum of the internal Ear, eſpecially on that of the Officula, ſemicircular Canals, and Half Canals of the Cochlea, we diſcover a vaſt Number of Blood-Veſſels, not only by Anatomical Injections, but in Inflammations, and even without the Help of a Microſcope; for I have often ſhewn them to the naked Eye in the ſemicircular Canals and Half Canals of the Cochlea. The Arteries come partly from the internal Carotid, and partly from the Arteria Baſilaris, which is a Continuation of the Vertebralis, the ſmall Capillary Ramifications of which may be obſerved to accompany the Auditory Nerve through the internal Foramen Auditorium.

409. The Portio Mollis of the Auditory Nerve ends by its Trunk, at the great Foſſula of the internal Auditory Hole, from whence the Filaments paſs through ſeveral ſmall Holes in the Baſis of the Cochlea, partly to the Perioſteum of the ſemicircular Canals, and partly to the internal Perioſteum of the Half Canals of the Cochlea.

410. The Portio Dura, which I name Nervus Sympatheticus Minor, runs firſt of all into the ſmall Foſſula of the Foramen Auditorium Internum, then paſſes through the whole bony Duct, called Aqueductus *Fallopii*, and comes out again through the Stylo-Maſtoide Hole of the Os Temporis. In this Courſe it communicates with the Dura Mater on the upper or anterior Side of the Apophyſis Petroſa, at the Place where the bony Duct is interrupted, as was mentioned in the Deſcription of the Skeleton N° 264, 443.

411. HAVING reached behind the ſmall Pyramid in the Bottom of the Tympanum, this Nerve ſends a ſmall Filament to the Muſcle of the Stapes; and a little before it goes out by the Stylo-Maſtoide Hole, it gives off another more conſiderable Filament, which enters the Tympanum from behind forward, paſſes between the long Leg of the Incus and Handle of the Malleus, and afterwards runs croſs the whole Breadth of the Tympanum a little obliquely, and goes out at the ſame Place at which the Tendon of the anterior Muſcle of the Malleus enters.

412. THIS ſmall Nerve is generally called Chorda Tympani, becauſe in its Paſſage through the Tympanum it has been compared to the Cord of a Drum. Having left the Cavity of the internal Ear, it advances toward one Side of the Baſis of the Tongue, where having joined the ſmall Nervus Lingualis, it is conſidered as a Kind of Recurrent; but the remaining Part of its Courſe muſt be referred to the Deſcription of the Tongue.

413. THE Portio Dura of the Auditory Nerve having paſſed through the Foramen Stylo-Maſtoidæum, is diſtributed in the Manner already mentioned in the Deſcription of the Nerves; and we ought very carefully to obſerve its different Communications with the Branches and Rami of the Nerves of the fifth Pair, with the Sympatheticus Medius or Eighth Pair, with the ſecond Pair of Cervical Nerves, and with the Nervi Sub-Occipitales, or tenth Pair of the Medulla Oblongata, &c.

414. THE Ear is the Organ of which we can moſt diſtinctly unfold the Structure, and demonſtrate the greateſt Number of Parts, that is, of ſmall Machines of which it is made up. We know likewiſe in general that it is the Organ of Hearing; but when we endeavour to diſcover the Uſes of each of theſe Parts, that is, how each contributes to the great Deſign of the Whole, after having throughly examined them, we muſt be obliged to own that the greateſt Part of what the moſt able Philoſophers have ſaid upon this Subject, is without any real Foundation.

415. IT is certain that the Cavity of the external Ear collects Sounds or Noiſe, and concenters it towards the Bottom of the Concha, all the Way to the external Meatus Auditorius. This we learn from Experience, by enlarging this Cavity with the Hand. It may likewiſe be affirmed with Certainty, that in Proportion as the Membrana Tympani is more or leſs ſtretched, Sounds become more or leſs ſenſible. This Experience teaches us; for when this Membrane is wetted by any Liquor, our Hearing is imperfect, but is reſtored again when the Membrane is dry. By the Muſculus of the Officula, we can demonſtrate that this Membrane is capable of being ſtretched and relaxed, as Occaſion requires; but the Proſecution of this curious Subject muſt be referred to another Treatiſe.

ART. V.

The Mouth.

Introduction. 416. THE Word Mouth may have two Significations; for firſt, it means the tranſverſe Slit between the Noſe and Chin, formed by the Lips, and ſecondly, it expreſſes the internal Cavity, of which this tranſverſe Slit is the external Opening. For this Reaſon the Mouth may be diſtinguiſhed into external and internal, and the Parts of which it conſiſts may likewiſe come under the ſame two general Heads. The bony Parts are the Oſſa Maxillaria, Oſſa Palati, Maxilla Inferior, and the Teeth: To theſe we may add the Os Hyoides, and the upper Vertebræ of the Neck.

417. THE external Parts of the Mouth are the two Lips, one upper, the other, under, the Borders or red Parts of the Lips, the Corners or Commiſſures of the Lips, the Foſſula of the upper Lip, the Baſis of the under Lip, the Chin, the Baſis of the Chin, the Skin, Beard, and even the Cheeks, as being the lateral Parts of the Mouth in general, and of the Lips in particular.

418. THE internal Parts of the Mouth are the Gums, Palate, Septum Palati, Uvula, Amygdalæ, the Tongue, the Membrane which lines the whole Cavity of the Mouth, the Salival Ducts and Glands, and the Bottom of the Mouth. We might likewiſe reckon among the internal Parts of the Mouth, all the Muſcles that have any Relation to it, as thoſe of the Lips, of the Tongue, of the Uvula, of the Septum Palati, &c. and to theſe might be added the Muſcles of the Lower Jaw, and of the Os Hyoides, which have been already deſcribed.

419. IN the Compendious View of the Parts of the Human Body, I made a general Enumeration of all thoſe that belong to the Neck, of which there is a very conſiderable Number, but the greateſt Part of them has been already deſcribed among the Bones, Muſcles, Arteries, Veins and Nerves; and of thoſe that remain, very few belong to the Deſcription of the Thorax.

420. THE Parts of the Neck ſtill undeſcribed are only the Larynx, Pharynx, Glandulæ Thyroidææ, and the Muſculus Cutaneus, which really belongs to the Head; and therefore inſtead of making a particular Section for ſo ſmall a Number of Parts, I choſe to bring them in under the Deſcription of the Head, eſpecially ſince the Larynx and Pharynx have ſo near a Relation to the internal Parts of the Mouth, that I find myſelf under a Neceſſity of deſcribing them, before I proceed to the Mouth in particular.

§. 1. *The*

§. 1. *The Larynx.*

421. The Larynx forms the Protuberance in the upper and anterior Part of the Neck, called commonly Pomum Adami. Anatomiſts term it the Head of the Trachea Arteria, which I explained particularly in the Deſcription of the Thorax, N° 127, &c. and it is larger and more prominent in Men than in Women.

422. It is chiefly made up of five Cartilages, the Names of which are theſe: Cartilago Thyroides, which is the anterior and largeſt; Cricoides, the inferior, and Baſis of the reſt; two Arytenoides, the poſterior and ſmalleſt; and the Epiglottis, which is above all the reſt. Theſe Cartilages are connected together by Ligaments, and they have likewiſe Muſcles, Glands, Membranes, &c. belonging to them.

Cartilago Thyroides.

423. The Cartilago Thyroidæa is large and broad, and folded in ſuch a Manner as to have a longitudinal Convexity on the Foreſide, and two lateral Portions which may be termed Alæ. The upper Part of its anterior middle Portion is formed into an angular Notch; the upper Edge of each Ala makes an Arch, and together with the middle Notch, theſe two Edges reſemble the upper Part of an Ace of Hearts in playing Cards.

424. The lower Edge of each Ala is more even, and the poſterior Edges of both are very ſmooth, being lengthened out both above and below by Apophyſes, which I name the Cornua of the Thyroide Cartilage. The ſuperior Apophyſes are longer than the inferior, and the Extremities of all the four are rounded like ſmall Heads, which in the inferior Apophyſes, have a ſhining Surface on the Inſide, reſembling an articular Eminence.

425. On the Outſide of each Ala near the Edge, is a prominent oblique Line which runs from behind forward. The upper Extremity of this Line is near the ſuperior Apophyſis or Cornu, and both that and the lower Extremity end in a ſmall Tuberoſity, the loweſt being often the moſt conſiderable. Theſe Tuberoſities ſerve for the Inſertion of Muſcles and Ligaments. The Inſide of the Alæ and the convex Side of the anterior Portion are very uniform; and this Cartilage oſſifies gradually in old Age.

Cartilago Cricoides.

426. The Cricoide Cartilage reſembles a Kind of thick, irregular Ring, very broad on one Side and narrow on the other; or it may be compared to a ſmall Portion of a thick Tube, cut horizontally at one End, and very obliquely at the other. I diſtinguiſh it into a Baſis and Top, into an anterior, poſterior, and two lateral Sides. The Baſis is almoſt horizontal, when we ſtand, and to this the Aſpera Arteria is connected, ſo that the Cricoides may be looked upon as the upper Extremity of the Trachea.

427. The poſterior Portion of the Cricoides is larger than the reſt, and its poſterior or convex Side is divided by a longitudinal Eminence, or prominent Line, into two diſtinct Surfaces, for the Inſertion of Muſcles. The Top is gently ſloped above this prominent Line, and terminates on each Side by a Kind of obtuſe Angle, formed between it and the oblique Edge of

of each lateral Portion of this Cartilage. At the upper Part of each of these Angles, there is a very smooth articular Surface, gently convex.

428. The whole posterior Side is distinguished into two lateral Portions by two prominent Lines, each of which runs down almost in a straight Direction from the articular Surface at the Top, a little below the Middle of this Side, where it terminates in another articular Line a little concave; and near these four articular Surfaces there are small Tubercles. The two superior Surfaces are for the Articulation of the Cartilagines Arytenoidææ, as we shall see presently; and the two inferior, for the Articulation of the inferior Cornua or Appendices of the Cartilago Thyroides.

Cartilagines Arytenoides.

429. The Cartilagines Arytenoidææ are two small, equal, similar Cartilages, which joined together resemble the Spout of an Ewer, and they are situated on the Top of the Cricoides. In each, we may consider the Basis, Cornua, two Sides, one posterior and concave, the other anterior and convex, and two Edges, one internal, the other external, which is very oblique. The Bases are broad and thick, and have each a concave articular Surface, by which they are joined to the Cricoides.

430. The Cornua are bent backward, and a little toward each other. In some Subjects they are very loose, appearing like true Appendices, and easily separable from the rest, as I demonstrated in my private Courses about eight Years ago. Between their inner Edges they form a Kind of Fissure, and their outer oblique Edges terminate each by a thick prominent Angle.

Epiglottis.

431. The Epiglottis is an elastic Cartilage, nearly of the Figure of a Purslane Leaf, narrow and thick at the lower Part, thin and slightly rounded at the upper Part, gently convex on the Foreside, and concave on the Backside. It is situated above the anterior or convex Portion of the Cartilago Thyroides; and its lower Extremity is tied by a short, pretty broad and very strong Ligament to the middle Notch in the upper Edge of that Cartilage. It is perforated by a great Number of Holes, something like those in the Leaves of the Hypericum or St. John's-Wort, which are hid by the Membranes that cover its two Sides.

Ligaments of the Larynx.

432. The Cartilago Thyroides is connected to the Cricoides by several short strong Ligaments, round the Articulations of the two inferior Cornua with the lateral articular Surfaces of the Cricoides. The Apices of the superior Cornua are fixed to the posterior Extremities of the great Cornua of the Os Hyoides, by slender round Ligaments, about a Quarter of an Inch in Length.

433. In the Middle of each of these Ligaments, we often meet with a small Cartilage of an oval Figure, and much thicker than the Ligaments. The Thyroides is likewise connected to the Os Hyoides by a short broad strong Ligament, one End of which is inserted in the superior Notch of the Cartilage, and the other in the lower Edge of the Basis of the Bone. It has also two Ligaments at the Middle of the concave Side, which belong to the Arytenoidææ.

434.

434. The Cricoides is tied to the lower Part of the Thyroides by a ſtrong Ligament; and by the Ligaments already mentioned, to the inferior Cornua of that Cartilage. Its Baſis is fixed to the firſt cartilaginous Ring of the Trachea Arteria, by a Ligament exactly like thoſe by which the other Rings are connected together; and the membranous or poſterior Portion of the Trachea is likewiſe fixed to the poſterior Part of the Baſis of the Cricoides.

435. The Cartilagines Arytenoidææ are connected to the Cricoides by Ligaments, which ſurround their Articulations with the Top of that Cartilage. Anteriorly the Baſis of each Arytenoides is fixed to one End of a ligamentary Cord, which by its other End is inſerted about the Middle of the concave Side of the anterior Portion of the Thyroides. At their Inſertions in the Thyroides, theſe two Ligaments touch each other, but a ſmall Space is left between them, where they are fixed in the two Arytenoides; and they ſeem likewiſe to have a ſmall Adheſion to the Top of the Cricoides. This is what is called the Glottis. *Glottis.*

436. Under theſe two ligamentary Cords there are two others, which run likewiſe from behind, forward. The Interſtice between the ſuperior and inferior Cords on each Side form a tranſverſe Fiſſure, which is the Opening of a ſmall membranous Bag, the Bottom of which is turned outward, that is, toward the Ala of the Thyroides. Theſe two Sacculi are the Ventricles mentioned by the Ancients, and reſtored by *M. Morgagni*, who has given an excellent Deſcription of them. They are chiefly formed by a Continuation of the internal Membrane of the Larynx, and the inner Surface of their Bottom appears ſometimes to be glandulous.

437. On the anterior Surface of the Arytenoide Cartilages, there is a ſmall Depreſſion between the Baſis and the convex upper Part. This Depreſſion is filled by a glandulous Body, which not only covers the anterior Surface of each Arytenoides, but is likewiſe extended forward from the Baſis over the poſterior Extremity of the neighbouring ligamentary Cord. They are larger and more ſenſible in ſome Subjects than in others; and they are covered by the Membrane which lines the neighbouring Parts. Theſe Glands were diſcovered by *M. Morgagni*.

438. I have already deſcribed the Ligaments which connect the Epiglottis to the Notch of the Thyroides, and to the Baſis of the Os Hyoides. Theſe two Ligaments, and a third which ties the Baſis of the Os Hyoides to the Notch of the Thyroides, form a triangular Space filled with a cellular or fatty Subſtance, and with ſmall Glands.

439. The Epiglottis has likewiſe two lateral Ligaments, by which it is connected to the Arytenoides, all the Way to their Points or Cornua. It has alſo a membranous Ligament, which running along the Middle of its anterior or concave Side, ties it to the Root or Baſis of the Tongue. This Ligament is only a Duplicature of the Membrane which covers the Epiglottis continued to the neighbouring Parts. Laſtly, there are two lateral membranous Ligaments belonging to it, fixed near the glandulous Bodies called Amygdalæ.

440. The Epiglottis is not only perforated by the regular Holes already mentioned, but has likewiſe a great Number of ſmall irregular Sciſſures and Breaks, which are ſo many different Lacunæ ſituated between its two Membranes, and filled with ſmall Glands, the excretory Orifices of which are chiefly on the Backſide of this Cartilage.

Muſcles of the Larynx.

441. The Larynx gives Inſertion to a great Number of Muſcles, which may be divided into common, proper and collateral. The common Muſcles, according to the general Acceptation of that Term, are all thoſe that move the whole Body of the Larynx, one Extremity of them being inſerted in other Parts; and theſe are reckoned to be four in Number, two for each Side, viz.

