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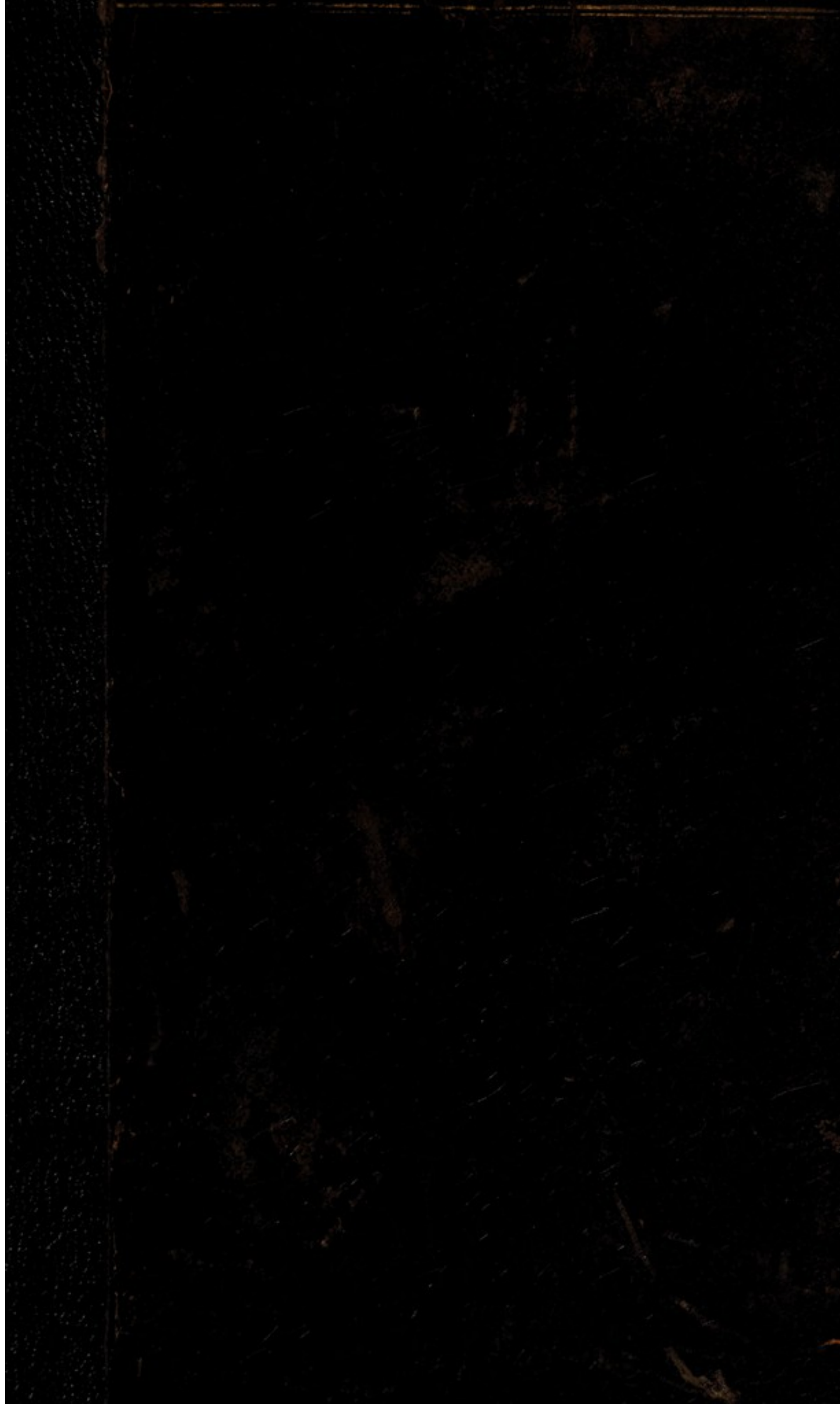
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W. H. H. &
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I. Webb



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A
COMPENDIUM
OF
ANATOMY.

CONTAINING
A Short but Perfect VIEW
Of all the PARTS of
HUMANE BODIES.

Wherein are inserted,
The MODERN DISCOVERIES :
Together with a Variety of Curious Obser-
vations never before made publick.

*Translated from the last Edition of D. LAURENTIUS
HEISTER, Professor of Anatomy, Surgery, and
Physick in the University of Altorfe, &c.*

Adorn'd with COPPER PLATES.

L O N D O N :

Printed for THO. COMBES, at the *Bible and
Dove* in *Pater-noster Row*, and JAMES
LACY, between the *Temple Gates* in *Fleet-
street*. 1721.

A
COMPLEMENTUM

OF

ANATOMY.

CONTAINING

A Short but Correct VIEW



HUMAN BODIES.

Which are illustrated

The Modern Discoveries;
Together with a Variety of Curious Observations
never before made publick.

By William Cheselden, Esq;
Engraver, Printer of Anatomical, Surgical, and
Physick in the University of London, &c.


Adorn'd with Copper Plates.

LONDON:

Printed for Tho. Cornwall, at the Bible and
Dove in Fleet-street; near St. Dunstons Church;
and James Knapton, at the Royal Exchange in Fleet-
street. 1721.



THE
AUTHOR'S
PREFACE.

 *Ltho' there is a Variety of Anatomical Books, and no Scarcity of Compendiums of Anatomy; yet I am apt to think that it cannot be reasonably objected that I perform only what was done before, in publishing a second Edition of this Compendium. For since the Anatomical Art is such, that, like other Sciences, it daily admits of Amendments, makes new Advances by the Industry and indefatigable Labour of the Curious, and has particularly of late Years receiv'd very large Improvements; it is hence easily apparent to such as are acquainted with these Matters, that a vast Variety of Things which have of late Years been either discover'd and invented, or*

A 2 *amended*

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amended and corrected, cannot be found in the Abstracts and Systems of Anatomy at this time in common Use. The Knowledge of these is however of the last Importance to all who are conversant in Learning, but especially to those, who intend to employ their Minds in the Studies of Physick and Surgery.

But being entirely sensible that 'tis very troublesome for such to search out and make a Collection of the Fundamentals of Anatomy, and the Discoveries lately made from so great a Number of Books, and these too not often very concise, which Labour occasions no small Hindrance in their Pursuit of Learning, and often creates a Distaste in their Minds; I have endeavoured by this Epitome to relieve them from this Fatigue, and to render Art, which (according to the Aphorism of the divine HIPPOCRATES) is already sufficiently long and difficult, abundantly more short and easier to be obtain'd.

*The illustrious Boyle * advises, that a new System shou'd from time to time be publish'd, written according to the Judgment and Observations of the most celebrated Authors, whenever great Advances and large Improvements have been made in the Sciences. For,*

* Tentam. Physiologic. in Procem.

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says he, such a Work may then be of the greatest Advantage; partly for the Instruction of Youth in Schools and Academies, and partly that Men may have constantly before them an Index of those things which are already discover'd, that no farther Labour may be employed in the Search of what is known, and that the Advances which Men make in the Sciences may more evidently appear. *Yet he admonishes at the same time*, that no such Performance should be engag'd in, until the Sciences had gain'd some very considerable Improvements.

If we take a Review of the very latest Systems and Compendiums of our Times, we may easily find that a prodigious Number of Discoveries lately made, and a very great Collection of new Observations are to be met with in different Authors, which are entirely wanting in them.

Let us but consider the most useful Treatise of Anatomy which has hitherto been published, and which to this Day is constantly read in the Academies, namely, the celebrated VERHEYEN'S Anatomy of the Human Body; (for of the more imperfect Pieces I'll take no notice) and we may observe that it contains a great Number of Errors which the Moderns have corrected and amended, and that very many new Discoveries are not to

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be found in it ; among which I don't comprehend that vast Variety which were the Observations of the Authors who wrote after him, but of those which were publish'd, and in the Hands of the Learned, before the last Edition of his Book at Brussels 1710.

Let me, to prove this, of a great Number which might be produc'd, propose only a few Instances which are either entirely omitted, or erroneously describ'd in this Author, and most others who publish'd Anatomical Systems or Abridgments before him. This I do without the least View to detract any thing from the Character of this great Man, who, as all must allow, was an excellent Anatomist ; but to demonstrate that many important Observations were omitted or neglected by him, and therefore that a new Anatomical System or Index was necessary, lest it should be justly objected against me, that I have done only what was done before, and no way exceeded the Performance of Verheyen.