Sterno-Thyroidæi.
Thyro-Hyoidæi, or Hyo-Thyroidæi.

442. The proper Muſcles are thoſe inſerted wholly in the Larynx, and which move the Cartilages ſeparately. Theſe have been divided in various Manners, but may be all reduced to the following Pairs.

Crico-Thyro-Hyoidæi.
Crico-Arytenoidæi Laterales.
Crico-Arytenoidæi Poſteriores.
Thyro-Arytenoidæi.
Arytenoidæi.
Thyro-Epiglottici.
Aryteno-Epiglottici.
Hyo-Epiglottici.

443. By the collateral Muſcles, I underſtand thoſe which are inſerted by one Portion in the Larynx, without appearing to contribute any Thing to the Motions of it. Of this Kind are the Thyro-Pharyngæi, Crico-Pharyngæi, &c. of which hereafter.

444. The Larynx may likewiſe be moved by Muſcles, which are not immediately inſerted in it, but altogether in other Parts. Such are the Mylo-Hyoidæi, Genio-Hyoidæi, Stylo-Hyoidæi, Omo-Hyoidæi, Sterno-Hyoidæi, and eſpecialli the Digaſtrici of the lower Jaw, by Reaſon of their particular Adheſion to the Os-Hyoides. It is likewiſe probable that thoſe Muſcles of the Pharynx which are inſerted in the Baſis Cranii, may in certain Circumſtances move the Larynx in ſome ſmall Degree.

Sterno-Thyroidæi.

445. The Sterno-Thyroidæi are two long, flat, narrow, thin Muſcles, like Ribbons, broader above than below, and ſituated along that Part of the Neck which lies between the Thyroide Cartilage and the Sternum. They are covered by the Sterno-Hyoidæi, and they cover the Thyroide Glands, paſſing immediately before them.

446. Each Muſcle is fixed by its lower Extremity, partly in the ſuperior Portion of the inner or Backſide of the Sternum, partly in the Liga-

ment and neighbouring Portion of the Clavicula, and partly in the cartilaginous Portion of the firſt Rib. Sometimes it runs a great Way down on the firſt Bone of the Sternum, and croſſes the Muſcle on the other Side. From thence it runs up on the Aſpera Arteria, cloſe by its Fellow, paſſes before the Thyroide Glands over the Cricoide Cartilage, and is inſerted by its upper Extremity in the lower Part of the lateral Side of the Thyroide Cartilage, and partly along that whole Side. I have found this Muſcle double, one diſtinct Portion of it being inſerted in the Baſis, and the other laterally.

447. The Thyro-Hyoidæi, or Hyo-Thyroidæi are two flat, thin Muſcles, lying cloſe by each other, between and above the former. Each of them is inſerted by its upper Extremity, partly in the Baſis, and partly in the neighbouring Part of the great Cornu of the Os Hyoides; and by its lower Extremity, in the lower Part of the lateral Side of the Thyroide Cartilage, immediately above the ſuperior Extremity of the Sterno-Thyroidæus; and both this ſuperior Extremity of the laſt-named Muſcle, and the lower Extremity of the Thyro-Hyoidæus, are at their Place of Union confounded a little with the Thyro-Pharyngæus Inferior, of which hereafter. *Thyro-Hyoidæi.*

448. The Crico-Thyroidæi are two ſmall Muſcles, ſituated obliquely at the lower Part of the Thyroide Cartilage. They are inſerted by their lower Extremities in the anterior Portion of the Cricoide Cartilage near each other, and by their ſuperior Extremities laterally in the lower Edge of the Thyroide Cartilage at a Diſtance from each other. By this oblique Situation they repreſent a Roman V. *Crico-Thyroidæi.*

449. Each of theſe ſmall Muſcles is in a Manner double, its upper Extremity inſerted in the Thyroide Cartilage being in ſome Subjects very broad, and divided into two Portions, one anterior, the other more lateral and more oblique. They may likewiſe be eaſily ſeparated into two diſtinct Muſcles, whereof one may be called Crico-Thyroidæus Anterior ſive Internus, the other Lateralis ſive Externus.

450. The two Muſculi Crico-Arytenoidæi Poſteriores are ſituated poſteriorly at the large or back Portion of the Cricoides, filling almoſt the two longitudinal Surfaces of that Portion, and diſtinguiſhed by the prominent Line between theſe two Surfaces already mentioned. Each of them runs up obliquely, and is inſerted by its upper Extremity in the poſterior Part of the Baſis of the Arytenoide Cartilage of the ſame Side, near the Angle of that Baſis. *Crico-Arytenoidæi Poſteriores.*

451. The two Crico-Arytenoide Laterales are ſmall, and ſituated more laterally than the former. Each Muſcle is fixed by one End to the Side of the broad Part of the Cricoides, and by the other, to the lower Part of the Side of the neighbouring Arytenoides. *Crico-Arytenoidæi Laterales.*

452. The two Thyro-Arytenoidæi are very broad, each Muſcle being ſituated laterally between the Thyroides and Cricoides. It is fixed by a broad Inſertion in the Inſide of the Ala of the Thyroide Cartilage; and the Fibres contracting from thence, run from before backward, and from *Thyro-Arytenoidæi.*

below

below upward, towards the neighbouring Arytenoide Cartilage, in which they are inſerted, from the Glottis to the Angle of the Baſis. In ſome Subjects, theſe Muſcles cover almoſt both Sides of the Glottis.

Ayrtenoidæi. 453. The Arytenoidæi are ſmall Muſcles lying on the poſterior concave Sides of the Arytenoide Cartilages. Dr. *James Douglas*, in the firſt Edition of his Treatiſe of the Muſcles, divided them into two Kinds, one of which he called Arytenoidæi Majores, the other Arytenoidæi Minores; and it muſt be owned that there is ſome Variety in different Subjects. I ſhall here confine myſelf to what I have moſt frequently and moſt diſtinctly obſerved, and that is, that there are two crucial Arytenoidæi and one tranſverſe.

454. The crucial Muſcles run each obliquely from the Baſis of one Arytenoide Cartilage, to the Middle and upper Part of the other, the left Muſcle covering the right, as is obſerved by *M. Morgagni* in his firſt Adverſaria.

455. I look upon theſe Muſcles as ſuperior Crico-Arytenoidæi, becauſe I have always found them partly inſerted in the upper neighbouring Portion of the Cricoides. The Arytenoidæus Tranſverſalis is inſerted more or leſs directly by both Extremities, in the two Arytenoide Cartilages; and this I look upon as the true Muſculus Arytenoidæus.

Thyro-Epiglottici. 456. The two Thyro-Epiglottici croſs the Thyro-Arytenoidæi, being inſerted in the inner lateral Part of the Thyroides, and laterally in the Epiglottis.

Aryteno-Epiglottici. 457. The Aryteno-Epiglottici are ſmall fleſhy Faſciculi, each of which is fixed by one Extremity in the Head of one of the Arytenoide Cartilages, and by the other in the neareſt Edge of the Epiglottis.

Hyo-Epiglottici. 458. I never had an Opportunity of examining the Hyo-Epiglottici in very muſcular Subjects, and therefore I am not ſure that the Fibres which go from the convex Side of the Baſis of the Os Hyoides, to the convex Side of the Epiglottis, are really fleſhy.

Uſes. 459. The Larynx ſerves particularly to admit and let out the Matter of Reſpiration; and the Solidity of the Pieces of which it is compoſed hinders not only external Objects, but alſo any hard Thing which we ſwallow, from diſordering this Paſſage. The Glottis being a narrow Slit, modifies the Air which we breathe, and as it is very eaſily dilated and contracted, it forms the different Tones of the Voice, chiefly by means of the different Muſcles inſerted in the Cartilagines Arytenoidææ, to which the other Muſcles of the Larynx, both proper and common, are Aſſiſtants.

460. The whole Larynx is likewiſe of Uſe in Deglutition, as has been already obſerved, by means of its Connexion with the Os Hyoides, to which the Digaſtric Muſcles of the lower Jaw adhere; which Muſcles raiſe the Larynx together with the Os Hyoides every Time we ſwallow. I have already ſaid ſomething on this Subject in the Deſcription of the Muſcles, No. 1130, 1131, 1132, and ſhall further explain it after the Deſcription of the Pharynx and Tongue.

461.

461. The Facility of varying and changing the Tone of the Voice, depends on the Flexibility of the Cartilages of the Larynx, and decreaſes in Proportion as we advance in Age; becauſe theſe Cartilages gradually harden and oſſify, though not equally ſoon in all Perſons; and this Change happens not only to the Cartilago Thyroides, but alſo to the Cricoides and Arytenoides.

462. The Muſculi Sterno-Thyroidæi ſerve in general to pull down the Thyroide Cartilage, and the whole Larynx along with it. They may likewiſe aſſiſt the Sterno-Hyoidæi in its Actions explained Sect. 3. N° 1149. and compreſs the Thyroide Gland, of which hereafter. The Thyro-Hyoidæi may, as Occaſion requires, either draw up the Larynx toward the Os Hyoides, or draw that Bone downward toward the Cartilago Thyroides.

463. It is difficult to determine the Uſe of the Crico-Thyroidæi from their Situation. They may either pull the Cricoides obliquely backward, or the Thyroides obliquely forward; and by this Action the inferior Cornua of the Thyroides, and ſmall articular Surfaces of the Cricoides, muſt ſlide upon each other.

464. Both the lateral and poſterior Crico-Arytenoidæi may ſeparate the Arytenoide Cartilages, and thereby open or dilate the Glottis, but they do not both perform this Action in the ſame Manner. The lateral Muſcles ſeparate theſe Cartilages obliquely forward, and at the ſame Time looſen or relax the Sides of the Glottis; but the poſterior Muſcles ſeparate them obliquely backward, and at the ſame Time ſtretch or extend the Sides of the Glottis; and when both Muſcles act equally, they ſeparate the Cartilages directly.

465. The Thyro-Arytenoidæi acting together, draw both the Arytenoide Cartilages forward, and conſequently looſen the Glottis, and render it capable of the ſmalleſt Quaverings of the Voice. They may likewiſe probably compreſs the lateral Sinuſes or Ventricles of the Larynx, and alſo the Arytenoide Glands.

466. The Arytenoidæi bring the Arytenoide Cartilages cloſe together, and preſs them againſt each other; and when the Cartilages are in this Situation, they may at the ſame Time be inclined either forward by the Thyro-Arytenoidæi, or backward by the Crico-Arytenoidæi Poſteriores. By this Means the Glottis, when ſhut, may be either relaxed or tenſe, and in this laſt Caſe, it is intirely ſhut, as when we hold in our Breath in ſtraining; but of this more in another Place.

467. The general Uſe of the Epiglottis is to cover the Glottis like a Penthouſe, and thereby hinder any Thing from falling into it when we eat or drink; and for this Purpoſe it is depreſſed in the Manner that ſhall be ſhewn hereafter. It ſerves likewiſe to hinder the Air which we inſpire, from ruſhing directly upon the Glottis, but by ſplitting it, as it were, obliges it to enter by the Sides, or in an oblique Courſe. The Muſcles of the Epiglottis do not appear to be abſolutely neceſſary for that Cartilage; for in Deglutition, it may be ſufficiently depreſſed by the Baſis

of the Tongue; and it may raiſe itſelf again by its own Elaſticity. The Thyro-Epiglottici and Aryteno-Epiglottici may ſerve to ſhut any lateral Openings that might remain when the Epiglottis is depreſſed by the Baſis of the Tongue; and the Hyo-Epiglottici may pull it a little forward in ſtrong Reſpirations, as in Sighing, Yawning, &c.

§. 2. *The Pharynx.*

468. The Pharynx is a muſcular and glandular Bag, the outer Surface of which is cloſely joined to the inner Surface of all that Space which is at the Bottom of the Mouth, behind the poſterior Nares, Uvula, and Larynx, and which reaches from the great or anterior Apophyſis of the Os Occipitis all the Way to the Œſophagus, which is the Continuation of the Pharynx. This Space is bounded poſteriorly by the Muſcles which cover the Bodies of the firſt Vertebræ of the Neck, and laterally by the ſuperior Portions of both the internal Jugular Veins, and of both the internal Carotid Arteries, by the Spinal Apophyſes of the Os Sphenoides, by the Extremities of the Apophyſes Petroſæ, by the Os Sphenoides, immediately above the internal Alæ of the Apophyſes Pterygoides, and by the neighbouring Portion of both Pterygoide Muſcles.

469. From theſe Limits and Adheſions of the Pharynx we may pretty nearly determine its Figure. It may be compared to the wide Part of a covered Funnel of which the Œſophagus is the narrow Part or Tube; or it may be called the broad End of the Œſophagus, that and the Pharynx taken together, being compared to a Trumpet. The Pharynx may be divided into three Parts, one ſuperior, which is the Arch of the Pharynx, one middle, which is the Body or great Cavity, and one inferior, which is the Bottom, narrow Portion, or Sphincter. We are likewiſe to obſerve in it three Openings, that of the Arch, toward the Nares, that of the Body, toward the Mouth, and that of the Bottom, toward the Œſophagus.

470. The Arch is the broadeſt Part of the Pharynx, and ends on each Side in an Angle or Point, toward the Jugular Foſſulæ of the Baſis Cranii. Afterwards the great Cavity contracts a little toward the Sides, all its other Dimenſions continuing the ſame; and behind the Larynx it is again enlarged on each Side, a very ſmall Space being left between it and the Cricoide Cartilage. The Extremity of the lower Portion is very narrow, and joins the Baſis of the Cartilage juſt named.

471. The Pharynx is made up partly of ſeveral diſtinct fleſhy Portions, which are looked upon as ſo many different Muſcles ſo diſpoſed as to form a large Cavity, and partly of a Membrane which lines the inner Surface of this whole Cavity, and is a Continuation of that of the Nares and Palate.

472. This Membrane is wholly glandular, and it is thicker on the ſuperior and middle Portions of the Pharynx, than on the Bottom or lower Portion. Immediately above the firſt Vertebra, it forms ſeveral longitudinal

dinal Rugæ very thick, deep and ſhort, and we generally find therein, a Collection of Mucus in dead Bodies. In the great Cavity there are no Rugæ, the Membrane adhering, both there and in the upper Part, very cloſely to the Muſcles. At the lower Part, where it is thinneſt, it covers likewiſe the poſterior Part of the Larynx, and is very looſe, and formed into irregular Folds. It runs in a little on each Side between the Edges of the Pharynx.

Muſcles of the Pharynx.

473. THOUGH almoſt all the muſcular or fleſhy Portions of which the Pharynx is compoſed, concur in the Formation of one continued Bag or Receptacle, they are nevertheleſs very diſtinguiſhable from each other, not only by their different Inſertions, from which they have been denominated, but alſo by the different Directions of their Fibres. The greateſt Part of them may be looked upon as Digaſtric Muſcles, the middle Tendons of which lie backward in one longitudinal Line, which in ſome Subjects appears plainly like a Linea Alba.

474. THESE Muſcles may be reduced to three general Claſſes, with Regard to their Inſertions. The firſt Claſs is of thoſe which are inſerted in the Baſis Cranii, viz.

Cephalo-Pharyngæi.
Petro-Pharyngæi.
Spheno-Pharyngæi, ſive Spheno-Salpingo-Pharyngæi.
Pterygo-Pharyngæi.
Stylo-Pharyngæi.

THE ſecond Claſs comprehends thoſe which are inſerted toward the Mouth, viz.

Peryſtaphilo-Pharyngæi.
Gloſſo-Pharyngæi.
Hypero-Pharyngæi.
Genio-Pharyngæi.

THE third Claſs includes thoſe inſerted in the lateral Parts of the Larynx, viz.

Syndeſmo-Pharyngæi.
Thyro-Pharyngæi.
Crico-Pharyngæi.
Œſophagæus.
Adeno-Pharyngæus.

475. THE Cephalo-Pharyngæi are inſerted in the lower Side of the Apophyſis Baſiliaris, or great Apophyſis of the Os Occipitis, about the Middle of the poſterior Part. From thence they ſeparate laterally, and

ſometimes join the Stylo-Pharyngæi. The Linea Alba of the Pharynx begins by the middle Adheſion of theſe Muſcles.

476. The Petro-Pharyngæi are inſerted in the lower Part of the Extremity of the Apophyſis Petroſa; the Spheno-Pharyngæi, partly in the Os Sphenoides, directly above the internal Ala of the Apophyſis Pterygoides, and partly in the neighbouring cartilaginous Portion of the *Euſtachian* Tube; and the Pterygo-Pharyngæi, in the Edge of the ſame Ala of the Apophyſis Pterygoides. Theſe three Muſcles on each Side run obliquely backward, covering each other by ſome Fibres, and meet at the Linea Alba. Their Uſe may be to draw the middle Portion, or great Cavity of the Pharynx, upward.

477. The Stylo-Pharyngæi are inſerted interiorly by one Extremity in the Apophyſis, or Epiphyſis Styloides. From thence each Muſcle runs down obliquely along the lateral Part of the Pharynx, covering and croſſing the other Muſcles. It extends gradually in Breadth as it deſcends, and forms two principal Portions, one ſuperior which is narrow, and one inferior which is broad. The narrow Portion is ſpread among the muſcular Fibres above the Thyroide Cartilage, and the broad Portion is inſerted in the Side of that Cartilage; and thus the Stylo-Pharyngæus is partly a true Stylo-Thyroidæus. Theſe Muſcles may draw the Pharynx laterally upward, eſpecially by their Thyroide Portions; but the Uſe commonly aſſigned to them of dilating the Pharynx, ſeems conformable neither to their Situation, nor to their Direction.

478. The Periſtaphylo-Pharyngæi are two ſmall Muſcles inſerted between the Uvula and lower Extremity of the internal Ala of the Apophyſis Pterygoides, and run obliquely backward on the Sides of the Pharynx. It is difficult to find them in very lean or young Subjects, and they ſeem to be the ſame which *M. Santorini* calls Hypero-Pharyngæi, or Palato-Pharyngæi. The Gloſſo-Pharyngæi are Fibres which run along the lateral Edges of the Tongue, from which they are parted backward, and run down on the Sides of the Pharynx under the Stylo-Pharyngæi.

479. The Hyo-Pharyngæi in general are thoſe on each Side which are inſerted in the Os Hyoides; and they may be reckoned three Pairs, the Baſio-Pharyngæi, Kerato-Pharyngæi Minores, and Kerato-Pharyngæi Majores; theſe Denominations being taken from their Inſertions in the Baſis, and in the ſmall and great Cornua of the Os Hyoides.

480. I have never been able to ſee diſtinctly the Mylo-Pharyngæi of Dr. *James Douglas*; all that I have hitherto found is a muſcular Portion really diſtinct from the Genio-Gloſſus, inſerted in the Side of the Pharynx, and for that Reaſon I call it Genio-Pharyngæus, as being joined to the Genio-Gloſſus all the Way to the Chin.

481. The Syndeſmo-Pharyngæi of Dr. *Douglas* are Faſciculi of muſcular Fibres very diſtinctly inſerted by one End along the Ligaments by which the ſuperior Cornua of the Cartilago Thyroides are connected to the Extremities of the great Cornua of the Os Hyoides. From thence they run backward and meet at the Linea Alba. To be able to ſee them diſtinct from

from the other Muſcles, the Pharynx muſt be filled with Cotton to give it a proper Convexity, and to ſupport its Sides, which otherwiſe collapſe, and ſink inward, and thus prevent our ſeeing the Direction and Diſtinction of ſeveral of the Muſcles belonging to it.

482. The Thyro-Pharyngæi are very broad, and each Muſcle is inſerted along the Outſide of the Ala of the Cartilago Thyroides, between the Edge of that Cartilage and the oblique Line in which the Thyro-Hyoidæi are fixed; and they are a little confounded with the Crico-Hyoidæi. From thence they run up obliquely backward, and meeting under the Linea Alba, they ſometimes appear to be but one Muſcle without any middle Tendon. Sometimes they have appeared to me to be diſtinguiſhed into Superior and Inferior, becauſe their upper Portion ran upward and backward, and their lower Portion more tranſverſely.

483. The Crico-Pharyngæi are inſerted each in the lower Part of the Side of the Cricoide Cartilage. They ſeem to be Appendices of the Thyro-Pharyngæi, ſhewing no other Marks of Diſtinction but theſe Inſertions, and a ſmall Difference in Direction, becauſe as they run backward they deſcend a little. For this Reaſon I have ſometimes looked upon theſe two Muſcles to be one, and have called it Thyro-Crico-Pharyngæus.

484. The loweſt of theſe muſcular Fibres make a compleat Circle backward, between the two Sides of the Baſis of the Cartilago Cricoides. This Circle is the Beginning of the Œſophagus, and has been thought by ſome to form a diſtinct Muſcle, called Œſophagæus. I have found another Faſciculus of Fibres detached from the Thyro-Pharyngæus, and inſerted laterally in the Thyroide Gland, for which Reaſon I call it Muſculus Thyro-Adenoidæus.

485. The particular Uſes of all theſe Muſcles are very difficult to be determined. It is certain that thoſe of the middle and lower Portions of the Pharynx ſerve chiefly for Deglutition. Thoſe of the upper Portion, and ſome of thoſe of the middle Portion may, among other Functions, be uſeful in modifying the Voice, according to the Opinion of *M. Santorini*.

§. 3. *The Palate, Uvula, &c.*

486. The Palate is that Arch or Cavity of the Mouth, ſurrounded anteriorly by the Alveolary Edge and Teeth of the upper Jaw, and reaching from thence to the great Opening of the Pharynx. This Arch is partly ſolid and immoveable, and partly ſoft and moveable. The ſolid Portion is that which is bounded by the Teeth, being formed by the two Oſſa Maxillaria, and two Oſſa Palati. The ſoft Portion lies behind the other, and runs backward like a Veil fixed to the Edge of the Oſſa Palati, being formed partly by the common Membrane of the whole Arch, and partly by ſeveral muſcular Faſciculi, &c.

487. The Membrane that covers all this Cavity is like that which lines the ſuperior and middle Portions of the Pharynx. It is very thick ſet

with ſmall Glands, the Orifices of which are not ſo ſenſible as in the Pharynx and eſpecially in the Rugæ of the ſuperior Portion thereof, where *M. Heiſter* obſerved a conſiderable Orifice, and a Canal proportioned to that Orifice, which he could eaſily inflate with Air. This is certainly the beſt Way of beginning theſe Kinds of Inquiries, eſpecially if the Pipe be held at firſt only very near the Part, without endeavouring to force it in. To immerge the Parts in clear Water in the Manner already mentioned, is likewiſe a very good Way to diſcover ſmall Orifices, by the Help of a Microſcope. Small Ducts of the ſame Kind with what I have now mentioned, may be ſuppoſed to lie along the middle Line or Raphe of the Arch of the Palate, and along the Alveolary Edge, becauſe of ſome ſmall Tubercles or Points which appear there.

488. THIS Membrane, together with that of the poſterior Nares, forms, by an uninterrupted Continuation, the anterior and poſterior Surface of the ſoft Portion, or Septum Palati; ſo that the muſcular Faſciculi of this Portion lie in the Duplicature of a glandulous Membrane. The Muſcles compoſed of theſe Faſciculi ſhall be preſently deſcribed.

489. THE Septum, which may likewiſe be termed Velum, or Valvula Palati, terminates below by a looſe floating Edge, repreſenting an Arch ſituated tranſverſely above the Baſis or Root of the Tongue. The higheſt Portion or Top of this Arch ſuſtains a ſmall, ſoft, and irregularly conical glandulous Body, fixed by its Baſis to the Arch, and its Apex hanging down without adhering to any Thing which is called Uvula.

490. ON each Side of the Uvula there are two muſcular Half Arches, called Columnæ Septi Palati. They are all joined to the Uvula by their upper Extremities, and diſpoſed in ſuch a Manner, as that the lower Extremities of the two which lie on the ſame Side, are at a little Diſtance from each other, and ſo as that one Half Arch is anterior, the other poſterior, an oblong triangular Space being left between them, the Apex of which is turned toward the Baſis of the Uvula.

491. THE two Half Arches on one Side, by joining the like Half Arches on the other Side, form the intire Arch of the Edge of the Septum. The poſterior Half Arches run by their upper Extremities, more directly toward the Uvula than the anterior. The anterior Half Arches have a Continuation with the Sides of the Baſis of the Tongue, and the poſterior, with the Sides of the Pharynx. At the lower Part of the Space left between the lateral Half Arches on the ſame Side, two Glands are ſituated termed Amygdalæ, which ſhall be deſcribed hereafter, together with the glandular Structure of the Uvula, among the other Glands of the Mouth.

492. THE Half Arches are chiefly made up of ſeveral flat fleſhy Portions, almoſt in the ſame Manner with the Body of the Septum. The Membrane which covers them is thinner than the other Parts of it towards the Palate, Pharynx and Tongue. Each Portion is a diſtinct Muſcle, the greateſt Part of which terminate by one Extremity in the Subſtance of the Septum and of the Half Arches, and by the other Extremity in Parts different from theſe.

493. As

493. As Anatomiſts uſed formerly to aſcribe all theſe Muſcles, as far as they knew them, to the Uvula, without any Regard to the Septum, they termed them in general either Ptery-Staphylini, or Peri-Staphylini. The laſt Part of theſe two compound Words expreſſes the Uvula; the firſt Part of the firſt Word is an Abridgment of Pterygoides, and expreſſes the Inſertion of theſe Muſcles, but the firſt Part of the ſecond Word ſignifies no more than round, or about, &c.

494. I ſhould be very glad to make Uſe of the Term Peri-Staphylinus as a general Denomination for the Muſcles belonging to the Septum, and then to add the other Terms, of which theſe Names have been made up by modern Writers. But leſt I ſhould be thought to affect a Language different from the common, I ſhall retain the ordinary Names, only deſiring the Reader to take Notice that by the Term Staphylini I do not mean preciſely the Uvula, but only the Parts round it. If we could be allowed to frame Names of Greek and Latin Words compounded together, we might, for Example, ſay Gloſſo-Palatinus, inſtead of Gloſſo-Staphylinus. I ſhall call the Muſcles that go to the Uvula, ſimply Staphylini, or Epiſtaphylini, becauſe that Part reſembles a ſmall Bunch of Grapes, according to the Signification of the Greek Word. From what has been ſaid, I name theſe Muſcles in the following Manner.

Gloſſo-Staphylini.
Pharyngo-Staphylini.
Thyro-Staphylini.
Pterygo-Staphylini.
Spheno-Salpingo-Staphylini, called commonly Peri-Staphylini Externi.
Pterygo-Staphylini Superiores.
Pterygo-Staphylini Inferiores.
Pterygo-Salpingo-Staphylini, called commonly Ptery-Staphylini Interni.
Staphylini ſive Epiſtaphylini.

495. The Gloſſo-Staphylini are two ſmall Muſcles, fixed each in the lower and lateral Part of the Baſis of the Tongue; from whence they run up obliquely backward, along the anterior Half Arches of the Septum Palati, and terminate inſenſibly on each Side near the Uvula, ſome of their Fibres being ſpread through the Septum. The Thickneſs of the anterior Half Arches is chiefly owing to theſe two Muſcles.

496. The Pharyngo-Staphylini are likewiſe two ſmall Muſcles, each of them being fixed by one Extremity to the lateral Part of the Muſculi Thyro-Pharyngæi, as if they were Portions detached from theſe Muſcles. From thence they run up obliquely forward along the two poſterior Half Arches of the Septum, and terminate in the Septum above the Uvula, where they meet together, and ſeem to form an intire Arch by the Union of their Fibres. The Thickneſs of the two poſterior Half Arches is owing to theſe Muſcles.

497. The

497. The Thyro-Staphylini are two ſmall Muſcles, which accompany the Pharyngo-Staphylini very cloſely, through their whole Courſe, except that their poſterior Extremities are fixed in the Thyroide Cartilages near the other Muſcles. They likewiſe contribute to the Thickneſs of the poſterior Half Arches, and are inſerted in the Septum in the ſame Manner with the former. Theſe two Pair of Muſcles may be made one Pair, and may be called Thyro-Pharyngo-Staphylini.

498. The Spheno-Salpingo-Staphylini are each fixed by one Extremity, partly to the Sphenoidal Side of the bony Portion of the *Euſtachian* Tube, partly to the neareſt ſoft Portion of the ſame Tube. From thence it runs toward the external Ala of the Apophyſis Pterygoides, into which one Portion of this Muſcle is inſerted. The other Portion runs to the End of the Ala, and turns round to the forked Extremity thereof, as over a Pulley, and is afterwards inſerted in the Septum Palati, near the Uvula.

499. I look upon theſe two Portions as two diſtinct Muſcles, one of which ending in the Ala, ſeems only to ſerve for the Dilatation of the Tuba *Euſtachiana*. The other Portion is a true Spheno-Staphylinus, and as it has likewiſe an Inſertion in the Tube, it may be termed Spheno-Salpingo-Staphylinus, or Staphylinus Externus. This is the Muſcle commonly called Peri-Staphylinus Externus.

500. The Pterygo-Staphylinus Superior is only the external Portion of the Muſcle laſt deſcribed; and this Name may likewiſe be given it, becauſe it has a ſmall Inſertion in the upper Part of the Apophyſis Pterygoides, beſides that in the Sphenoidal Part of the bony Portion of the Tube. The Pterygo-Staphylinus Inferior on each Side, is a ſmall Muſcle inſerted by one Extremity in the Uncus Pterygoidæus, and by the other in the Septum near the Uvula. This Obſervation we owe to *M. Heiſter*.

501. The Petro-Salpingo-Staphylini, or Salpingo-Staphylini Interni, are thoſe which are commonly called Peri-Staphylini Interni. Each Muſcle is fixed by one Extremity, partly to the inner Side of the bony Portion of the *Euſtachian* Tube, or that next the Apophyſis Petroſa, partly along the cartilaginous Portion of the ſame Tube. From thence it paſſes a little Way under the ſoft membranous Part, and toward what I called the Half Pad of the Tube, and then turning toward the Septum, is fixed in the Edge, and partly in the upper Side thereof.

502. The Staphylini, or Epiſtaphylini, are two ſmall fleſhy Ropes, cloſely united together, as if they made but one Muſcle, but in ſome Subjects they are diſtinguiſhed by a very fine white Line. They are fixed by one Extremity in the common Point of the poſterior Edges of the Oſſa Palati, and from thence run downward and backward along the Middle of the Septum, and likewiſe along the Middle of almoſt the whole Uvula. Theſe Muſcles have been termed Azygos *Morgagnii* from the Diſcoverer, but he conſidered them as one Muſcle. The Pterygo-Staphylini Inferiores are of the ſame Kind, and might be termed Staphylini, or Epiſtaphylini Laterales, and theſe laſt, Medii.