In the first place we may remark in general, that Verheyen was altogether unacquainted with the English Authors, and to mention one in particular, with the Works and Discoveries of that famous and accurate Anatomist Mr. William Cowper; which I think is evident, because he no where quotes nor mentions them. And altho' the Glands
+ which

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which he discover'd were made publick in a Latin Treatise printed in London 1702, and afterwards in the Leipſick Transactions, the French Ephemerides, the History of the Royal Academy of Sciences, Keil's Anatomy, Drake's Anthropologia, and in Horne's Microſm; yet he ſays in a Parentheſis, Cap. XXIV. where he treats of the Penis, What Glands theſe are I know not. Beſides theſe he has alſo omitted ſeveral new Muſcles, which Cowper deſcribes in his Myotomia Reformata, publiſh'd An. 1694, as the Rectus Minor Anticus, Rectus lateralis, and the Interſpinales Colli, as alſo his beautiful Figures of the Muſcles of the Eye and Tongue, with ſeveral other famous and curious Obſervations. Neither has he taken any thing from the Transactions of the Royal Society in England, the History of the Royal Academy of Sciences, the Ephemerides, the Pariſian Diary, the Leipſick Acts, nor from any other periodic Accounts of the Discoveries and Works of the Learned. He never read Gagliard the Italian, nor Havers upon the Bones and mucilaginous Glands; and omits the Obſervations of Bonclarc and Leal Lealis about the Teſtes: as alſo the tranſverſe Muſcles of the Urethra deſcrib'd by Bidloo, Cowper, Littrius, and others. He never ſaw DUVERNEY De Organo Auditûs, nor does he make any mention of Vallaſſa de Aure humanâ.

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I am surpriz'd that he has omitted the Corpus reticulare Malpighii in the Tongue, and makes no mention of Terreneus's Observations on the Glands, and Swammerdam's Observations and Figures of the Uterus. He takes no notice of Drake's fine Figures, of Ridley's Treatise of the Brain, of Glisson's and Bohnius's on the Liver, nor of the New Vessels of the Eyelids, discover'd by Meibomius. He is silent about the Discoveries of the Salival Duct of the Glandula Sublingualis. He says nothing of the little Hole which Ravinus discover'd in the Membrana Tympani, of Pacchionus's Observations on the Dura Mater, nor of the Vessels which Thebesius discover'd in the interior Surface of the Heart.

He gives no Account of BRIGGS on the Eye, nor of HOW on the Humours of the Eyes; in like manner he either omits, or slightly mentions the many surprizing Injections and Discoveries of Ruysch, and forgets to propose those of Pecrus of the Intestinal Glands, and what NOVESIUS wrote of the Seminal Vessels of Women, the Auditory Nerve, and other things no less curious than useful.

I will not mention the Observations and Discoveries which have been made since the
+ *last*

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last Edition of his Book, because he had no Opportunity of inserting them; but proceed to remark some few of those Defects and Errors which he might have easily avoided.

And first in his Division of the Trunk of the Body into three Parts, viz. the Head, Thorax and Abdomen, he omits the Neck, which cannot be referr'd to any of the three. Secondly, he says that the right Orifice of the Stomach is as high as the left, and figures it as such, which is contrary to common Observations, for it is lower: he omits the Valve of the Pylorus, and says 'tis only a fibrous Circle, and delineates the Pylorus in an Horizontal Situation which should be oblique.

He figures the Valve of the Colon round, whereas it is longitudinal. He gives bad Figures of the Muscles of the Oesophagus, and ascribes a double Coat to the Spleen, which tho' they be found in Calves, cannot be discovered in Humane Bodies; and its cellulous Substance which he maintains is refuted by Ruysch.

*He thinks it is impossible that the Bile shou'd flow into and from the Gall-bladder thro' one and the same Cystic Duct, whereas there is no Obstacle. He delineates the Cystic Duct strait, but it is contorted. He takes not any
notice*

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notice of the Sphincter of the Gall-bladder, or that the Structure of the Ureters is compos'd of a triple Membrane. He delineates the Renal Glands as situated between the Kidneys, Vena Cava, and Aorta, whereas they lie upon the upper and inner part of the Kidneys. The Use he ascribes to them is supported neither by Reason, Experiment, nor Analogy.

He says that the Prostatae are two globular Bodies, but they are only one. He asserts that the Cavernous Substance of the Urethra is as it were obliterated about the Glans; whereas 'tis more expanded here, and constitutes almost the whole Glans, and therefore he gives a bad Figure of the Glans, as if it was compos'd of two spongy Bodies. He numbers only two pair of Muscles of the Penis and Urethra, whereas there are three.

He says that the Coronary Arteries of the Heart arise under the semilunar Valves of the Aorta, but the contrary is the Truth. To explain the Motion of the Heart, he introduces a Ferment, but this is imaginary. He says that the Thyroide Gland adheres to each side of the Trachea, and that it may be properly divided into two, and so he figures it; but Morgagnius informs us, 'tis only one, in the Shape of the new Moon, with its Horns upwards, and not downwards, as
Verheyen

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Verheyen represents it. He asserts that the Number of the Rings of the Trachea to the Division into the Bronchia, is very frequently twenty two or more. But I in most Bodies cou'd find only sixteen or eighteen, but scarcely once twenty. Altho' he describes the Distribution of the Bronchial Artery in Ruysch's Words, yet he takes no notice that he was the Discoverer. Besides these there are a thousand other Errors and Omissions in this Author, which I forbear to mention here, lest the Preface should be swell'd to too great Bulk.

Since therefore there are so many Defects and Errors in this System of Verheyen, which has been so lately publish'd, I am willing to believe that no Person of Candour or Equity will condemn this my Labour, in which I have studied to correct those Errors, and supply his Defects from the latest Authors and my own Experience. And I am pretty well assur'd that in this I have performed an Office which will not be unuseful to young Students, since in this Compendium I have labour'd so to reduce the Anatomical Science, which otherwise is very prolix, into a proper Epitome, that it may be introduc'd into Academies by the Professors and Instructors of Anatomy, for the Use of all such as attend their Lectures and Demonstrations. For having premis'd a general Idea of Anatomy, and subjoin'd
a brief

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a brief Account of the Bones, which are the Foundation and Support of the other Parts of the Humane Body, I proceed to the soft Parts; where I first explain in short Tables the common Teguments of the Body, and afterwards expound in the same Method the Parts of the Abdomen, Thorax and Head, and at length the Arteries, Veins, Nerves, Muscles and Glands.

Altho' I have for the most part express'd my Thoughts in very few Words, yet I observ'd that they were sufficient for an Index and Rule of the several Particulars that are to be learn'd and demonstrated; for since the Book was compos'd chiefly for Colleges and Anatomical Demonstrations, such a Method was the most proper.

I began to write this Abstract in the first Years of my Anatomical Studies, but in very few Words, and only for my own Use, out of Verheyen's Anatomy it self, because at that time it was accounted the best; that, when I dissected and examin'd dead Bodies, I might briefly and immediately discern what Particulars should be enquir'd into in any part which I design'd to examine. And if afterwards in my Reading or Dissections I found any thing which was not in Verheyen and my Tables, or otherwise than it was describ'd by him, I took care to make Remarks upon it,
and

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and added it to my Tables ; and thus at length by the vast Number of Additions it became more bulky than it was at first, and assum'd a quite different Form.

This Index afterwards, when I began to teach Anatomy, was yet more useful to me ; for as often as I engag'd in Dissection and Demonstration, I immediately had recourse to the Table of the Part to be demonstrated ; and thus committing to my Memory the Particulars that were to be search'd out and demonstrated, I found and exhibited them with greater Ease.

At length, because this Method had been of very great Advantage to me in obtaining an accurate Knowledge of Anatomy, I was unwilling to conceal it from my Auditors, and therefore allow'd them to take Transcripts of it that they might not be forc'd to make laborious Searches in Verheyen or other Authors.

Lastly, To free them from this Trouble also, especially because they often committed many Errors in transcribing, I determin'd, at their Request, to commit the whole Compendium to the Press, which I first did An. 1717. But since this Essay found no ill Reception from the Learned, and the first Edition has been entirely taken off, at the Request of my Bookseller

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seller I have prepared this second Edition, abundantly more compleat and correct than the former; for besides a vast Number of Additions inserted in the Body of the Book, I have also added some new Figures taken chiefly from my own Observations.

Wherefore I doubt not but this Epitome will now be of greater Advantage than before, since I have not only digested it in a better Order, and with greater Perspicuity, but have also compar'd and examin'd all the new Authors which I cou'd procure, and transferr'd into it whatever I found in them worthy of Observation; which any one may easily know cou'd not be done in so great a Number without great Expence of Labour and Time; especially since I have described very few Particulars as true, which I have not examined in Humane Bodies, and found to be really such. In a word, I have all along quoted the Authors from whom I have taken the different Observations, that they who desire a larger Account may have recourse to them; and added to this Edition the Adenology, and some Notes upon the controverted and more obscure Places: And lastly, a compleat Index, that the Compendium of the whole Body of Anatomy might be more perfect, and consequently of greater Use.