503. The

503. The Septum Palati ſerves to conduct the Lacrymal Lympha, and that which is continually collected on the Arch of the Palate, into the Pharynx. It ſerves for a Valve to hinder what we ſwallow, and eſpecially what we drink, from returning by the Nares. The Uſes of the Different Muſcles of the Septum are not as yet ſufficiently known, nor the different Motions of which it is capable, as may be obſerved by looking for ſome Time into an healthy Perſon's Mouth opened wide. I ſhall endeavour to explain theſe Things at greater Length in another Place.

§. 4. *The Tongue.*

504. Every one knows that the Tongue is a ſoft fleſhy Body, which fills all that Part of the Cavity of the Mouth that is ſurrounded by the Alveolary Border and Teeth of the lower Jaw, and extends ſtill further back. All this Space is therefore in a Manner the Mould and Meaſure of the Length and Breadth of the Tongue, as well as of its Thickneſs and Figure.

505. The Tongue is divided into the Baſis and Point; the upper and under Sides; and the lateral Portions or Edges. The Baſis is the poſterior and thickeſt Part; the Point, the anterior and thinneſt Part. The upper Side is not quite flat, but a little convex, and divided into two lateral Halves, by a ſhallow depreſſed Line, called Linea Linguæ Mediana. The Edges are thinner than the other Parts, and a little rounded as well as the Point. The lower Side reaches only from the Middle of the Length of the Tongue to the Point.

506. The Tongue is principally compoſed of very ſoft fleſhy Fibres, intermixed with a particular Medullary Subſtance, and diſpoſed in various Manners. Many of theſe Fibres are confined to the Tongue without going any farther, the reſt form ſeparate Muſcles which go out from it in different Ways, and are inſerted in other Parts. All the upper Side of the Tongue is covered by a thick Membrane of a Papillary Texture, upon which lies another very fine Membrane like a Kind of Epidermis, which is likewiſe continued over the lower Side, but without Papillæ.

507. Three Sorts of Papillæ may be diſtinguiſhed in the upper Side of the Tongue; Capitatæ, Semi-Lenticulares and Villoſæ. Thoſe of the firſt Kind are the largeſt, reſembling little Muſhrooms with ſhort Stems, or Buttons without a Neck. They lie on the Baſis of the Tongue in ſmall ſuperficial Foſſulæ.

508. They reſemble ſmall Conglomerate Glands ſeated on a very narrow Baſis, and each of them has ſometimes a ſmall Depreſſion in the Middle of their upper or convex Side. They occupy the whole Surface of the Baſis of the Tongue, and they are ſituated near each other in ſuch a Manner as that the moſt anterior form an Angle. They are Glandular Papillæ, or ſmall ſalival or mucilaginous Glands, of the ſame Kind with thoſe that are to be deſcribed hereafter.

509. We oftentimes obſerve about the Middle of this Part of the Tongue a particular Hole of different Depths, the inner Surface of which is intirely Glandular, and filled with ſmall Papillæ, like thoſe of the firſt Kind. It is called Foramen Cæcum *Morgagnii*, as being firſt deſcribed by that Author. Since that Time *M. Vaterus* has diſcovered a Kind of Salival Ducts belonging to it; and *M. Heiſter* found two of theſe Ducts very diſtinctly, the Orifices of which were in the Bottom of the Foramen Cæcum near each other. He obſerved the Ducts to run backward, divaricating a little from each other, and that one of them terminated in a ſmall oblong Veſicle ſituated on the Side of the ſmall Cornu of the Os Hyoides.

510. The Papillæ of the ſecond Kind, or Semilenticulares, are ſmall orbicular Eminences, only a little convex, their circular Edge not being ſeparate from the Surface of the Tongue. When we examine them in a ſound Tongue with a good Microſcope, we find their convex Sides full of ſmall Holes or Pores, like the End of a Thimble.

511. They lie chiefly in the middle and anterior Portions of the Tongue, and are ſometimes moſt viſible on the Edges, where they appear to be very ſmooth and poliſhed, even to the naked Eye, and ſometimes in living Subjects. They ſoon loſe their Conſiſtence after Death, ſo that by rubbing them ſeveral Times, they may be drawn out in Form of ſmall ſoft Pyramids inclined to one Side.

512. The Papillæ of the third Kind, or Villoſæ, are the ſmalleſt and moſt numerous. They fill the whole Surface of the upper Side of the Tongue, and even the Interſtices between the other Papillæ. They would be more properly named Papillæ Conicæ than Villoſæ, from the Figure which they appear to have when examined through a Microſcope in clear Water. They are naturally ſoftiſh, but they become extremely flaccid after Death; ſo that by handling them they may be made ſhort and thick, whereas they are naturally long and ſmall.

513. The fleſhy Fibres of which the Tongue is compoſed, and which go no further than the Tongue, may be termed Muſculi Linguæ Interiores, or the Intrinſick Muſcles, and they are the ſame which *Spigelius* named Muſculi Linguales. The Fibres theſe Muſcles conſiſt of, are of three general Kinds, Longitudinal, Tranſverſe, and Vertical; and each of theſe Situations admits of different Degrees of Obliquity. The Longitudinal Fibres point to the Baſis and Apex of the Tongue, and ſeem partly to be Expanſions of the Muſculi Stylo-Gloſſi, Hyo-Gloſſi, and Genio-Gloſſi, of which hereafter. The Vertical Fibres ſeem likewiſe to be in Part produced by the ſame Genio-Gloſſi, and the Tranſverſe by the Mylo-Gloſſi.

514. Besides theſe mixed Productions, there is a diſtinct Plane of Longitudinal Fibres, which run near the Surface of the upper Side of the Tongue, and a diſtinct tranſverſe Plane under them. All theſe Fibres are partly interwoven, one Portion of them terminating at the two Edges of the Tongue, and the other at the Baſis and Point, without going to any other Part; and they lie immediately above thoſe that belong to the Genio-Gloſſi. To diſcover all theſe different Fibres, and their different Degrees

of

of Direction, we need only cut the Tongue longitudinally, after it has been boiled, or long macerated in ſtrong Vinegar.

515. The extrinſick Muſcles, or Muſculi Exteriores, are thoſe which by one Extremity make a Part of the Body of the Tongue, and are fixed by the other in ſome Part without the Tongue. Of theſe we commonly reckon four Pairs.

Mylo-Gloſſi.
Stylo Gloſſi.
Hyo-Gloſſi.
Genio-Gloſſi.

516. The Muſcles which move the Os Hyoides, already deſcribed in Sect. 3. belong likewiſe to the Tongue, and are the principal Directors of its Motions. The Names of theſe Muſcles may be remembered to be as follow:

Mylo-Hyoidæi.
Genio-Hyoidæi.
Stylo-Hyoidæi.
Omo-Hyoidæi.
Sterno-Hyoidæi.

517. The Mylo-Gloſſi are ſmall fleſhy Planes ſituated tranſverſely, one on each Side, between the Ramus of the lower Jaw, and the Baſis of the Tongue. Their Inſertion in the Jaw is immediately above the poſterior Half of the Hylo-Hyoidæus, between the prominent oblique Line on the Inſide of the Bone, and the Dentes Molares. From thence they run toward the Baſis of the Tongue, and are loſt there on one Side of the Gloſſo-Pharyngæi. Theſe Muſcles are often wanting.

518. The Stylo-Gloſſi are two long ſmall Muſcles which run down from the Styloide Apophyſes or Epiphyſes, and form two Portions of the lateral Parts of the Tongue. Each Muſcle is fixed in the Outſide of the Apophyſis Styloides by a long Tendon, being the uppermoſt of the three Muſcles fixed in that Apophyſis, which at *Paris* go by the Name of *Riolan*'s Noſegay. The Stylo-Hyoidæus is the loweſt, and the Stylo-Pharyngæus is in the Middle, but more backward.

519. As it runs down almoſt oppoſite to the Inſide of the Angle of the lower Jaw, it ſends off a pretty broad and ſhort lateral Aponeurotic Ligament, which being fixed in that Angle, ſerves for a Frænum, or Ligamentum Suſpenſorium to the Muſcle in this Part of its Courſe. From thence it paſſes on to the Side of the Baſis of the Tongue, where it firſt of all adheres cloſely to the lateral Portion of the Hyo-Gloſſus, and then forms, together with that Muſcle, a large Portion of the Side of the Tongue.

520. The Hyo-Gloſſi are each inſerted in three Parts of the Os Hyoides that lie near each other; in the Baſis, in the Root of the great Cornu, and in the Symphyſis between theſe two; and on this Account the Hyo-Gloſſus has been divided by ſome into two or three diſtinct Muſcles called Baſio-Gloſſus, Cerato-Gloſſus, and Chondro-Gloſſus. In ſome Subjects they may eaſily be ſeparated, the three Portions being ſimply contiguous to each other; but it is needleſs to burden the Memory with ſo many uſeleſs Names, and therefore I deſcribe them all as one Muſcle, by the Name of Hyo-Gloſſus.

521. It is ſituated on the Inſide, and a little lower than the Stylo-Gloſſus, with which it forms the lateral Part of the Tongue. The Portion inſerted in the Baſis of the Os Hyoides lies more anteriorly, and is larger than the other two; that which is inſerted in the Symphyſis is the leaſt, and that inſerted in the great Cornu, the moſt poſterior. This Muſcle is partly ſuſtained by the Mylo-Hyoidæus, as by a Girth; and the anterior Portion is diſtinguiſhed from the reſt by the Paſſage of the Nerves of the fifth Pair, and of the Arteries which accompany them.

522. The Genio-Gloſſi are ſituated cloſe to each other on the lower Side of the Tongue. Each Muſcle is inſerted in the inner or Backſide of the Symphyſis of the lower Jaw, immediately above the Genio-Hyoidæus. From thence it runs backward toward the Os Hyoides, to which the loweſt Fibres are connected by a Ligamentary Membrane; and in this Courſe its Fibres are ſpread through the Subſtance of the Tongue in a very ſingular Manner.

523. Of theſe Fibres, ſome run directly toward the Os Hyoides, all the Way to the Baſis of the Tongue; ſome are inflected forward, and go to the Point of the Tongue; and the reſt are diſtributed in a radiated Manner, forward, upward, and backward in the Subſtance of the Tongue; and the middle Fibres expand laterally toward the Edges of the Tongue.

524. The two Genio-Gloſſi run cloſe to each other, as if they formed but one Maſs; but they are evidently divided by a very thin Cellular Membrane, or middle Septum, which penetrates a good Way between the two lateral, or right and left Halves of the Tongue, lying in the ſame Plane with the Linea Mediana of the upper Side of the Tongue.

525. When we ſeparate theſe two Muſcles from the Chin, they preſently contract ſo much, that their anterior Extremities which lay under the Point of the Tongue, are as far back as the Middle of it. It is in this preternatural Situation that we ſee theſe Muſcles repreſented in Figures given by very great Anatomiſts, and drawn and engraved by very good Artiſts, in which Figures the whole Beauty of their true Mechaniſm is loſt.

526. These two Muſcles, by their poſterior ſtraight Fibres which go to the Baſis, can draw the Tongue out of the Mouth, and bring it back again by their anterior bent Fibres which go to the Point. They can either ſucceſſively, or all at once, make the Tongue longitudinally hollow-

or like a Groove; and they can at the ſame time contract it, by the lateral Expanſion of their middle Fibres. I paſs over many other Motions which theſe Muſcles are capable of performing, from whence I formerly uſed in my private Courſes to call them Muſculi Polychreſti.

527. When either of the Stylo-Gloſſi acts, it turns the Tongue toward the Cheek, and forces the Aliment between the upper and lower Molares. When they act jointly with the lateral Portions of the ſuperior fleſhy Plane of the Tongue, they turn the Tongue obliquely upward to the Teeth of the upper Jaw, and near the Cheeks, as when we bring down any Part of the Food that may have ſtuck there, after Maſtication. When they act jointly with the lateral Portions of the Hyo-Gloſſi, they turn the Tongue downward between the lower Teeth and the Cheek.

528. When all the Parts of the Hyo-Gloſſi act together, they ſhorten the Tongue. They likewiſe turn the Point of the Tongue between the Teeth and the under Lip, and make it paſs over that Lip. The ſuperior fleſhy Plane of the Body of the Tongue, bends it upward toward the Palate, and makes it paſs along or lick the upper Lip. The Mylo-Gloſſi ſerve as a Frænum to one Side of the Baſis, while the Point is turned to the other Side. The Ligamenta Suſpenſoria of the Stylo-Gloſſi may anſwer the ſame Purpoſe, and even ſupply the Want of the Mylo-Gloſſi.

529. Beſides the Membranes of the Tongue already deſcribed, it is cuſtomary to mention another, called Membrana Reticularis, which is commonly demonſtrated from the boiled Tongues of Oxen or Sheep; and ſome pretend to have ſhewed it in the Human Tongue, which I own I have never been able to do. It is now a long Time ſince I ſhewed that what they take from the Tongues of Oxen and Sheep is not a true Membrane, but a Kind of clear mucilaginous Subſtance, which lies between the papillary and external Membranes, and which by boiling becomes white, and acquires Solidity enough to be taken out in large Portions, and that the Holes found in it are owing to the ſmall Pyramidal Papillæ.

530. The Tongue is fixed in the Mouth, not only by Muſcles, but alſo by Ligaments, which are for the moſt Part membranous. The principal Ligament is that called the Frænum, which is the prominent Fold that appears firſt under the Tongue, when we raiſe it with the Mouth opened, and is no more than a Continuation or looſe Duplicature of that Membrane, which covers the inferior Cavity of the Mouth. It covers the Curvature of the anterior Portion of the Genio-Gloſſi from the Point of the Tongue, almoſt as high as the middle Interſtice between the lower Dentes Inciſorii.

531. The other Ligaments of the Tongue are the ſmall membranous Fold which runs along the Middle of the convex Side of the Epiglottis to the Baſis of the Tongue; and the membranous Folds which cover the inferior Half Arches of the Septum Palati. Theſe three Folds are Continuations of the Membrane which covers the neighbouring Parts. The Aponeurotic Ligaments of the Stylo-Gloſſus may be looked upon as true lateral Ligaments

ments of the Tongue; and they adhere a little to the lower Part of the Muſculus Pterygoidæus Internus, or Anterior.

532. The principal Blood-Veſſels of the Tongue are thoſe that appear ſo plainly on its lower Surface, on each Side of the Frænum; and they conſiſt of one Artery and one Vein, which accompany each other, and are called Arteriæ & Venæ Sublinguales or Raninæ. The Veins lie next the Frænum, and the Arteries on the other Side of the Veins. The Arteries are Rami of the ſecond internal or anterior Branch of the external Carotid on each Side, and communicate with the firſt external or poſterior Branch of the ſame Carotid, &c. The Veins are commonly Rami of a Branch of the external anterior Jugular Vein, deſcribed among the other Veins, Sect. 5. N° 79.

533. We obſerve four nervous Ropes to go very diſtinctly to the Baſis of the Tongue, and to continue their Courſe through its whole Subſtance all the Way to the Point. Two of theſe Ropes are Rami of the inferior Maxillary Nerves, or of the third Branch of the fifth Pair from the Medulla Oblongata. The other two are the Nerves of the ninth Pair. The two firſt I have already named Linguales or Hypo-Gloſſi Minores, and the other two Linguales or Hypo-Gloſſi Majores. The Majores are inferior and internal, the Minores, ſuperior and external, or lateral. The ſmall Portion or firſt Branch of the Nervus Sympatheticus Medius, or of the eighth Pair, ſends likewiſe a Nerve to each Side of the Tongue.

534. The great Lingual Nerve on each Side runs forward between the Muſculus Mylo-Hyoidæus and Hyo-Gloſſus, under the Genio-Gloſſus, and is diſtributed to the fleſhy Fibres all the Way to the Point of the Tongue, communicating by ſeveral ſmall Filaments with the Lingualis Minor, and with the Nerve from the eighth Pair. For the other Diſtributions of it, I refer to the Deſcription of the Nerves.

535. The ſmall Lingual Nerve on each Side goes off from the Maxillaris Inferior, ſometimes at and ſometimes before its Paſſage between the Pterygoide Muſcles. Afterwards ſeparating more and more from the Trunk, it paſſes under the lateral Part of the Tongue, over the Sublingual Gland, of which hereafter. It ſupplies the neareſt Parts of the Tongue as it paſſes, and then entering its Subſtance, terminates at the Point, having ſent a great Number of Filaments to the Papillary Membrane. It communicates, as has been ſaid, with the Lingualis Major, and with the Nerve from the eighth Pair.

536. This Lingual Nerve, a little after it leaves the Maxillaris Inferior, is accompanied by a ſmall diſtinct Nerve, which runs upward and backward toward the Articulation of the lower Jaw, in Company with the lateral Muſcle of the Malleus, paſſes through the Tympanum between the Handle of the Malleus and the long Leg of the Incus, by the Name of Chorda Tympani, and afterwards perforating the Backſide of the Tympanum, unites with the Portio Dura of the Auditory Nerve, as has been already ſaid in the Deſcription of the Ear.

537. This

537. This ſmall Nervous Rope has been looked upon by Anatomiſts as a Kind of ſmall Recurrent of the Nervus Lingualis; but as in ſome Subjects it appears to make ſimply an acute Angle with the Lingual Nerve, and as this Lingual Nerve is ſomething larger after this Angle, it ought rather to be believed to come from the Tympanum, and to unite with the Lingual Nerve, than to ariſe from this Nerve, and run up to the Tympanum. In ſome Subjects the Union of this Nerve with the Lingualis is in a Manner Plexiform, and very difficult to be unfolded.

538. The Lingual Nerve of the eighth Pair, which is its firſt Branch, runs firſt of all on the Inſide of the Digaſtric Muſcle of the lower Jaw, and ſupplies the Genio-Hyoidæi, the neighbouring Muſcles of the Baſis of the Tongue, and thoſe of the Pharynx. Afterwards it ſends out the Ramifications, and forms the Communications deſcribed in the Hiſtory of the Nerves; and laſtly goes to the lower Part of the Tongue, where it communicates with the Lingual Ramus of the fifth Pair, and with the Lingual Ramus of the ninth.

539. The Tongue is the Organ of the Senſe, called the Taſte, by means of the Papillæ, eſpecially the Villoſæ or Pyramidales. It is not as yet diſcovered in what Manner the Papillæ Semi-lenticulares contribute to the Taſte; and the Capitatæ ought to be looked upon as Salival Glands.

540. The Tongue is likewiſe one of the principal Inſtruments of Speech, and of the Articulation of the Voice. *Riolan* in his Anthropographia mentions a Child of five Years of Age, who though he had loſt his Tongue by the Small Pox, but not the Uvula, continued ſtill to ſpeak almoſt as diſtinctly as before. Probably the Baſis of the Tongue ſtill remained. *M. de Juſſieu* has publiſhed an Obſervation in the Memoirs of the Royal Academy concerning a little Girl who could ſpeak, though ſhe was born without a Tongue, in Room of which there was only a Kind of ſmall Tubercle.

541. The Tongue ſerves alſo to collect all the Morſels which we chew, to turn them in different Manners and to different Parts of the Mouth, and to rub off whatever ſticks to the Palate; and it is uſeful in ſpitting, ſucking, &c. It bears a great Part in Deglutition, being aſſiſted by the Digaſtric Muſcles, which by contracting at the ſame Time that the other Muſcles preſs the lower Jaw againſt the upper, raiſe the Os Hyoides, and fix it at a convenient Height, that the Stylo-Gloſſi and Hyo-Gloſſi may make the Baſis of the Tongue bear back upon the Morſel which is to be ſwallowed, and ſo force it into the Pharynx, the Portions of which that are at that Time immediately above the Morſel, do inſtantly contract, and puſh it into the Œſophagus.

§. 5. *The Cheeks, Lips, and Gums.*

542. The Cheeks and Lips form the Sides and Entry of the Cavity of the Mouth. They are formed in general by the Connexion of ſeveral fleſhy Portions of different Breadths, fixed round the convex Sides of the two Jaws,

Jaws, covered on the Outſide with the Skin and Fat, and lined on the Inſide by a glandulous Membrane. Beſides all this, the Lips ſeem likewiſe to have a ſoft ſpongy Subſtance in their Compoſition, which ſwells and ſubſides on certain Occaſions independently of the Action of the Muſcles belonging to them, and is mixed with Fat.

543. The Subſtance which forms the red Border of the Lips is very different from the reſt of the Skin, being a Collection of very fine, long, villous Papillæ, cloſely connected together and covered by a fine Membrane, which ſeems to be both a Continuation of the Epidermis, and of that Pellicle which covers the glandulous Membrane of the Cavity of the Mouth. This Subſtance is extremely ſenſible, and very painful when the outer Membrane is by any Accident deſtroyed. The internal Membrane of the upper Lip forms a ſmall middle Frænum above the firſt Dentes Inciſorii.

544. The Gums are that reddiſh Subſtance like Leather, which covers the two Sides of the whole Alveolary Border of both Jaws, inſinuates itſelf between all the Teeth, ſurrounds what I called the Collar of each Tooth in particular, and adheres very ſtrongly to them. Therefore the outer and inner Gums are continuous, and both together form juſt as many Openings as there are Teeth.

545. The Subſtance of the Gums is of a very ſingular Structure, reſembling in ſome Meaſure the Texture of a Hat, ſuppoſed to be very compact and elaſtic. It is not immediately fixed to the Bones of the Jaws, but by the Intervention of the Perioſteum with which it is perfectly united; and it is covered by a fine, ſtrong, even Membrane, which ſticks very cloſe to the Subſtance of the Gums, and ſeems to be a Continuation of that thin Membrane which goes to the Lips and Cheeks, and of that which goes to the Tongue.

546. The Arteries which go to the Lips, Cheeks, and Gums, are Ramifications of the external Carotid, and chiefly of thoſe Branches called Maxillares Externæ & Internæ, of which I deſire the Reader to conſult the Diſtributions and different Communications in the Deſcription of the Arteries N° 55, 58. The Veins are Ramifications of the external anterior Jugular.

547. The Nerves of theſe Parts come from the Maxillaris Superior and Inferior, which are Branches of the fifth Pair; and alſo from the Portio Dura of the Auditory Nerve, or Sympatheticus Minimus, the Ramifications of which are ſpread in great Numbers on all theſe Parts, and communicate in a pretty ſingular Manner with the Nerves of the fifth Pair in ſeveral Places, as may be ſeen in the Deſcription of the Nerves.

548. There is ſo much Variety to be met with in the Muſcles of the Lips in different Subjects, that it is not at all ſurpriſing to find the Deſcriptions given of them by Anatomiſts very unlike one another. In ſome Subjects Portions of theſe Muſcles are wanting; in ſome they can ſcarcely be diſtinguiſhed, becauſe of the Paleneſs and Attenuation of the Fibres; and in others there are really ſome particular Faſciculi which are not generally to be

be found. About fifteen Years ago I diſſected an old Woman, in which Subject alone I obſerved a great many ſingular Things which I have not met with in great Numbers of other Subjects more proper for Diſſection. In this Subject the Muſcles of the Face in general were very much multiplied, and very diſtinct, as I ſhall ſhew in particular Obſervations.

549. The Muſcles of the Lips are commonly divided into common and proper. The common Muſcles are thoſe which end at the Angles or Commiſſures of the two Lips; and thoſe are proper which are fixed in one Lip only, which are again ſubdivided into the proper Muſcles of the upper Lip, and proper Muſcles of the under Lip. All theſe Muſcles have particular Names, ſome of which are taken from ſomething in the Conformation of the Muſcles, ſome from the Inſertions or Situation, and ſome from the Uſes attributed to them.

550. I ſhall here deſcribe thoſe which I am able to ſhew, without mentioning thoſe which I have not hitherto found, though I am in no Doubt about the Accuracy of theſe great Anatomiſts who have publiſhed Accounts of them, and who have beſides given unqueſtionable Proofs of their being faithful and judicious Obſervers. I ſhall lay aſide the Names taken from the ſuppoſed Uſes, partly becauſe I have done ſo all along for Reaſons already given, partly becauſe I am ſtill uncertain about ſome of the Uſes attributed to them, and partly to encourage Anatomiſts and even Beginners to try their Hands at gueſſing, at which they may perhaps ſucceed better than I have done.

551. The Muſcles to which I confine myſelf may be enumerated in the following Order.

Muſculi Communes.

Semi Orbiculares.
Supra-Semi-Orbiculares.
Buccinatores.
Zygomatici Majores.

Muſculi Proprii Labii Superioris.

Zygomatici Minores.
Canini.
Inciſorii Laterales.
Inciſorii Medii.

Muſculi Proprii Labii Inferioris.

Triangulares.
Triangularium Collaterales.
Quadratus.
Inciſorii Inferiores.
Cutanei.

552. The upper Lip is ſometimes moved by the Action of the Muſcles of the Noſe, eſpecially of the Pyramidales; and both Lips either jointly or ſeparately are moved by Suction, without the Aſſiſtance of the Muſcles belonging to them.

553. The Semi-Orbiculares are commonly looked upon as one Muſcle, ſurrounding both Lips, from whence it is called Orbicularis; but when we examine carefully the Angles of the Lips, we find that the Fibres of the upper Lip interſect thoſe of the under Lip, and we eaſily diſtinguiſh the muſcular Arch of one Lip from that of the other; and for this Reaſon I divide this Muſcle into two, and I call them either by the common Name of Semi-Orbicularis, or I call one of them Semi-Orbicularis Superior, and the other Semi-Orbicularis Inferior; but the Name of Semi-Ovales would be ſtill more proper.

554. The ſuperior Semi-Orbicular Muſcle is oftentimes broader than the inferior; and it has this Peculiarity likewiſe, that all its Fibres do not go to the Corner of the Mouth, but terminate by Degrees between the Middle and Extremities of this Arch, nearly like the Semi-Oval Fibres of the upper Palpebra. The inferior Semi-Orbicular Muſcle is commonly more uniform in the Diſpoſition of its Fibres.

555. The Supra-Semi-Orbiculares are Fibres which increaſe the Breadth of the two lateral Portions of the ſuperior Semi-Orbicularis, upward; and they appear at firſt Sight to be one continued Arch like the Muſcle laſt named, but being narrowly examined, they will be found to be ſeparated by a ſmall Interſtice, lying betwixt their contiguous Extremities, which are fixed in the Gums oppoſite to the Edges of that cutaneous Foſſula that runs down from the Septum Narium to the Middle of the Edge of the upper Lip. Their other Extremities are confounded with thoſe of the Semi-Orbicularis Superior.

556. The Buccinatores are two in Number, each of them ſituated tranſverſely between the poſterior Part of the two Jaws and the Corner of the Mouth. They are broad backward and narrower forward in the Shape of a Triangle or Trapezium, and they form a conſiderable Portion of the Cheeks, and for that Reaſon are ſometimes called the Muſcles of the Cheeks. To have a juſt Idea of theſe Muſcles, we muſt be made acquainted with a Ligament on each Side of the Face which I call Ligamentum Inter-Maxillare, becauſe it connects the two Jaws, and alſo gives Inſertion to the poſterior Fibres of the Buccinator.

557. This Ligament is ſtrong and pretty broad. It is fixed by one End to the Outſide of the upper Jaw above the laſt Dens Molaris, and at the Side of the Apophyſis Pterygoides, where it adheres very cloſely to the Muſculus Pterygoidæus Internus. By the other End it is fixed in the poſterior or ſuperior Extremity of the oblique prominent Line on the Outſide of the lower Jaw, below the laſt Dens Molaris. It ſerves likewiſe as a Frænum to check and limit the Depreſſion of the lower Jaw in opening the Mouth, and we may feel it ourſelves, with the End of the Finger in the Mouth, eſpecially when it is wide open.

558. The

558. The Buccinator is inſerted poſteriorly in three different Places. The middle Fibres are fixed tranſverſely in the Ligamentum Intermaxillare, and run directly to the Corner of the Mouth. The ſuperior Fibres run down in an oblique graduated Manner, from the Alveoli of the upper Jaw to the Corner of the Mouth; and the inferior Fibres run up from the lower Jaw in the ſame Manner. All theſe Fibres contract by Degrees as they approach the Commiſſure of the Lips, where they run in behind the Extremities and Union of the Semi-Orbiculares, by which they are covered, and to which they adhere cloſely. There is a large Hollow between this Muſcle and the Maſſeter filled with Fat.

559. The Zygomatici Majores are two Muſcles ſituated one on each Side, between the Zygoma and the Corner of the Mouth. Each Muſcle is thin, long, oblique, and fixed by one Extremity to the lower Edge of that Portion of the Os Malæ, which is connected with the Zygomatic Apophyſis of the Os Temporis. From thence it runs down obliquely from behind forward, being in its Paſſage commonly involved in Fat. It ends at the Commiſſure of the two Lips, adhering ſtrongly to the Buccinator which covers it. This Muſcle is very often complex.

560. The Zygomatici Minores are two ſmall ſlender Muſcles, lying above the great Zygomatici, and almoſt parallel to them. Their ſuperior Extremity ſeems to be a Detachment from the lower Fibres of the Orbicularis Palpebrarum; but they may always be diſtinguiſhed. Their lower Extremity unites with the neighbouring Inciſorius. Theſe Muſcles are quite buried in Fat, and for that Reaſon often diſappear.

561. Each of the two Canini is fixed by a broad Inſertion in the upper Jaw above the Socket of the Dens Caninus, in a Depreſſion below the inferior Edge of the Orbit near the Os Malæ. From thence it runs down a little obliquely, croſſing the lower Extremity of the Zygomaticus Major, which covers it at this Place. Afterwards it terminates at the Extremity of the Arch of the Semi-Orbicularis Superior, and communicates by ſome Fibres with the Triangularis. I formerly looked upon this as a neutral Muſcle, that is, as being neither a proper Muſcle of the upper Lip, nor common to both.

562. Each of the two Inciſorii Laterales is a Sort of Biceps, its upper Part being divided into two Portions which unite below. One of theſe ſuperior Portions is larger than the other, and is fixed in the Os Maxillare below the middle Tendon of the Orbicularis Palpebrarum, ſeeming to communicate by ſome Fibres with the contiguous Fibres of that Muſcle. From thence it runs down a little obliquely toward the Cheek, along the Apophyſis Naſalis, mixing with the Pyramidalis Naſi, and ſending ſome Fibres to the Nares. Afterwards it paſſes over and adheres to the Myrtiformis, or Tranſverſales Naſi, and unites with the other Portion.

563. This other Portion is fixed by a broad Inſertion immediately below the Edge of the Orbit, in the Os Maxillare near the Union of this Bone with the Os Malæ, and likewiſe a little in the laſt named Bone, being at this Place

covered by the inferior Portion of the Orbicularis Palpebrarum, with which it has ſometimes a Kind of Communication. From thence it runs down obliquely toward the Noſe, and unites with the firſt Portion.