*Lastly, It will not be improper if I add
here,*

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here, that in the last Man's Body which I dissected, I at length found the Muscle of the Uvula, which (by Morgagnius, who first discover'd it) is call'd Azygos, situated at the Back of the Body of the Uvula, very thin and round. Afterwards I also found in the Penis, besides its ligamentum suspensorium, two lateral Ligaments, almost like the suspensorium, which arose distinct on each side from the ossa pubis, just above the Rise of the Musculi erectores, and were inserted into the Sides of the cavernous Bodies, above the Insertion of these Muscles.

After my former Edition had been work'd off, I at last obtain'd Mangetus's Theatrum Anatomicum, which since that time I have also perus'd. I hop'd indeed, because this was a very modern Piece, that I should find several new and curious Observations, of which I had not made any mention in my Performance. But my Hopes deceiv'd me, for I found not any thing valuable in him, of which I was ignorant before; but on the contrary, knew and wrote many things which were not observ'd by him, and avoided a considerable Number of Errors which he unhappily committed.

*In the Preface to my former Edition I made some transient Remarks upon this Work of Mangetus, and promis'd to take it into farther Consideration upon another Occasion: But I
find*

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find that I am prevented by Morgagnius, who has consider'd and corrected the Errors in his first Volume, many of which were very gross, and promises to examine the rest in what he proposes to publish shortly. To this great and accurate Anatomist I therefore willingly commit this Province, and wish him a prosperous State of Health, that he may finish those Animadversions, which he has not as yet perfected, for the Improvement of Anatomy and the publick Good; for so this Science (I am persuaded) will be freed from the many Errors, that occur, as well in this Author, as in Verheyen and others.



A COM.



COMPENDIUM ANATOMICUM :

OR, A


COMPEND

OF

ANATOMY.



Of ANATOMY in General.

1.  ANATOMY is that Art which gives ^{*The Definition.*} us a Demonstration of the Situation, Structure, Action, and Use of all the different Parts of the Human Frame.

2. The Primary, or Principal Object of ^{*The Object.*} this Science is a Human Body: but the *Carcasses* of other Animals must be admitted as the Secondary, or Subordinate, that by the
B Inspection

Of ANATOMY in general.

Inspection and careful Examination of these, we may arrive at a more perfect Knowledge of the former ; and that these may be substituted to supply the Deficiency in case we cannot readily procure the other. When the Bodies of Beasts are the Object of this Art, 'tis then call'd Zootomy or *Comparative Anatomy*^a.

The Subject. 3. The Subject of this Science is a Man duly furnished with all Abilities necessary to qualify him artfully to dissect, and clearly to demonstrate to the Spectators or Students the several Parts of this wonderful Machine, that hence they may attain to a due Knowledge of the Position, Connexion, Structure, Action and use of these Parts ; and the Person thus qualified is call'd an *Anatomist*.

The Means. 4. The *Dissection* or *Incision of dead Bodies*, *Microscopes*, *Injections*, and other Instruments, of which we will particularly discourse in their proper place, are the *chief Means*, by which the Anatomist accomplishes these ; but the *Means by which Students may obtain an Habit in this Art*, are 1. diligent Observation, when the Operators are employed in Dissection. 2. Imitation, as well in the Bodies of Beasts, as in those of Men ; and thirdly the reading of valuable Authors.

Anatomical Author. 5. That those who design to make Advances in this Science may not be at a Loss in

^a About this consult M. A. Severini Zootomia Democritæ, Blasius's Anatom. Animal. Collin's Anatom. Dissect. Anatom. varior. Animalium Parisiis olim institutæ.

a proper Choice of such, it may be of some use to recommend a few of the best to their Perusal. The most considerable Authors in respect of Anatomy among the Antients are, *Galen, Vesalius, Eustachius, Ingrassias, Columbus, Fallopius, Coiterus, Fabricius, ab Aquapendente, Bainhus, Riolanus the Son, Spigelius, Casserius, Laurentius, Asellius, Laurembergius, and Casper Hoffman.*

6. These among the Moderns have generally the greatest Character, *viz. Harvey, Veslingius, Wharton, Glisson, Pecquet, Willis, Lower, Steno, Malpighi, Bellini, Graafe, Swammerdam, Schneider, Horne, Rolfincius, Peyerus, Bartholine, Lyserus, Drelincurt, Nuck and Havers.* Modern Authors.

7. Besides these now mentioned, there is a considerable Number who have of late oblig'd the World with their Discoveries, and therefore must not be omitted in this List; of this Rank are the following, *viz. Ruysch, Bidloo, Du Verney, Bohnius, Brunnerus, Ortlorius, Vieussien, Schelhammer, Jo. Mauric. Hoffman, Dionis, Cowper, Ridley, How, Morgagnius, Valsalva, Fanton, Pachionus, Bianchus, Keil, Drake, and Cheselden:* To which Number may be added the Anatomists, whom for Brevity we have here omitted, whose Writings are contained in *Mangetus's Bibliotheca & Threstrum Anatomicum*; as also the Anatomical Observations; which from time to time are publish'd in the *French, English,* The latest Authors.

glish, Italian and German Transactions. If any is desirous of having a larger Catalogue of Anatomical Writers, let him consult *Gælickius's History of Anatomy*, and *Dr. Douglas's Specimen Bibliographiæ Anatomicae*.

The Ends.

8. Various are the *Ends* of Anatomy; however, to know and admire the wonderful Works of the supreme Being in the artful Contrivance of the Humane Body, must be accounted the *Principal* or *Chief*: since the Contemplation of this surprizing Machine in the admirable Figure, Connexion, Communication, Action, and Use of all its different Parts, not only undeniably demonstrate, in Opposition to Atheism, the Existence of God, and his immense and stupendous Wisdom; but also irresistably invite the amaz'd Observator to a profound Reverence and Worship of him: Let therefore this be establish'd as a certain Truth, that the chief or principal End of Anatomy is the Glory of God. And in this Sense it is, that Anatomy may be termed Philosophical, Physical, or even Theological, being of admirable Use to all such as employ themselves in the Study of Wisdom and Theology.

Secondary Ends.

9. The *Secondary Ends* of this Science are many, of which we may venture to propose *Health* as the first, tho' by others it has been accounted the *Principal*; for by an exact Knowledge of the humane System, Diseases may be more readily prevented, and receive a quicker

quicker and more happy Cure: From this End Anatomy is call'd Medicinal.

10. Again it often happens, that dead Bo- *The Second,*
dies are to be opened by the Command of the Magistrate, in order to search out the Causes of a violent or suspected Death, that a true Relation of the Inspection, and a proper Judgment may be given; as for Instance, whether the Person was depriv'd of Life by any external Violence inflicted, Poyson received, or any other destructive Means, or whether he died by the Malignity of an internal Cause; none of which can be rightly discovered without an accurate Knowledge of this Art. When Anatomy is thus employed, 'tis *Civil* or *Juridical*, than which nothing can be of greater Importance to Lawyers, who by the Assistance of this, will be capable to determine with greater Sagacity, in the Cases of Impotency; Barrenness, the Causes of a Divorce, the Vitality of the Foetus, and a Crowd of other Circumstances falling under the Cognisance of the Law.

11. Thirdly, We call Anatomy *Practical*, *The Third.*
when we proceed to investigate the Causes of Death and Diseases by dissecting the Bodies of such as have died by the Violence of them. That this is very advantageous in the Practice of Physick, is abundantly evident, since many hidden Causes of Diseases have been and are daily detected by it, which otherwise would forever have been concealed from us, but now

by the Means of this Discovery admit of a more easy and speedy Cure; Instances of which may be observ'd in Cases of the *Stone*, *Empyema*, *Ascites*, *Ruptures*, *Cataracts*, *Glaucoma*, *Trepanning*, and many others.

*The Dis-
tinction.*

12. Hence on account of these various Ends, Anatomy may be justly denominated *Philosophical*, *Physical*, and *Theological*; *Civil*, *Medico-legal*, or *Juridical*; and *Medicinal*. But besides these different Appellations, this Art is distinguished into *Speculative* or *Theoretical* and *Practical Anatomy*. It receives the former Denomination, when any by the Inspection of dead Bodies, while others are dissecting them, and by the frequent reading of Anatomical Authors, improve themselves so far in the Knowledge of the Humane Fabrick, as is necessary for their several purposes. Those, who thus make Advances in this Science, are characteris'd by the Name of *Theoretical Anatomists*, in which Sense many are said to understand this Art, who were never exercis'd in the Dissection of Bodies. The latter part of the Distinction is made use of, when any employ themselves in cutting up, in separating, preparing, and in examining the various Parts after an artful Manner. The Operators who are thus engaged in making Discoveries are properly call'd *Practical Anatomists*.

The Use.