564. The two Portions thus united and contracting in Breadth, run behind the Semi-Orbicularis Superior, and are fixed therein oppoſite to the lateral Dens Inciſorius. Sometimes it ſends a ſmall Faſciculus of Fibres to the Muſculus Caninus, which may be reckoned an Aſſiſtant to that Muſcle, and named Caninus Minor.

565. The Inciſorii Medii are commonly called Inciſorii Minores Cowperi or Inciſorii Minores Superiores. They are two ſmall ſhort Muſcles ſituated near each other below the Septum Narium. They are fixed by one Extremity in the Os Maxillare, on the Alveoli of the firſt Inciſores behind the Semi-Orbicularis Superior, and by their other Extremity in the middle and ſuperior Part of the Subſtance of the upper Lip, near the Nares, in which they likewiſe have an Inſertion; and they ſometimes ſend lateral Fibres to the Semi-Orbicularis.

566. Each of the two Triangulares is fixed by a broad Extremity in the Outſide of the Baſis of the lower Jaw, from the Maſſeter to the Hole near the Chin. From thence it aſcends, contracting in Breadth in a bent triangular Form, runs in between the Extremities of the Buccinator and Zygomaticus Major, to both which it adheres very cloſely, and terminates at the Commiſſure of the Lip, partly in the Semi-Orbicularis Superior, and partly, though not always equally, in the Semi-Orbicularis Inferior. This Muſcle ſeems ſometimes to be a Continuation of the Caninus Major.

567. The Quadratus forms the thick Part of the Chin below the under Lip. It is a very complex Muſcle, and very difficult to be prepared becauſe its Fibres are interwoven with a great Quantity of Fat or a pellicular Texture of the Membrana Adipoſa. It is firſt of all inſerted in the Foreſide of the lower Jaw, where it partly fills the broad Foſſula on each Side of the Symphyſis. From thence it runs up, interſecting, along the Symphyſis, the contiguous Fibres of the Skin, and terminates by a broad Inſertion in the Semi-Orbicularis Inferior. The Direction of the other Fibres of which it is compoſed, varies in different Subjects, and it communicates by ſome Fibres with the Cutanei.

568. The Inciſorii Inferiores are two ſmall Muſcles, commonly mentioned with the Addition of *M. Cowper*'s Name. Each of them is fixed by the ſuperior Extremity, on the Alveoli of the lateral Inciſores of the lower Jaw. From thence they run down, approaching each other, and are inſerted together in the lower Part of the Middle of the Semi-Orbicularis Inferior.

569. On the Outſide of the ſuperior Inſertion of each of theſe Muſcles, we meet with a Faſciculus of Fibres which ſeem to be detached from it near the Inciſores. This Faſciculus goes off laterally in Form of an Arch, and unites with the Fibres of the Semi-Orbicularis Inferior, with which it may be eaſily confounded. It may be looked upon as a Muſculus Acceſſorius to the Semi-Orbicularis Inferior, or as a Collateralis to the Inciſorius Minor.

570. The

570. The two Muſculi Cutanei form a Kind of fleſhy Membrane, which covers the whole Foreſide of the Throat and Neck, from the Cheek and Chin, all the Way down below the Claviculæ, and adheres very ſtrongly to the membranous or aponeurotic Expanſion deſcribed above N° 190, 197. This Expanſion has a particular Adheſion to the anterior Portion of the Baſis of the lower Jaw, of the ſame Kind with that at the lower Part of the Zygoma, and it is ſpread over all the Muſcles that lie round the Neck, and over the upper Portion of the Pectorales Majores, Deltoides, and Trapezii.

571. The Fibres of each cutaneous Muſcle run obliquely upward and forward, and meet and ſeem to interſect thoſe of the other Muſcle at acute Angles, from the Sternum all the Way to the Chin. They adhere very cloſely to the Skin by the Intervention of the Cellular Subſtance. From the Clavicles to the upper Part of the Neck, theſe Muſcles are very thin, and from thence increaſe a little in Thickneſs as they approach the Baſis of the lower Jaw, and eſpecially from the Maſſeter to the Chin.

572. They adhere ſtrongly to the lower Portion of the Maſſeter, Triangularis, and Quadratus, and on the Maſſeter and Buccinator their fleſhy Fibres become aponeurotic, but continue longer on the Triangularis, being mixed with the Fibres of that Muſcle all the Way to the Commiſſure of the Lips. They likewiſe advance a little on the neighbouring Portion of the Quadratus.

573. The Portion of theſe Muſcles which anſwers to the Baſis of the Triangularis, is in a Manner divided into two fleſhy Laminæ, the outermoſt of which is what advances over the Triangularis and Quadratus, the other being inſerted ſeparately in the lower Jaw. I have ſometimes obſerved a Part of the fleſhy Extremity of the right Side, to paſs before the Symphyſis of the Chin, over a like Part from the left Side, the one covering the other.

574. The common Muſcles of the Lips either draw both Corners of the Mouth at once, or only one at a Time, according to the different Direction of their Fibres. The proper Muſcles pull the different Parts of the Lips in which they are inſerted. The Buccinators in particular may ſerve to move the Food in Maſtication. An intire Treatiſe might be written on the almoſt innumerable Combinations of the different Motions of all theſe Muſcles, according to the different Paſſions, and according to the different Poſtures in which a Man may put his Face, as I ſhall ſhew elſewhere. None are more affecting than thoſe produced by the Cutanei alone, eſpecially in Weeping, which they do by their Adheſions to the Triangulares, &c. But by their Inſertions in the Bone of the lower Jaw, they draw up the lower Part of the Integuments of the Neck, and thoſe of the Breaſt next to theſe; for they cannot move the Jaw. In old People, and in thoſe who are very much emaciated, theſe Muſcles may be perceived by the Eye, under the Chin, and on the Neck.

§. 6. *The*

§. 6. *The Salival Glands, &c.*

575. By Saliva we mean in general, that Fluid by which the Mouth and Tongue are continually moiſtened in their natural State. This Fluid is chiefly ſupplied by Glands, called for that Reaſon Glandulæ Salivales, of which they commonly reckon three Pairs, two Parotides, two Maxillares, and two Sublinguales. Theſe are indeed the largeſt, and they furniſh the greateſt Quantities of Saliva; but there are a great Number of other leſſer Glands of the ſame Kind, which may be reckoned Aſſiſtants or Subſtitutes to the former. All theſe may be termed Salival Glands, and they may be enumerated in the following Manner:

Glandulæ Parotides.
Glandulæ Maxillares.
Glandulæ Sublinguales.
Glandulæ Molares.
Glandulæ Buccales.
Glandulæ Labiales.
Glandulæ Linguales.
Amygdalæ.
Glandulæ Palatinæ.
Glandulæ Uvulares.
Glandulæ Arytenoidææ.
Glandula Thyroidæa.

576. The Parotides are two large whitiſh Glands, irregularly oblong and protuberant, ſituated on each Side, between the external Ear and the poſterior or aſcending Ramus of the lower Jaw, and lying on ſome Part of the neighbouring Maſſeter Muſcle. The ſuperior Portion of this Gland lies before the cartilaginous Meatus of the Ear, and touches the Apophyſis Zygomatica of the Os Temporis; and it is extended forward and backward under the Lobe of the Ear, as far as the Maſtoide Apophyſis.

577. From the anterior and ſuperior Portion of this Gland, a white membranous Duct or Canal is produced by the Union of a great Number of ſmall Tubes repreſenting ſo many Roots. This Duct runs obliquely forward on the Outſide of the Maſſeter, and then perforates the Buccinator from without inward, oppoſite to the Interſtice between the ſecond and third Dentes Molares, where the Hole or Orifice repreſents the Spout of an Ewer.

578. This Canal is named Ductus Salivalis Stenonis, or Ductus Superior. It is about the twelfth Part of an Inch in Diameter, and in ſome Subjects is partly covered by ſmall glandular Bodies, united with it in different Quantities. The Arteria and Vena Angularis run up over this Duct, and the Portio

tio Dura of the Auditory Nerve runs through the Gland itſelf; and it alſo receives Filaments from the ſecond Vertebral Pair.

579. The Maxillary Glands are ſmaller and rounder than the Parotides, and are ſituated each on the Inſide of the Angle of the lower Jaw, near the Muſculus Pterygoidæus Inferior. From the Inſide, or that which is turned to the Muſculus Hyo-Gloſſus, each of them ſends out a Duct in the ſame Manner as the Parotides, but it is ſmaller and longer, and goes by the Name of Ductus Salivalis *Whartoni*, or Ductus Inferior.

580. This Duct advances on the Side of the Muſculus Genio-Gloſſus, along the inner Part and ſuperior Edge of the Glandula Sublingualis, to the Frænum of the Tongue, where it terminates by a ſmall Orifice in Form of a Papilla.

581. The Glandulæ Sublinguales are likewiſe two in Number, of the ſame Kind with the former, only ſmaller, ſomething oblong, and flatted like a blanched Almond. They are ſituated under the anterior Portion of the Tongue, one on each Side, near the lower Jaw, on the lateral Portions of the Muſculi Mylo-Hyoidæi which ſuſtain them. The two Extremities of each Gland are turned backward and forward, and the Edges obliquely inward and outward.

582. They are covered on the upper Side by a very thin Membrane, which is a Continuation of the Membrane that covers the under Side of the Tongue. They ſend out laterally ſeveral ſmall ſhort Ducts which open near the Gums by the ſame Number of Orifices, all ranked in the ſame Line, at a ſmall Diſtance from the Frænum, and a little more backward. In many Animals we find particular Ducts belonging to theſe Glands, like thoſe of the Glandulæ Maxillares, but they are not to be found ſo diſtinctly in Men. The Muſculi Genio-Gloſſi lie between the two Sublingual Glands, and alſo between the two Maxillary Ducts.

583. The Molares are two Glands nearly of the ſame Kind with the former, each of them being ſituated between the Maſſeter and Buccinator; and in ſome Subjects they may eaſily be miſtaken for two ſmall Lumps of Fat. They ſend out ſmall Ducts which perforate the Buccinator, and open into the Cavity of the Mouth, almoſt over againſt the laſt Dentes Molares; and from thence *M. Heiſter*, who firſt deſcribed them, called them Glandulæ Molares.

584. All the Inſide of the Cheeks near the Mouth, is full of ſmall glandulous Bodies, called Glandulæ Buccales, which open by ſmall Holes or Orifices through the inner Membrane of the Mouth. The Membrane which covers the Inſide of the Lips, a Continuation of that on the Cheeks, is likewiſe perforated by a great Number of ſmall Holes, which anſwer to the ſame Number of ſmall Glands, called Glandulæ Labiales. The Glandulæ Linguales are thoſe of the Foramen Cæcum of the Baſis of the Tongue, which have been already ſpoken to.

585. I have alſo explained the Glandulæ Palatinæ, or thoſe that belong to the Arch and Septum of the Palate; and the Glandulæ Aryte-

noidææ were deſcribed with the Larynx. The Uvular Glands are only a Continuation of the Membrane of the Palate in Form of a ſmall Bunch of Grapes. We might likewiſe reckon among the Salival Glands thoſe of the ſuperior Portion of the Pharynx, mentioned in the Deſcription of that Part, and alſo the glandular Bodies of the Membrana Pituitaria of the Nares, and of the Sinuſes that communicate with theſe.

586. The Amygdalæ are two glandular Bodies of a reddiſh Colour, lying in the Interſtices between the two lateral Half Arches of the Septum Palati, one on the right, the other on the left Side of the Baſis of the Tongue. Their Appearance is not unlike that of the Outſide of an Almond Shell, both becauſe their Surface is uneven, and becauſe it is full of Holes big enough to admit the Head of a large Pin.

587. These Holes, which repreſent a Sieve, or a Piece of Net-Work, are continued to an irregular Sinus or Cavity within the Gland, filled commonly with a viſcid Fluid, which comes from the Bottom of the Sinus, and is from thence gradually diſcharged through theſe Holes into the Throat. To ſee the true Structure of the Amygdalæ, they muſt be examined in clear Water, having firſt been waſhed in lukewarm Water, and handled very gently.

588. The Thyroide Gland is a large whitiſh Maſs which covers the anterior convex Side of the Larynx. It ſeems at firſt Sight to be made up of two oblong glandular Portions, united by their inferior Extremities, below the Cricoide Cartilage, in ſuch a Manner as to have ſome Reſemblance to a Creſcent, with the Cornua turned upward. It is of a moderate Thickneſs, and bent laterally like the Thyroide Cartilage, from which its Name is taken. The two lateral Portions lie on the Muſculi Thyro-Hyoidæi, and the middle, or inferior Portion, on the Crico-Thyroidæi. The Thyro-Pharyngæi Inferiores ſend Fibres over this Gland, and they communicate on each Side by ſome ſuch Fibres, with the Sterno-Thyroidæi and Hyo-Thyroidæi.

589. This Gland ſeems to be of the ſame Kind with the other Salival Glands, but it is more ſolid. Some Anatomiſts thought they had diſcovered the Excretory Duct, but they miſtook a Blood-Veſſel for it. We ſometimes meet with a Kind of glandular Rope which runs before the Cartilago Thyroides, and diſappears before the Baſis of the Os Hyoides.

590. This glandular Rope goes out from the common Baſis of the lateral Portions of the Thyroide Gland, and is loſt between the Muſculi Sterno-Hyoidæi, behind the Baſis of the Os Hyoides, or between that Baſis and the Epiglottis. I have likewiſe ſhewn in my private Courſes, ſmall Openings on the Side of the anterior Ligament of the Epiglottis, or that by which it is connected to the Baſis of the Tongue. One of theſe Openings appears like a ſmall Papilla; and this is the furtheſt that I have been able to trace the glandular Rope.

§. 7. *Glandulæ Lymphaticæ.*

591. Below each of the firſt Salival Glands above deſcribed, or Parotides, toward the Maſtoide Apophyſis, is fixed a ſmall Gland of another Kind, differing from the former in Figure, Colour, Excretory Duct, and in the Fluid which it ſecretes. It is round, and of an even Surface, without Tubercles, and it is the uppermoſt of a great Number of Glands of the ſame Kind, which lie partly below the Interſtice between the Parotid and Maxillary Glands, and at different Diſtances, along the internal Jugular Vein, all the Way to the lower Part of the Neck. We obſerve among theſe Glands and upon this Vein a great Number of tranſparent Veſſels, with an Appearance of numerous Valves. The Fluid which they contain is tranſparent, a little mucilaginous, and is called Lympha.

592. The Veſſels are likewiſe termed Lymphatic Veſſels, and the Glands, Lymphatic Glands. Theſe Glands are not all equally large, nor equally round, ſome being oblong, thick, flat, ſmall, &c. The Lymphatic Veſſels go out alternately by one Extremity, from one Gland, and enter by the other Extremity ſome other Gland near the former, and both as they go out and as they enter, theſe Extremities are very much ramified. The Trunk is commonly ſingle, and the Valves are ſo diſpoſed, as that the Fluid contained in the Veſſel can only run toward the Thorax, but cannot return to the Head.

593. These Glands and Veſſels are to be found in many other Parts of the Body. We meet with them not only in ſeveral Parts of the Head, but alſo in many outward and inward Parts of the Thorax, Abdomen, and both Extremities. They accompany the Maxillary Salival Glands, as well as the Parotides; and there are ſeveral ſpread on the lateral and Backſides of the Neck, in the Membrana Adipoſa, near the Muſcles.

594. In the Cavity of the Thorax the Lymphatic Glands are ſituated at different Diſtances on one Side and behind the Œſophagus, eſpecially at the Place which is even with the fifth Vertebra of the Back. I have found ſome on the anterior Portion of the Diaphragm on one Side of the Mediaſtinum; and there are others round the Baſis of the Heart, in the Fat which lies there. They are to be met with likewiſe in the Subſtance of the Membrana Adipoſa which covers the Thorax, near the inner Surface, eſpecially about the Clavicles, and in the cellular Interſtices of the Muſcles which lie on the Thorax.

595. In the Cavity of the Abdomen theſe Glands are very numerous, and particularly round the ſuperior Orifice, and on the two Curvatures of the Stomach; on the Capſula of the Sinus of the Vena Portæ; on the cellular Ligament of the Veſicula Fellis; near the Beginning of the Ductus Cyſticus; at the Adheſions of the Omentum to the Spleen, and to the Colon; through the whole Extent of the Meſentery; at the Adheſions of the Meſocolon;

Meſocolon; behind the Adheſions of theſe two Membranes to the Vertebræ of the Loins; near the Bifurcation of the Aorta; and along the Iliac Veſſels. There are likewiſe other ſuch Glands on the Outſide of the Abdomen, in the Subſtance, and toward the Inſide of the Membrana Adipoſa.

596. In the ſuperior Extremities of the Body, theſe Glands lie chiefly under the Articulation of the Os Humeri with the Scapula, in the Hollow of the Axilla. The moſt conſiderable Lymphatic Glands in the lower Extremity are toward the lower Part of the Inguina, commonly called the Inguinal Glands, to which the Faſcia Lata or Crural Aponeuroſis gives a Kind of double Capſula, which makes ſome of them lie very near the Skin, and the reſt at a greater Diſtance from it.

597. As all theſe Lymphatic Glands differ more in Situation, than in Size or Figure, they are commonly enumerated and denominated from the Places already mentioned, where they lie in the following Order.

Glandulæ Parotides Lymphaticæ.
Glandulæ Maxillares Lymphaticæ.
Glandulæ Jugulares.
Glandulæ Cervicales.
Glandulæ Occipitales.
Glandulæ Claviculares.
Glandulæ Axillares.
Glandulæ Thoracicæ.
Glandulæ Œſophagææ.
Glandulæ Mediaſtinæ.
Glandulæ Cardiacæ.
Glandulæ Ventrales Externæ, Internæ.
Glandulæ Stomachicæ.
Glandulæ Hepaticæ.
Glandulæ Cyſticæ.
Glandulæ Epiploicæ.
Glandulæ Meſentericæ.
Glandulæ Lumbares.
Glandulæ Iliacæ.
Glandulæ Inguinales.
Glandulæ Crurales, &c.

598. There are three Sorts of Veſſels that now go by the Name of Lymphatics, whereas formerly that Word was uſed only to ſignify the tranſparent Veſſels already mentioned, which accompany the Lymphatic Glands. The original Sources of theſe Veſſels are very difficult to be found out; and even their Diſtribution through the Body has not been ſufficiently traced to enable us to deſcribe them particularly in this Treatiſe, and therefore I muſt reſerve that for the Subject of another. As to their Termination, we are ſure that for the moſt Part they end in the Ductus Thoracicus.

599.

599. Besides these Vessels which accompany the Glands, there are others of the same Structure found on the several Viscera, where no Lymphatic Glands have hitherto been discovered. We meet with them in very great Numbers in the external Membrane of the Liver, and in the Duplicature of the superior membranous Ligament of this Viscus, as I have already observed. Several Discoveries have been made about these Vessels in Brutes, which I here pass over in Silence, the sole Design of this Work being to describe the Human Body.

600. The third Sort of Vessels termed Lymphatics, are the small Arteries and Veins which, in the natural State, transmit only the serous Part of the Blood. These Vessels differ from those of the first in the Smallness of their Diameter, and in their Structure and Situation. All these little Arteries and Veins are uniform, extremely narrow, and though their Sides are not thinner than those of the Valvular Lymphatics, yet their Diameters are generally less. The other Lymphatics are full of Valves, and very thin, but they are not narrow in Proportion. The Arterial and Venal Lymphatics are found on the Parts which are naturally white, as on the Skin, the White of the Eye, &c. and their Origins are easily discoverable; but the Valvular Lymphatics are confined to the internal Parts of the Body, and are found on Parts of all Colours that are in the Body, and we cannot easily trace them to their original Sources.

601. Besides what has been here said about the Glands, I have explained several Things relating to them in the Compendious View, in the Description of the Liver, and in the Description of the Cortical Substance of the Brain. I have only here to add, that in order to have a general Enumeration of all the Glands of the Human Body, we need only add to the Salival and Lymphatic Glands, all the particular Glands and glandular Viscera which have been explained in the Descriptions of the Abdomen, Thorax and Head.

602. I think it very proper that the ancient Division of Glands into Conglobate and Conglomerate should be retained. Under the first Kind I include the Lymphatic Glands alone, and all the other Glands of the Body under the second; and these again may be subdivided into Simple and Compound. I must be obliged to refer what still remains to be said concerning the internal Structure of Glands and glandular Bodies to a particular Dissertation, which is designed to contain an Answer to *M. Helvetius*'s Letter published at the End of his late Performance concerning the Pulmonary Blood.

F I N I S.

The Explication of the FIGURES.

Table AA. the xxv. of *Euſtachius*.

Lanciſi's Explication.

a. The Heart with the Vena Cava annexed.
b. The External Jugular Vein of the right Side, cut.
c. Vena Jugularis Interna.
d. d. Venæ Subclaviæ.
e. e. Venæ Axillares.
f. f. The Cephalic Veins of both Sides.
g. g. Venæ Medianæ.
h. Vena Baſilica Dextra.
i. i. Arteriæ & Venæ Renales or Emulgentes.
k. k. The Paſſage of the Aorta, hid by the Diaphragm, viewed on the under Side.
l. l. Arteriæ & Venæ Iliacæ, which afterwards become Crurales, &c.
m. Vaſa Pudica.

Additional Explication.

n. The Vaſcular Arch on the Palm of the Right Hand.
o. Another Diſtribution of the Veſſels of the Left Hand.
p. The Arch or Curvature of the Trunk of the Aorta.
p. Aorta Inferior.
q. Vena Cava Superior.
r. Vena Cava Inferior, as it paſſes through the Diaphragm.
s. Vena Cava Inferior, as it paſſes behind the Liver.
t. The left Iliac Vein.
u. u. Arteriæ & Venæ Crurales, or Crurales Superiores.
x. x. Arteriæ & Venæ Crurales Inferiores.
y. y. y. y. The two Tibiæ.
z. z. The Tendon of the Rectus Anterior, cut off.
1. 1. 1. 1. The Muſculus Vaſtus Externus inverted.
2. 2. Vaſtus Internus.
3. 3. Crureus.
4. 4. Muſculus Faſciæ Latæ.
5. 5. Triceps.
6. 6. The Kidneys.
7. 7. Muſculus Latiſſimus Dorſi.
8. 8. Trapezius.
9. 9. Deltoides.

10. 10.

10. 10. Biceps.
11. 11. Anconæus Maximus.
12. 12. Supinator Longus.
13. Ulnaris Externus.
14. The Radialis Internus, cut.
15. The Ulnaris Gracilis or Palmaris, cut.
* Vena Jugularis & Arteria Carotis.
** Venæ & Arteriæ Frontales.
17. Venæ & Arteriæ Temporales.
18. Venæ & Arteriæ Occipitales.
19. Muſculus Perforatus.
20. 20. Gaſtrocnemii.
21. 21. Soleus.

Table BB. the xviii. of *Euſtachius.*

Lanciſi's Explication.

Fig. II.

a. a. Nervi Olfactorii.
b. b. The Nervi Optici, cut.
c. c. Motores Oculorum communes.
d. d. Nervi Pathetici.
e. Proceſſus Annularis.
f. f. The three Branches of the fifth Pair.
g. g. The ſixth Pair.
h. h. The two Portions of the Nervi Auditorii.
i. i. i. i. The Origin of the eighth Pair.
m. m. Nervi Recurrentes.
n. The left Nerve of the ninth Pair.
o. The right Nerve of the ninth Pair.
p. p. Corpora Pyramidalia.
q. q. The tenth Pair cut, according to *Lanciſi*'s Explication of theſe two white Points; but as theſe two Marks are not to be found in the other four Figures of the Brain, this Explication is without Foundation.
r. r. The ſuperior Extremity of the Nerves, commonly called Intercoſtales, which, according to *Lanciſi*, may be reckoned an eleventh Pair.
s. s. s. The great Trunks of theſe Nerves.
t. u. u. The Nervus Acceſſorius of the eighth Pair, and its Communication with the third Pair of the Vertebrales.
x. x. x. The Nervi Diaphragmatici, of which the left is naturally longer than the right.
y. The inferior Opening of the Infundibulum.
z. z. The Nerves which go to the Teſtes, Uterus, &c.

Additional Explication.

1. 1. Nervi Brachiales.
2. 2. &c. The Communications of the Vertebral Nerves, with thoſe commonly called Intercoſtales.
3. 3. Nervi Crurales & Sciatici.

Fig. I. and III.

From a to k, the References are the ſame as in the foregoing Figure.
l. The Nervus Acceſſorius of the eighth Pair, or Nervus Spinalis, with its different Origins.
m. Chorda Tympani.
n. The Communication of the Portio Dura Nervi Auditorii, with the Nervus Maxillaris Inferior.
o. Nervus Ocularis, or Ophthalmicus.
p. Nervus Maxillaris Superior.
q. Nervus Maxillaris Inferior.

Fig. IV. and V.

Theſe Figures are the ſame with the firſt and ſecond, the Sections of the Nerves excepted.

Table CC. the xli. of *Euſtachius.*

Lanciſi's Explication.

Fig. I.

a. a. The Muſculi Frontales, bifurcated. This Bifurcation is not always to be found.
b. b. The ſuperior Segments of the Muſculi Palpebrarum Orbiculares.
c. c. The inferior Segments of the ſame Muſcles.
d. Muſculus Levator Auriculæ.
e. Muſculus Temporalis.
f. Muſculus Maſſeter.
g. The inferior Edge of the Zygoma.
h. A Portion of the lower Jaw.
i. The upper Extremity of the Muſculus Depreſſor Alæ Narium. This whole Muſcle is ſeen Fig. 3. a.
l. Muſculi Pyramidales Alæ Narium.
m. m. Muſculi Zygomatici Majores.

n. Zygo-

n. Zygomaticus Minor Acceſſorius.
o. o. Muſculi Canini.
p. Muſculus Quadratus Menti.
q. Muſculus Triangularis. There is here a Miſtake in *Lancisi*'s Original Explication.
r. Muſculus Labiorum Orbicularis. Vide Fig. 3. b.
s. Muſculus Buccinator. Vide Fig. 3. c.

Additional Explication.

t. t. Muſculi Palpebrarum Minores.
u. Muſculus Zygomaticus Minor.
x. Muſculus Inciſorius Major.
y. The ſmall Muſcle of the Sub-Septum Narium.

Fig. II.

This Figure, and the fifth and ſixth, ſeem not to have been taken from Human Subjects.
a. Muſculus Sterno-Thyroidæus Dexter.
α. Muſculus Hyo-Thyroidæus Dexter in ſitu.
b. Sterno-Hyoidæus Dexter.

Fig. III.

a. The Muſculus Depreſſor Narium intirely.
b. Muſculus Orbicularis Labiorum.
c. Buccinator.
d. d. Muſculi Canini.

Fig. IV.

The Muſculus Temporalis, extra ſitum.

Fig. V.

a. Muſculi Sterno-Hyoidæi.
b. Muſculus Coraco-Hyoidæus, or Omo-Hyoidæus.
c. The middle Tendon of this Muſcle.
d. Muſculus Mylo-Hyoidæus, called here Genio-Hyoidæus Externus, ſive Obliquus.
e. Muſculus Genio-Hyoidæus, called here Genio-Hyoidæus Internus, ſive Rectus.
f. The Stylo-Hyoidæus of the right Side.
g. g. Cerato-Gloſſi, or Hyo-Cerato-Gloſſi.
h. h. Stylo-Gloſſi.

i. Os Hyoides.
k. Glandulæ Sublinguales.
l. Glandula Thyroidæa.
m. The Appendix of that Gland.

Addition.

n. Muſculus Sterno-Thyroidæus.

Fig. VI. and VII.

Theſe two Figures are nearly the ſame with the ſecond.

Fig. VIII.

a. Aſpera Arteria.
b. Œſophagus.
c, c. Muſculus Colli Longus.
d. The Glandula Thyroidæa, which appears to be divided.
e. The Appendix to that Gland, according to *Morgagni*.
f. f. Muſculi Crico-Thyroidæi.
g. Cartilago Thyroides.
h. Muſculus Thyro-Pharyngæus.
i. Muſculus Stylo-Pharyngæus Siniſter.
k. The Tendon and common Inſertion of that Muſcle.
l. l. Muſculi Baſio-Gloſſi. That on the right Side appears like a Genio-Gloſſus.
m. Os Hyoides.
n. Muſculus Genio-Hyoidæus Obliquus, which is more properly named Genio-Gloſſus.
o. Genio-Hyoidæus Rectus. It appears here like a Portion of the Baſio-Gloſſus.
q. Stylo-Gloſſus.

Fig. IX. and X.

The Officula Auditus. The Stapes and Muſcle of the Malleus were diſcovered by *Euſtachius*.

Fig. XI.

a. a. Muſculi Baſio-Gloſſi. That on the right Side appears here like a Genio-Hyoidæus.
b. Cerato-Gloſſus Siniſter.
c. Stylo-Gloſſus Siniſter.
d. Stylo-Pharyngæus Siniſter.

e. Œſophagæus.

e. Œsophagæus. This appears rather to be the Thyro-Crico-Pharyngæus, raised and inverted.
f. Stylo-Hyoidæus Sinister.
g. Crico-Thyroidæus Sinister.
h. Aspera Arteria.
i. A Portion of the Œsophagus, cut off.

Addition.

k. The Ligament of the Stylo-Glossus.
l. Musculus Cerato-Pharyngæus.
m. Syndesmo-Pharyngæus. These two Muscles cover the middle Portion of the Stylo-Pharyngæus.
n. The lower Portion of the Stylo-Pharyngæus, inserted partly in the Cartilago Thyroides, and partly in the Cornu of the Os Hyoides.
o. The Basis of the Os Hyoides.
p. The left Cornu of that Bone.
q. Cartilago Thyroides.

Fig. XII.

a. The Basis of the Os Hyoides.
b. The Notch and left Side of the Cartilago Thyroides.
c. Musculus Hyo-Thyroidæus Sinister.
d. Sterno-Thyroidæus Sinister.

Addition.

e. A small distinct Muscle.
f. Another.
g. The Basis of the Os Hyoides.
h. The left Great Cornu.
i. The left Small Cornu or Appendix.

Fig. XIII.

a. Musculus Pterygoidæus Internus.
b. Pterygoidæus Externus.
c. The Musculus Colli Longus Superior of the left Side, which is likewise called Rectus Anterior.
d. Longus Colli Inferior of the right Side.

Addition.

e. Musculus Salpingo-Staphylinus, or rather the Ptery-Salpingoides.
f. The Obliquus Anterior of the right Side.

g. g. Recti Minores ſive Laterales Anteriores.
h. h. The Lower Jaw divided by the Chin.