13. From these several Observations, it may be reasonably inferr'd as incontestably evident,

vident, that the Usefulness of Anatomy is very considerable ; and that 'tis not confin'd only within the narrow Bounds of Medicine , but that a competent Knowledge of it is also of the greatest Consequence for those who prosecute the Studies of Divinity, Law, or Philosophy. But above all, 'tis undeniably certain , that neither Physicians nor Surgeons should, upon any Pretence, neglect the Attainment of the Art, unless by their ignorant and unskilful Practice in the Exercise of those Arts, which they desire to profess, they contribute more to the Detriment of Mankind , than they can possibly benefit it by their wild and inconsistent Guesses. For, notwithstanding the silly and idle Remonstrances of Quacks and Empiricks to the contrary, it must be allowed, that an intimate Acquaintance with this Art is as absolutely necessary for a rational Practitioner in Physick or Surgery, as the Compass or Magnetic Needle for the judicious Pilot.

Of Anatomical Instruments.

14. Since, as we have already hinted, (§. 4.) ^{Necessity of} we ought not to be without Instruments , if ^{Instruments.} we design to employ ourselves in the Anatomical Art , because without these Dissection, Separation, Examination and Demonstration of the Parts cannot be perform'd ; 'tis therefore incumbent upon the Operator to furnish him-

self with such as are proper and necessary. Many of these the Professors of Anatomy have been diligent in inventing, but those few that follow seem to be sufficient for our purpose.

Instru-
ments.

15. And these are a *Board*, or *Anatomical Table*, on which the dead Body is to be stretch'd out, a *Plank* or *Board* fitted for the Dissection of living Animals, *Ropes* for tying them down, *Knives*, or *Pen-knives* single edg'd only, and somewhat strait, (for the double-edg'd and crooked with a superfluous Croud of others are less useful than the others now mentioned) *Scissars*, a *Forceps*, *little Hooks*, and *Styles* of different thickness; *Bristles* are also requisite for exploring the Ducts of some Parts. To these we must add *strait* and *crooked Needles* with strong Thread for various Uses, as also large and strong *Pins*. In like manner a *Saw*, *Scraper*, *Wedges*, a *Mallet* or *Hammer*, and an *Elevator* for opening the Skull, *Tubes* of different Sizes for inflating the Vessels, Ducts, Bladder, Stomach, Intestines and Lungs, which last four however are more commodiously distended with proper Bellows.

16. Next to these we must mention *Microscopes* which are us'd with considerable Advantage in the curious Examination of the minuter Parts, *great Syphons* or *Funnels*, two of which at least are necessary, *Tubes* of different Magnitude and Diameter, one of which may serve for injecting Wax, and the second
other

other Liquors; an Iron one is also necessary, for the Immission of Mercury into the Vessels, a *Sponge* for absorbing the Humours, and cleansing the Filth, a *Hone* and one *Strop* for sharpening the Knives; *Terebræ* or *Piercers* of various Sizes, or other Instruments for perforating the Bones, *Brass-wire*, and such other Materials as are necessary for making up the Skeleton; and in the last place, *Air-Pumps* will contribute both to Satisfaction and Improvement for swelling the Vessels and other Uses. In a Word, the Operator should not be without an *Apron* and *Sleeves* to keep his Cloaths clean while dissecting, as also *Pots*, *Plates*, and other *Utenfils*, according as his Fancy, or Curiosity, or particular Conveniency may require.

*Of the External Parts and Division
of the Humane Body.*

17. These being thus described, before we proceed to examine particularly the Parts themselves, it will be convenient to say something, first, of the *Appellations of the External Parts* of the Humane Body: In Prosecution of which we will not insist upon those that are most common, and generally known by all, nor these which demand a particular Demonstration and Explication in the accurate Examination of the Parts, as the Eye, Nose, Ear, &c. but the more difficult only, and those

The Appellations.

those which do not so universally occur to the Apprehensions of the Generality ; of the rest in their due place.

The Division of the Body.

18. The *Humane Body* is divided into the *Trunk* and *Limbs*, or *Extremities*. The *Trunk* consists of the *Head*, *Neck*, *Thorax* and *Abdomen*; the *Limbs* are either superior or inferior; the former are the Arms and Hands, the latter the Thighs, Legs, and Feet.

19. In the *Head* we must remark, first, the *hairy Scalp*, and the Part not cover'd with Hair, call'd the *Face*, the *Sinciput* or Fore-head, the *Occiput* or Hind-head, the *Temples*, the *Crown*, the *Cheeks*, and their inside call'd *Bucca*, and the *Philtrum* or Dimple in the upper Lip; the rest are known to all. In the *Neck* are the *Throat*, the *Pomum Adami*, or Protuberance in the wind Pipe, and the *Cervix* or hind part of the Neck. In the *Thorax* are the Pit of the Stomach call'd *Scrobiculus cordis*, and the *Præcordia* or Contents of this Cavity. In the *Abdomen* are the *Epigastric Region* or Part of the *Abdomen*, above the Navel the *Hypochondriac* or parts under the Ribs, the *Umbilical* or middle part of the *Abdomen*, the *Hypogastric* or parts below the Umbilical, the *Loins*, the *Pubes*, the *Groins*, the *Ischiatic Region*, or Hips, and the *Perinæum*, or that part which is between the *Scrotum* and *Anus*.

20. In the upper Limbs, the *Shoulders*, the *Arm-pits*, the *Alæ*, the *Cubitus* or Fore-arm, the *Carpus* or Wrist, the *Metacarpus*, or that part which is between the Wrist and Fingers, the outside of which is call'd the *back of the Hand*, the *hollow of the Hand* call'd *Vola*, and the *Palma* or Palm of the Hand. In the inferior Limbs are the *Thigh*, the *Leg*, the *Shin*, the *Ankles*, the *Tarsus* or Instep, the *Metatarsus*, or part between the Instep and Toes, the Sole of the Feet call'd *Planta*, and the *Toes*.

Of the Similar or Simple Parts.

21. We might now proceed in Order to ^{The Me-} the *common Teguments* of the Body, and ^{thod.} from thence to the interior Parts; but since those who are unacquainted with this Art, understand the compounded Part with greater Ease, if they have a previous Idea of those that are more simple, the Rules of good Method direct us to begin with the Explication of these.

22. All the Parts of our Body are either *Solid* or containing, or *Fluid* or contained; the Solid are wont to be divided into *similar* or more simple, and *dissimilar* or compounded, or organical Parts. If we express'd our selves according to the Propriety of Speech, none but the Fibres could be accounted such, of which all the other Parts
are

are compos'd with a surprising Artifice; however in an extensive but allowable Sense, the Anatomists refer to this Rank the following Parts being to outward Appearance similar, that is, more simple than the others which are organical, as the Finger, Hand, Heart, Lungs, &c. since they, tho' not all of them, in every Case concur to the Composition of these. And these are the Arteries, Veins, Nerves, Membranes, Lymphatick Vessels, Lacteal Vessels, Excretory Ducts, Bones, Cartilages, Hair, Nails, and Glands. They refer the rest of the solid Parts to the *Dissimilar* or *Organical* one; these they again divide into the more or less *Principal*, as they obtain a greater or less Use or Necessity for the Existence and Support of Life.

A Fibre.

23. A *Fibre* is the most simple Part, small, fine as a Hair, and destin'd for the Composition of all the other Parts; and for this End it is, that some Fibres are hard, as the bony, the rest in the other Parts are more soft and flexible.

Arteries.

24. The *Arteries* are elastic Vessels, which convey the Blood with Pulsation from the Heart to all the other Parts. But the Veins receive and carry back the Blood to the Heart from all the Parts.

Nerves.

25. The *Nerves* are whitish round Vessels extended from the Brain and spinal Marrow, to all the Parts of the Body, for the performing of Sense and Motion.

26. The

26. The *Membranes* are Parts resembling *Membrane* expanded Linen, consisting of various Fibres interwoven like a Web, and serviceable for covering and wrapping up the Parts, and several other Uses. Coats are of the same Nature with the Membranes. The Ligaments also are scarcely distinguishable from them, but by their Use, and they receive this Name chiefly where the Parts, particularly the Bones, are to be firmly join'd.

27. The *Muscles* are those red Parts, which *Muscle* we distinguish by the Name of Flesh, that constitute the Instruments of Motion. The Tendons are those whitish Parts that form the Extremities of the Muscles, being only a Continuation of their Fibres, but more compact and closely united.

28. The *Fat* is an oily thick Substance *Fat* secreted and collected in small membranous Cells, and design'd by Nature for various Uses: From which the Marrow of the Bones is scarcely different, unless it be by the Fineness of their constituent Parts.

29. The *Lymphatic Vessels* are small pellucid Canals, that carry back from the Parts *Lymphatic Vessels* a thin and commonly a watery Fluid to the Heart. The lacteal Vessels are Channels resembling the former, which receive from the Intestines, and convey to a peculiar Duct the Chyle, which is a Fluid of a milky Colour, produc'd by Digestion of the Aliments in the Stomach and Intestines.

30. The

*Excretory
Duct.*

30. The *Excretory Ducts* are Vessels receiving Liquid secreted in certain Glands, or other *Viscera*, and discharging it into proper Places.

Bones.

31. The *Bones* are the white, brittle, and hardest Parts of the Body, fram'd for the Support and Defence of the soft Parts. Those Parts we call *Cartilages*, which being somewhat analogous to the Bones are flexible, slippery and elastic, and therefore serviceable for many Uses, but containing nothing of a marrowy Substance.

Nails.

32. The *Nails* in some Measure resemble the Substance of the *Cartilages*, and appear like so many horny Plates plac'd upon the Extremities of the Fingers and Toes. The Hairs are small Filaments or Threads sprouting out of the Skin in various Parts of the Body; especially the Head, where they are of a considerable Length.

Glands.

33. The *Glands* are Parts of a peculiar make, ^b (or as the Antients said a particular kind of Flesh) being compos'd of a Collection of very small Arteries, Veins, Nerves, and for the most part an Excretory Duct surrounded with proper Membranes of various Figure, Colour, and Consistence, fram'd for various Uses, but most commonly for the Secretion of some Liquid. Of all these similar Parts,

^b Vid. de hac re 19 Dissert. sub præsidio nostro habita, de vera Glandulæ Appellatione.

we design to discourse more fully in their proper Place.

34. The *Fluids* or Parts contained are the *Fluids*.
Chyle, Milk, Blood, Serum, Lymph, Spirit, Spittle, Bile, the Liquor of the Pancreas, Stomach, Intestines, OEsophagus, Brain, Eyes, Thorax, Pericardium, Abdomen, Vaginal Coat of the Testicles, with the Liquor of the Prostratae, the Mucus of the Nose, Tonsils, Joynts, Urethra, and Vagina of the Womb, the Ear, Wax, Urine, and Sweat.

35. The Anatomical Science is usually divided into *Osteology*, which explains the Nature of the harder parts, and *Sacrology* which accounts for that of the softer parts. We design to discourse first of the former, because they yield a Support or kind of Basis to the latter, which therefore are better and more easily understood after a due Explication of them.



O F
OSTEOLOGY:
AND FIRST,
Of the BONES in general.

36. **W**Hoever are studious of gaining a perfect Understanding of the Anatomy of a Humane Body, should first of all apply their Minds to procure an exact Knowledge of the Doctrine of the Bones.

The Object. 37. The *Object of Osteology* are the Bones (§. 31.) of Adults and Infants fresh and dry'd, to which the *Periosteum, Marrow, Ligaments,* and *Cartilages* also belong.

38. The Compages or artificial Conjunction of the Bones, imitating the natural Articulation of them is call'd a *Skeleton*.

39. The Bones are considered *Theoretically* or *Practically* ; the Theoretical or Speculative Consideration of them, is, when we only examine their external Confirmation and Use. The Practical is employed, 1. when we break them, that we may obtain an Opportunity of viewing their interior Parts ; 2. when we cut the Ligaments about the Junctures in dead Bodies, in order to know the Structure of the Joints ; and 3. when they are prepared
for

for Conservation and making up of a Skeleton.

40. The *Substance* of the Bones may fall under either a Chymical Analysis, or Anatomical Examination; the latter is better perform'd in the Bones of Embryo's and Infants, but the former in those of Adults.

41. If they be subjected to a Chymical Dissolution in a Retort, different Degrees of Fire being made use of, *Water*, *Salt*, *Spirit*, and *Oyl* are drawn off, Earth, or the *Caput mortuum* remaining in the Retort: Again, if we make an Analysis of the Spirit, it may be resolved into *Water*, *Salt*, and *Oyl*; hence it may evidently appear, that they consist of four Principles, which are very intimately united to compose so hard a Substance.

42. If they be examined with the Anatomical Knife, we find, that in the Beginning of Generation, they at first have the Appearance of *Membranes*^a, which are composed of various Fibres, and very minute or fine Vessels, from which they receive their Increase and Nourishment. These Fibres and Membranes by Degrees become Cartilaginous, and compose small Laminæ or Plates; within a while various

^a Vid. *Harvæus* de Generat. Animal. Exercit. LVI. *Kerkring.* Osteogen. foetus. *Ruyfch.* Thesaur. Anat. VI. Tab. I. II. III.

new Lays or Planes^a of Fibres and small Laminæ are laid over the former, which at length receiving a harder Consistence, and by the Concurrence of small Fibres like Tendrils^b being more closely compacted, constitute the Substance of the Bones, in which the Number of the Laminæ is greater or less according to the Thickness of the Bones^c.

The Difference.

43. The Bones *differ* in Bulk, Quality, Cavities, Figure, and Use, as will appear, when we enter upon a more particular Examination of them; but before we proceed to this, it will be necessary to premise some few generals relating to them.

Of Bones in general.

44. In every Bone the following things occur worthy of our Observation; namely, 1. The Bone it self. 2. The Cavities discernable in it. 3. The Articulation. And 4. The Use.

45. In the Bone it self we take Notice of three things, viz. 1. The Body of the Bone, which by Galen is call'd *Diaphysis*^d. 2. The *Apophyses*; and 3. the *Epiphyses*.

46. The *Diaphysis*, or Body of the Bone, is the principal and greatest part of the Bone, which first begins to harden in Children, and is the Foundation of the rest.

^a Malpigh. Anat. Plant. ^b Galiard. Anat. Part. I. Cap. I. Observ. II. ^c Harvers Osteologia. ^d Administr. Anatom. V.

47. The *Apophysis* is a Protuberance of *Apophysis*. the Bone, or an Excrescence arising from the Body of the Bone (46), of which it is a Continuation, as the Branch is a Continuation of the Tree.

48. This has various synonymous Names; for a Process, a Prominence, Eminence, Tubercle, Tuberosity, &c. are only different Terms, expressing one and the same thing, in the Writings of Anatomists.

49. According to its different Situation, Use and Figure, it receives different Titles, or Surnames; hence it is, that we make Use of the following Terms to distinguish the different Processes, viz. Coracoides, Mamillaris, or Mastoides, Glenoides, Coronoides, Styloides, Condylroides, Pterygoides, Odontoides or Dentiformis, Anchoroides; as also Condylus, Corone, Trochanter, &c. all of which shall be singly explained in the Demonstration of the particular Bones.

50. The general Use of the *Apophysis* is
1. for the greater Conveniency of Articulation, whether it be with or without Motion:
2. To afford a more commodious Origination and Insertion to the Muscles; and 3. to defend other Parts. But their particular Use shall be discovered, when each Bone is separately examined.

51. The *Epiphysis* (45) is a small Bone *Epiphysis*. set upon the Extremity of a greater or principal Bone (46) a Cartilage being interpos'd,

Of OSTEOLOGY in general.

by means of which 'tis only contiguous to the greater in those who are young; and hence 'tis called the *Appendix* of a Bone.

§ 2. The chief Things to be observed in the *Epiphyses* are those that follow: *viz.*

1. In Infants they all are cartilaginous; but as they advance in Years, they become hard and bony, nevertheless they remain always spongy. 2. Most of them in Adults degenerate into *Apophyses*. 3. They do not grow together by a plain Superficies, but by a mutual Ingress with the Body of the Bone. 4. Their Conjunction and Nature appear more perspicuous in the Bones of the Young, than in those of the Adult. And 5. About this Coalition the Body of the Bone is spongy and tender.

The Use.

§ 3. The Use of the *Epiphyses* (§ 1) in Adults and Infants is very different.

§ 4. In Adults they seem to be 1. a Covering for the ends of the Bones, which at this time are full of Marrow, lest there should be an Efflux or Waste of so useful a Substance. 2. By their Largeness they are serviceable to the Joynts which have Motion, in that they render it more sure or firm. 3. By their little Cells, they contribute to the Lightness of the Bones. 4. By their Prominencies about the Tendons, they encrease the Force of the Muscles. 5. They afford a larger Space of Insertion to the Extremities of the Muscles. 6. They impart a firm

a firm Cohesion to the Ligaments, which serve Articulation, and allow an easy Entrance to the Blood Vessels.

55. Their *Use* in *Infants* is, 1. That they, by the Softness of the *Epiphyses*, may be more easily folded up in the Womb, and be contained in a narrower Compass. 2. That the Bones, as long as the Person encreases in Bulk or Stature, may be more commodiously lengthened and extended to a due Magnitude. And 3. that in Children, they may prevent too frequent Fractures, which otherwise would unavoidably happen by their repeated Falls.