Fig. XIV.

This Figure does not appear in Human Subjects.

Table DD. the xlii. of *Euſtachius*.

Lanciſi's Explication.

Fig. I.

a. The Epiglottis raiſed a little.
b. b. The two Tops or ſmall Heads of the Cartilagines Arytenoides.
c. The left Ala of the Cartilago Thyroides, extra ſitum.
d. The Superior Apophyſis or Cornu of that Ala.
e. The Inferior Apophyſis or Cornu.
f. The right Ala, in ſitu.
g. Muſculus Thyro-Arytenoidæus Sinister.
h. Crico-Arytenoidæus Lateralis.
i. Crico-Arytenoidæus Poſterior.
k. k. Arytenoidæus.
l. Aſpera Arteria.
m. A Portion of the Muſculus Œſophagæus. This appears rather to be the membranous Portion of the Aſpera Arteria.

Addition.

n. The left, ſmall, lateral, articular Side of the Cartilago Cricoides, with which the inferior Apophyſis of the Cartilago Thyroides, is articulated.

Fig. II.

a. The inner Side of the Epiglottis.
b. b. Muſculi Arytenoidæi.
c. c. Crico-Arytenoidæi Poſteriores.
d. d. The poſterior and lower Side of the Cartilago Cricoides.

Addition.

e. The Prominent Line on the Backſide of the Cricoides.
f. Muſculus Arytenoidæus Verus.
g. g. The Heads of the Cartilagines Arytenoides.
h. h. The ſuperior Cornua of the Cartilago Thyroides.
i. i. The inferior Cornua.

THE FIGURES.

Fig. III.

a. Rimula Laryngis.
b. Muſculus Hyo-Thyroidæus Siniſter.
c. Sterno-Thyroidæus Siniſter.
d. Pharynx.
e. Œſophagus.

Addition.

If this Figure be taken from a Human Subject, it is a very extraordinary one.

Fig. IV. and VI.

a. The Point of the Tongue.
b. The Baſis of the Tongue.
c. c. and d. d. The Muſculi Stylo-Gloſſi cut, according to *Lancisi*.
e. e. and f. f. Stylo Pharyngæi.
g. g. Cephalo-Pharyngæi, united by a Linea Alba.
h. h. Œſophagus; or rather the Cerato-Syndeſmo-Pharyngæus.
i. The Opening of the Pharynx.
k. k. Œſophagus.
l. l. Aſpera Arteria.

Addition.

m. Muſculus Hyo-Crico-Pharyngæus.
n. n. Gloſſo-Pharyngæi.
o. A Portion of the Stylo-Pharyngæus.
p. p. p. p. The Velum or Septum Palati.
q. q. The Arch of the Pharynx, with the Rugæ.
r. r. Muſculi Petro-Pharyngæi.
s. Stylo-Pharyngæus Minor *D. Santorini*.
t. t. t. t. Periſtaphylini Externi.

Fig. V.

a. The Tongue.
b. Epiglottis.
c. Ligamentum Epiglotticum *Morgagnii* ſive Gloſſo-Epiglotticum.
d. Ligamentum Hyo-Epiglotticum Siniſtrum.
e. Os Hyoides.
f. The Glands of the Baſis of the Tongue.

Fig. VII.

A Fore-View of the Cartilago Cricoides.
a. The Forepart.
b. The Backpart.
c. c. The ſmall articular Heads or Tops.

Fig.

Fig. VIII.

A Side-View of the Cricoide Cartilage, in which the ſmall articular Surface expreſſed in Fig. I. is left out.

a. The anterior Part or Baſis.
b. The poſterior or upper Part.
c. The lateral Part, in which the ſmall articular Surface is wanting. Vide Fig. I. n.

Fig. IX.

a. The right Side of the Cartilago Thyroides.
b. The right Side of the Cartilago Cricoides.
c. Epiglottis.
d. The right ſuperior Cornu of the Cartilago Thyroides.
e. The left ſuperior Cornu.
f. The right inferior Cornu.

Fig. X.

A Back-View of the Cartilago Cricoides.
a. The prominent Line.
b. b. The lateral Sides.
c. c. The ſmall articular Eminences or Heads.

Fig. XI.

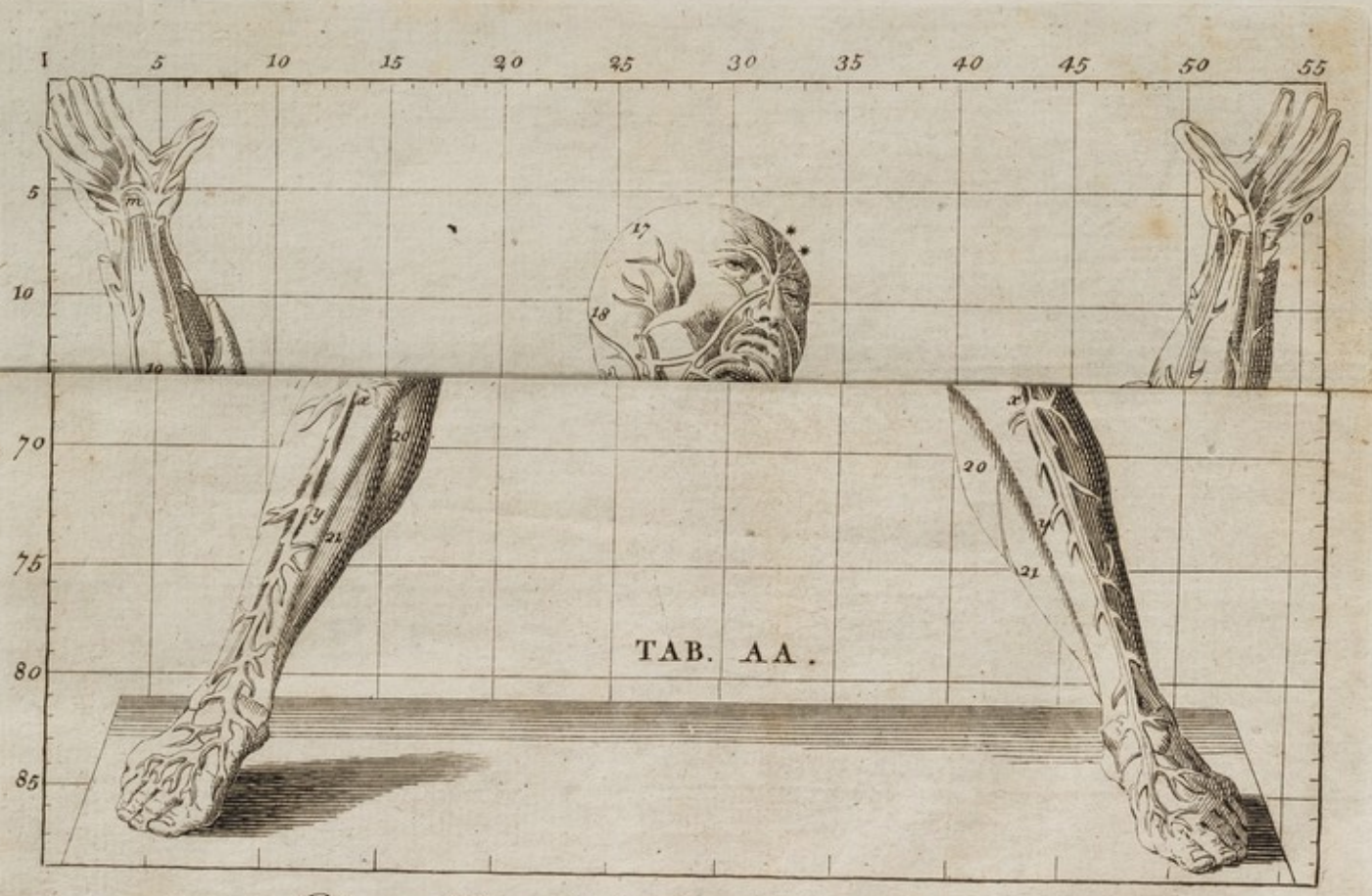
a. Epiglottis.
b. The right ſuperior Cornu of the Cartilago Thyroides.
c. The Superior Portion or Head of the right Arytenoide Cartilage.
d. d. The Orifice of the right Ventricle of the Larynx.
e. The right Portion of the Cricoides.
g. An anterior Section of the Cricoides.
h. A poſterior Section.

Fig. XII.

One of the Arytenoide Cartilages cleared from the Muſcles.

Addition.

a. b. The Baſis of this Cartilage.
b. The internal Angle of the Baſis.
c. The articular Cavity of the Baſis.
d. The Appendix or ſmall Head of this Cartilage.



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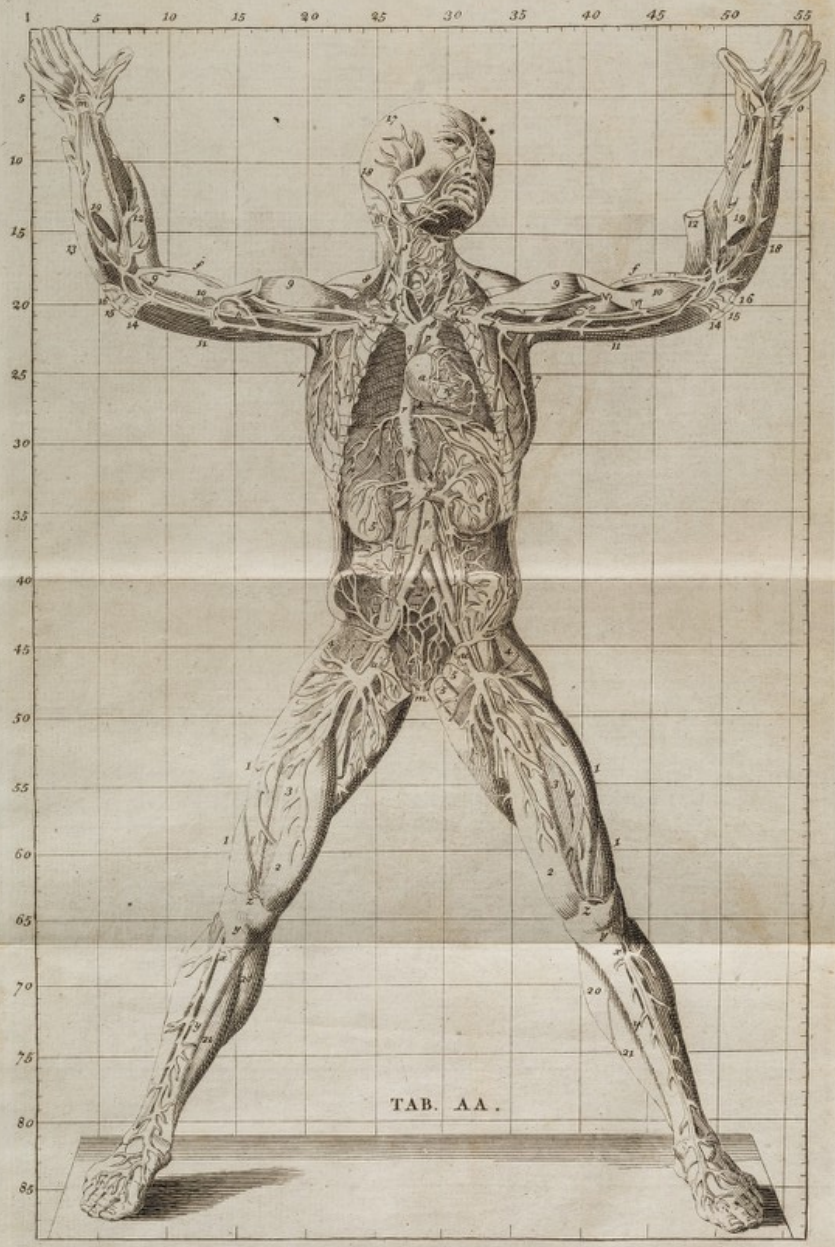

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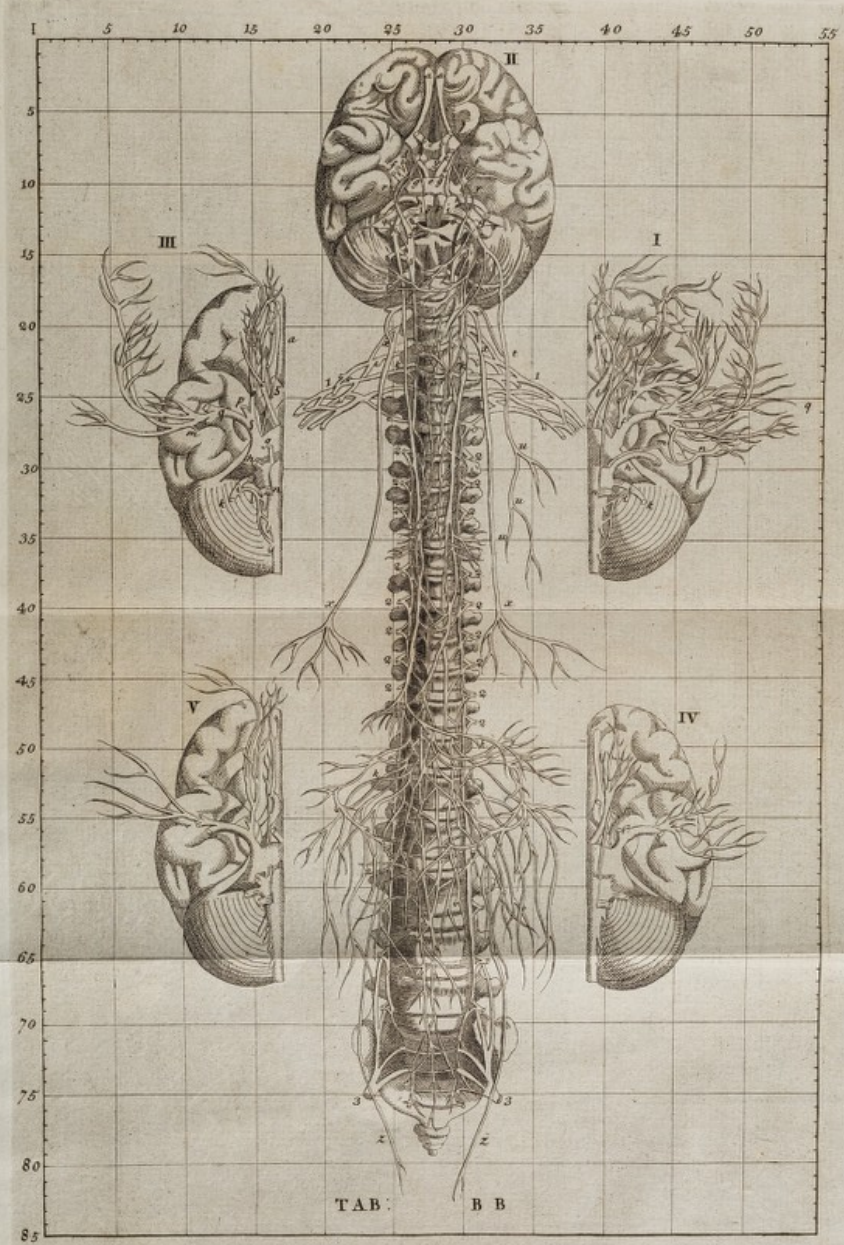

Pl. 2. to follow Pl. 1.

Pl. 3. to follow Pl. 2.

TAB. DD

Pl 4. to follow Pl. 3.