56. Some *Cavities* (44) are form'd for ^{The Cavi-} Articulation, and some for other Causes.^{ties.} The former are call'd either *Cotyle*, or *Glene*, being of different Degrees of Depth in fresh and dry'd Bones; because that in these the Cartilages are taken away, by means of which the Articulation is more firm. They contain a Mucilaginous Humour, secreted by peculiar Glands, call'd *Mucilaginosæ*^a, and the Ligaments of the Joynts, which lubricates the Bones, to render Motion more easy.

57. The *Cavities not subservient to Articulation*, are either Internal or External. The former, if they be large, contain Marrow; but if small, a red marrowy Juice,

^a Vid. *Havers* loco citat.

and are distinguished by the Name of small Cells or Caverns of the Bones.

58. The *External*, according to the Diversity of their Figure, receive different Appellations, some being termed *Foramen* or Hole, *Fossa* or Trench, *Sulcus* or Furrow, Canal, Duct, Sinus, Incisure, &c.

59. The *Joining*, or *Articulation of the Bones* (44), about which most Authors treat, before they proceed to the particular Explication of the *Skeleton*, or Bones, can scarcely be perceiv'd by young Students, unless they be first instructed in the particular Osteology of the Bones; therefore we will discourse of them in the close of this Part; and now enter upon the *Explication of the Skeleton* (38).

Of a Skeleton.

The Division.

60. A *Skeleton* is divided into the Head, Trunk, and Extremities or Limbs.

61. The *Head* is that Part of the *Skeleton*, which is fix'd upon the uppermost or first Vertebra of the Neck; and is divided into the *Skull* and *Jaw-Bones*.

Of the Skull.

62. The *Skull* is that Part of the Head, that forms that great bony Cavity which contains the Brains; and therefore all the Bones that unite, to make up this Cavity, are by us call'd Bones of the *Skull*.

63. In

63. In it we remark in general the oval Figure, the exterior Convex, and the interior Concave, Superficies; the Magnitude, unequal Thickness; the Substance, consisting of a double Table, interior and exterior, with the Interposition of the *Diploe*, or *Meditullium*; its Composition of different Bones; the Connexion by Sutures; and the Use.

64. The *Bones* of this Part (62) are Eight; namely, the *Os frontis*, the two *Ossa parietalia*, the two *Ossa temporum*, the *Os occipitale*, the *Sphenoides*, and the *Ethmoides* ^a.

65. The *Os frontis*, which is also call'd ^{The Os frontis.} *Os coronale*, is the first Bone of the Skull, which for the most part is single in Adults, but sometime divided into two to the Nose. In this we observe its Situation, Figure, and Connexion, its State during the Age of Infancy, and its internal Superficies, in which the Fovea or Dimple, and the Spine or Ridge, to which the *Sinus longitudinalis* of the *Dura Mater* adheres, are deserving of our Observation. In the external Superficies we are to remark the Place where the Frontal and Temporal Muscles, as also the Cartilaginous Ring of the *Musculus*

Some Authors ascribe several other Names to the Bones of the Skull, besides these which we have now mention'd; but because they seldom occur in Practical Writers, and are often the Cause of Obscurity, or confound the Reader, we thought fit to omit them here, retaining only such as are most in Use.

Trochlearis of the Eye are fix'd; the seven Apophyses; six of which concur to form the Orbits; but the seventh serves for the Support of the Bones of the Nose: And lastly, the Frontal Sinus's with their Use ^a.

The *Ossa*
Parietalia.

66. The *Ossa Parietalia*, call'd also *Ossa Bregmatis*, or *Ossa Sincipitis*, make up the second and third Bones of the Skull; in which we take notice of the Situation, Figure, Magnitude, Connexion, and Thickness; the External Superficies, in which is the Situation of a Part of the Temporal, or Crotaphite Muscle; the Internal, in which are Furrows, bearing the Resemblance of Branches, which are impress'd by the Pulse of the Arteries, and Dimples; lastly the Place, *Bregma*, call'd in Infants *Fontanella*, or *Fons Pulsatilis*.

The *Ossa*
Temporum.

67. The *Ossa Temporum*, call'd also *Ossa Squamosa* and *Petrosa*, are the fourth and fifth Bones: In these we consider their Situation, very irregular Figure, Connexion, scaly and stony Substance; the four *Apophyses*, namely, the *Processus Jugalis*, or *Zygomaticus*, the *Mamillary* or *Mastoideus*, the *Styloideus*, and the *Petrosus*; the Place where the lower Jaw is articulated, the *Meatus Auditorius*; the Place where the Ligament of the Ear is inserted nigh the Apo-

^a We will treat of the Holes of this, as also of the rest of the Bones of the Skull, together with their Uses, conjointly below.

physis Mastoidea ; the *Fossa Sigmoidæ*, where the lateral Sinus's of the Dura Mater are situated ; the *Incisure* under the *Processus Mastoideus*, where the *Musculus biventer*, or two belly'd Muscle takes it Rise ; the Dimple or Hollow, in which the Sinus of the Jugular Vein lies ; the Sinus's in the *Processus Mastoideus* opening into the Cavity of the Tympanum or Drum of the Ear.

68. In the *Temporal* or *Temple Bone*, we must observe the Cavity of the Tympanum, and in it the little Bones of the Ear, which are commonly four, with the same Number of remarkable Holes. The first of the little Bones is call'd *Malleus* or Hammer, in this the Head, Neck, and Handle which is fastened to the Membrane of the Tympanum, are to be noticed ; as also the two Apophyses, the longer of which call'd *Raviana*^a serves for the Insertion of the external Muscle of the Malleus. The second is call'd *Incus* or Anvil, in which the following Particulars occur worthy of our Observation ; namely, the Body, the two Cavities, by which the Articulation with the Malleus is made, and the two Legs ; to the longer of which the third little Bone called *Stapes* or Stirrop is join'd. In this we must care-

*The Bones
of the Ear.*

^a *Boerhaave Instit. Med. cap. de Auditu. Hujus figuram, quia nusquam reperitur, Tab. I. fig. 1. lit. d. exhibemus.*

fully review the Head, which is united to the longer Leg of the Incus; the *Basis* which stands upon the *Foramen ovale*, or oval Hole of the Labyrinth, and the two lateral Parts, having their internal Superficies furrowed. That which many take for the fourth Bone of the Ear, that is plac'd between the Incus and Stapes, and call'd *Os orbiculare* or round Bone, is not a separate or distinct Bone; but an Epiphysis of the longer Leg of the Incus. The first of the Holes, upon which the Basis of the Stapes stands, is call'd *Fenestra ovalis*, and that which is next to it, *Fenestra rotunda*; the latter leads to the *Cochlea*, the former to the *Vestibulum*. The third Hole is the Orifice of a Canal that terminates in the Mouth, and is call'd *Ductus*, or *Tuba Eustachii*, thro' which some can emit the Smoak of Tobacco thro' the Ears; and by the means of this, they, who are dull of Hearing, perceive Sounds better, when the Mouth is open. The fourth terminates in the little Cells of the *Processus Mastoideus*. All these contribute their Service for the Perception of Sounds.

The Labyrinth.

69. The inner part of the Ear, because of its various wonderful Pipes, is call'd the LABYRINTH; in which we are to remark the Cavity forming the Middle of the *Labyrinth*, distinguish'd by the Name *Vestibulum*; in one Part of which, three semicircular

lar Canals occur to our View, namely, the greatest, middle and least, opening by five Orifices into the Vestibulum; in the other is the *Cochlea*, or Cavity resembling a Snail's Shell, which makes up two spiral Lines and an half; in this is the *Nucleus*, or Kernel, and a Canal divided into two by a spiral Lamina; the upper of which call'd *Scala Vestibuli* opens into the Vestibulum, the lower by a round Hole into the Cavity of the Tympanum, and by *Val-salva* 'tis named *Scala Tympani*: Lastly, the Auditory Nerves. The first of these is common and larger, in which are little Holes into the Labyrinth; the second is proper, narrower and longer, terminating partly by a small Hole into the Cavity of the Skull, and partly into *Fallopian's* Aquæduct. *Val-salva* l. c. Tab. VII. fig. 4.

70. The *Os occipitale* is the sixth Bone ^{Os Occipitis.} of the Skull; in which we consider, the Situation and irregular Figure, its State in Infants, in whom it consists of four Pieces, its Connexion and remarkable Thickness; its three Apophyses, two of which call'd Condylroides are for Articulation with the uppermost Vertebra of the Neck, and the third is extended to the *Sella equina*, or Horse's Saddle. This third is sometimes wanting, and instead of it there is only a Prominence of the Bone. In its internal Superficies, we take Notice of its Cross-like Figure,

Figure, to which the Sinus's, or Channels, and Processes of the *Dura Mater* adhere: And within this are also to be remarked the four Cavities, in which the posterior Lobes of the Brain and the *Cerebellum* lye. In the External Superficies, besides the great Hole, thro' which the Medulla Spinalis has its Egreſs, we may also observe its various Eminencies and Dimples, in which various Muscles of the Head are inserted.

Os Sphenoides.

71. The seventh Bone of the Skull is call'd *Os Sphenoides*, *Cuneiforme*, and *Basillare*, because, like a Wedge, 'tis fix'd in the Rest, and as a Basis or Foundation supports them all, as also some of the upper Jaw. Its Figure is very irregular, in its upper Part it exposes to View the *Sella equina*, or *Turcica*, in which lyes the Sinus call'd *Sphenoides*, which sometimes is double, and opens into the Nostrils. It has thirteen Apophyses, six internal, nigh the *Sella Turcica*, call'd *Glenoideæ*; and seven external, of which the *Pytrigoideæ* are to be chiefly noted, being so call'd, because they are broad and thin like the Wing of a Bat. It has also three Cavities, one in the *Sella Turcica*, and two in the Processes last mentioned.

Os Ethmoides.

72. The *Os Ethmoides*, or Sieve-like Bone, is the eighth of the Skull; in which the following Particulars are most remarkable: *viz.* Its Extension to the *Septum*, or Nostrils,

Nostrils, and Orbits of the Eyes; its Figure, Connexion and State, during the Time of Infancy; its four Processes, as the *Crista Galli*, which is a sharp Apophysis in the middle of this Bone, the upper part of the Septum, which is the bony Ridge that divides the Nostrils, and the two upper *Ossa spongiosa*^a; the Part which is perforated with Holes like a Sieve, the Part that has several Cells, on which account it is call'd Cavernosa, the two external Laminæ of the *Ossa spongiosa*, which, because they are smooth and even, are named *Ossa plana* or *Papyracea*; under which are several small Sinus's: And lastly, the different Use of its different Parts.

73. All these Bones in Infants new born are in some Measures imperfect, and most of them consist of different Pieces; neither in this State are there any Sutures.

74. But in Adults, these eight Bones for the most part are join'd by SUTURES, which are either *common* or *proper*. The latter are either true, as the Coronalis, Sagittalis, and Lambdoidea; or spurious and false, as the Scaly Sutures of the *Ossa temporum*, or Bones of the Temples. The *common* are the Transversalis, (joining the *Os frontis* in the Face

^a Many take these Spongy Parts for peculiar Bones: But because in those who are advanc'd in Years, they are a Continuation of the other Parts; 'tis more reasonable to assert, that they are Parts of the *Os Ethmoides*.

with the Bones below) the Sphenoidalis, the Ethmoidalis, and the Zygomatica^a; &c. but these demand not much Observation.

75. Between the *Sutures*, especially the Lamdoidalis and Sagittalis, here and there certain Bones by some call'd *Triquetra*, by others *Wormiana*, of uncertain Situation and Figure, are sometimes found. These very Bones were discovered by *Galen* long since; some cry them up as a Specifick for the Epilepsy, but this is a groundless Conceit.

76. The Use of the *Sutures* is, 1. That the Dura Mater in those Places may be firmly join'd to the Skull and Pericranium, or Membrane, covering the Convex Superficies of the Skull. 2. That, because here the Bones of the Skull are disjoyn'd, the Head may encrease and be extended the more easily. 3. That by these a Transpiration of the superfluous Moisture of the Brain, particularly in Infants, may more readily be made. 4. To obviate great Fractures of the Skull; 5. and perhaps, that the Head might receive greater Advantage by the Application of Medicines, their volatile Particles having an easy Entrance thro' those Seams.

The Jaw-
Bones.

77. From the *Skull*, we proceed to the JAW-BONES, by which we understand the

^a Some mention several other common *Sutures*, such as the Nasal, the Palatine, and the Lacrymal, &c. but these are rather to be referr'd to that kind of Connexion call'd Harmony.

other Bones of the Head seated under the Fore-part of the Skull, but no way contributing for the forming of its Cavity. One of these is call'd the Upper-Jaw, and is immovable. The other the Lower, which is movable and serves for many Uses.

78. Their Length is less than in all other Animals, in Proportion to the Bulk of the Body, which without all Doubt was design'd for the greater Beauty of the Humane Frame.

79. The *Upper Jaw* is compos'd of thirteen Bones, and sixteen Teeth, if their ^{Bones of the upper Jaw.} Number be compleat.

80. Of these thirteen Bones there are six Pair. The first Pair is, the Lachrymal; the second, the Nasal; the third, the Jugal; the fourth, the Maxillary; the fifth, the lower Spongious; the sixth the Palatine; the last is single, and is call'd *Vomer*, or Plow-share^a.

81. They are united with one another by a Connexion, which to Appearance is equal, and this is commonly denominat'd *Harmonia*.

82. In the first Pair, which is call'd *Ossa Lachrymalia*, or *Ossa Unguis*, we consider the Original of the Name, the Situation,

^a Many distinguish these Maxillary Bones only by Number and not by particular Names; as for Instance, the first Pair, the second Pair, and so on; which often occasions great Errors among young Students.

Magnitude, and Circumference; the Connexion, very tender Substance; the Furrow for forming the Nasal Channel; the Use, and the Chirurgical Operation, which is commonly perform'd here for the Fistula Lachrymalis.

83. The second Pair are the *Bones of the Nose*, in which we examine the Situation, Circumference, Figure, Substance, upper and lower Superficies, Connexion, and Use.

84. In Examination of the third Pair call'd *Ossa jugalia*, or *Zygomatica*, we make Remarks upon the Etymology of the Name, the Situation, Circumference, hard Substance, Connexion, four Processes, the Places where the Muscles *Masseter* and *Zygomaticus* have their Origine, and the Holes with their Use.

85. The fourth Pair make the *Ossa Maxillaria*: In these we take a Review of the Circumference, Magnitude, Situation, four Processes, viz. 1. the Jugal, 2. the upper Nasal, 3. the inferior Nasal, to which the *Septum* of the Nose is join'd, and 4. the Palatine^a; the Palatine, and Nasal Cavities, the Sockets of the Teeth, the Sinus and its Magnitude, the Orifice or Aperture of this Sinus in those who are living;

^a These *Palatine Processes* are by some mistaken for distinct Bones, and are described under the Name of *Ossa Palatina Antica*; whereas they never are separate or distinct from this Bone.

rence of six Bones for their Composition ; namely, 1. the Coronale, 2. the Os Sphenoides ; 3. the Os Planum, or Part of the Ethmoides ; 4. the Jugal ; 5. the Maxillary ; and 6. the Lachrymal.

The Places. 90. In these we take Notice of the Beginning and the Bottom, where the *Muscles* of the Eyes and Eye-lids are inserted, and where the *lachrymal Gland*, the *Caruncle* and the *lachrymal Bag* are situated.

The under Jaw. 91. The *lower Jaw* is that movable Bone of the Head, that contains the lower Row of Teeth ; upon the Motion of which Mastication or Chewing chiefly depends.

92. In this we demonstrate, first, the Bone it self ; and secondly, the Teeth.

93. In the *Bone* it self, the following Particulars are worthy of our Observation, viz. the Number, its State in Infants ; its Magnitude, Figure and Substance, without firm and compact, within spongiuous, its external and internal Form, and its external and internal Brim ; its Connexion, the Place, where, in Children, the two different Bones unite into one, and the posterior Eminency at the Roots of the Fore-teeth ; the Chin, the Proceffes, call'd *Condylroides*, that are covered with a movable Cartilage, and the Coronoides, and their Use ; the two Angles, the Sockets of the Teeth, the four Holes, forming two Canals, and allowing a
I
Passage

Passage for the Vessels. The principal *Uses* of both Jaw-bones are for Mastication and Speech.

94. We now proceed to the Examination *The Teeth.* of the *Teeth* of both Jaws, which are very hard Bones, and fasten'd like Nails in the Sockets of the Jaw-Bones, which Connexion is call'd *Gomphosis*.

95. In our Review of these, we take Observation of their Situation, being fix'd in deep Holes; their Connexion by means of the Periosteum and Gums; their Colour; their Number from twenty eight, to thirty two, there being fourteen, fifteen or sixteen in each Jaw, if the Number be compleat; their Division into four fore-teeth, two *Canine* or Eye-Teeth, and eight Grinders in each Jaw, and two *Dentes sapientiae* or Teeth of Wisdom, which are the two last of the *Molares*, and spring out about the one and twentieth Year. We also consider their Basis, and its double Substance, stoney and medullary; their Roots or Fangs sometimes single; as in the Fore-teeth, Eye-Teeth, and first of the Grinders; sometimes double, triple, or quadruple, as in the farthest Grinders: As also their Cavities, which are surrounded within with a Membrane that is both vasculous and membranous, and the Holes in each Fang for the free Entrance of the Vessels that serve for their Nourishment and Sense. Lastly, we

take into Consideration the Rise and Growth of the Teeth in Infants, their Change also, and Regeneration after the seventh Year, and sometimes also in those who are Adult; and the wonderful Coalition of the Sockets in old People, after they have shed their Teeth^a.

96. Some particular Circumstances are also to be observed in our Examination of the Teeth; as when they either happen to be set at too great a Distance from one another, or when they grow together, so as to make one entire Bone^b, or are a Continuation of and not distinct from their Sockets; and when they spring out in the Palate, or at least are out of their natural Series or Position.

97. The Use of the Teeth is 1. to divide the Food into small Parts; 2. to be serviceable for Speech; and 3. to be an additional Beauty to the Mouth.

*The Holes
of the
Bones of
the Skull.*

98. That *the Holes of the Head* and their Uses may be the better retain'd in Memory, we will treat of them here conjointly, and divide them into the external and internal. We call those internal, which are easily discernable within the Cavity of the Skull. The external are those which are more obvious to our Sight on the outside.

^a *Ruyfch. Observat. Pag. 107.* ^b *Columbus de re Anatomica.*

99. There are eleven greater Pair of the *internal*, that allow a free Passage to the Nerves, Arteries and Veins of the Brain; and a single one, namely, the great Hole in the *Occiput*, which gives egress chiefly to the spinal Marrow, the spinal Nerves, and the vertebral Arteries.

100. When we examine each particularly, we find, that the *first Pair* (which may more justly be accounted a Collection of the Holes of the *Sieve-like Bone*) grants an egress to the *Olfactory* or first Pair of Nerves. The *second*, to the optic Nerves: The Pair of Holes, which is call'd *unequal*, allows a Passage to the third and fourth Pair of Nerves, to the first Branch of the fifth Pair, and to the sixth Pair. The *fourth*, which is in the *Os Sphenoides*, transmits the second Branch of the fifth Pair which is distributed thro' the upper Jaw. The *fifth* or oval Pair yields a Passage to the third Branch of the fifth Pair. The *sixth*, which is small, admits an *Artery* that is distributed thro' the *Dura Mater*. The *seventh*, that lyes between the *Sella Turcica* and *Processus Petrosus*, gives Transmission to nothing, but is clos'd up by the *Dura Mater*. The *internal Carotide Arteries* pass thro' the *eighth* Pair of Holes, on which account it is call'd the *Carotic Hole*. The auditory Nerve obtains Way thro' the *ninth Pair*, which

is in the *Os Petrosum*. The *Par vagum* and the lateral *Sinus's* of the *Dura Mater*, together with the spinal Nerve, have their egress thro' the *tenth Pair*, which is between the *Os petrosum* and *occipitale*. The *ninth Pair of Nerves* call'd *Par linguale* is transmitted thro' the *eleventh Pair*, which is in the *Os occipitis* adjoining to the Sides of the great Hole.

101. Within, in the *Os petrosum*, there are also some *less Holes*, that are deserving of our Consideration; *one of which* returns back a Branch of the auditory Nerve to the *Dura Mater*; *the other* transmits the Blood-Vessels to the *Labyrinth*.

102. There are two *proper external Holes* in the *os frontis* just above the Orbit, call'd *Superorbitalia*, which give a Passage to *Willis's opthalmic Nerve*, in whose Place there is only a certain superficial Incisure; and *four common* with the *Plane* or *Paper-like Bones* in the Orbit, two in each side, which transmit small Nerves and Vessels to the *Sinus's* of the *Os Ethmoides*. One in the *Parietal* for the Passage of a Vein from the Membrane of the Skull to the *Sinus sagittalis* of the *Dura Mater*. In each *Temple Bone* there are three *common*; the first of which is the *Foramen jugale* for the Passage of the *Crotaphite Muscle*; the second is large, and in it there is a *Sinus* of the *Jugular*; and the third is the Duct
of

of *Eustachius* between the *Os Petrosum* and *Sphenoides*, leading from the Mouth to the internal Ear (68). There are *three proper*: The first is the *Meatus auditorius*; the second the *Aqueduct* of *Fallopins* between the *Apophysis Mastoides* and *Styloides*, by which the *Portio dura* or hard Part of the auditory Nerve is transmitted. The third which lies behind the *Processus Mastoideus* gives Entrance to a Vein into the lateral Sinus. In the *Occipital*, there are behind the *Condylode Processes*, that give Passage to the vertebral Veins into the lateral Sinus of the *Dura Mater*, but these Holes are not to be found in many Skulls. In the *Os Sphenoides*, besides the internal Holes already mention'd, and the Orifices of the Sinus's opening into the Nostrils, there are some common to it, and the Bones of the Palate, which are Apertures of the Nostrils into the Jaws. In the *Os Ethmoides* there are, 1. some common to it and the *Os frontis* in the interior Side of the Orbits, but these have been already mentioned; and 2. Apertures of the Sinus of the *Ethmoides* into the Nostrils.

103. The Holes in the *Maxillary Bone* The Holes of the Jaw-bones. of the upper Jaw are, 1. the *Palatinum Anticum* behind the *Dentes incisores* or Fore-teeth, which comes from the Nostrils, but transmits nothing; 2. the *Infraorbitale*, which lyes patent for the Nerves of the

fifth Pair ; 3. behind the farther Grinders there are some , thro' which Vessels and Nerves enter to the Maxillary Sinus's ; 4. an Incisure in the exterior side of the Bottom of the Orbit , common to it and the *Os Sphenoides* , thro' which Vessels pass to the Nostrils and Eyes ; 5. the Nasal Canal common to it and the *Os unguis* ; 6. Apertures of Sinus's into the Nostrils ; and 7. the *Palatinum posticum* , common also to the Bones of the Palate , by which the Nerves have a Passage to the Palate. In the *Os jugale* are , 1. the common , or jugal ; 2. the proper , sometimes single , sometimes double for the Passage of a Nerve. In the *Os Palati* , besides the common one just described , there is also one proper , where 'tis join'd with the Processes , call'd *Pterygoides* , which allows the Nerves a Passage to the Palate.

104. In the *lower Jaw-bone* , there are two in the internal Superficies for the Entrance of an Artery , Vein and Nerve into the Substance of the Bone , by which itself and the Teeth are nourish'd ; and two in the external Superficies , that give egress to the same Vessels into the Gums and Chin.

105. If perhaps there be found other Holes in the Bones of the Head , they grant Entrance to Vessels for the Nourishment of the Bones of the Skull.

106. We

106. We may also refer to the Bones of *Os Hyoides.* the Head, the Bone that is plac'd at the Root of the Tongue, which is therefore call'd *Os linguale*, or because of its faint Resemblance to the Greek Upsilon, *Ypsoloides*, or *Hyoides*, as also *Bicorne*: In young Persons it consists of three Pieces, the Middle of which is the *Basis*, and this is the shortest and broadest, and the two side Bones call'd the Horns, to which the Tongue grows; but in Adults, at their Connexion with the *Basis*, are often found two others, that are very little, and in Figure like Grains of Wheat, (which from thence may be call'd *Triticea*) to which the Ligaments are join'd, by which they adhere to the *Processus Styloides*. Sometimes, but very seldom, other little Bones are found in those Ligaments; hence it happens, that *Vesalius* found six, and others after him have number'd eleven Pieces of the *Os Hyoides*. This Bone is a firm *Basis* for the Tongue, and the several Muscles that move both the Tongue and Larynx, are inserted in it.

107. Because the *four Cartilages of the* ^{Bones of} *Larynx*, namely, the *Thyroides*, the *Cricoi-* ^{the La-} *des*, and the two *Artænoides*, sometimes in old People become bony. they therefore, in some respects, may be referred to the Bones. But since their Nature and Use are better understood when they are fresh

Of the SPINE of the BACK.

fresh and soft, than when they are dry'd, we will not take any farther Notice of them here, but proceed immediately to the Examination of the Bones of the Trunk.

Of the Bones of the Trunk.

108. The Trunk which is the second Part of the Skeleton, consists of the *Spine of the Back*, the Bones of the Breast, and the *Ossa innominata* or nameless Bones.

*The Spine
of the
Back.*

109. The SPINE of the BACK, call'd in Greek *Rhachis*, is that bony Column, which extended down from the Head to the Fundament, and contains the Spinal Marrow.

110. We examine this, first in general, and next particularly.

111. The things that are to be remark'd in general, are its Name, its Pyramidal Figure, almost resembling the Letter *f*; the Reason of this Figure, the Connexion and Use.

112. When we take a particular Consideration of it, we remark its *Division* into Neck, Back, Loins, *Os sacrum*, and *Os coccygis*.

*The Verte-
brae.*

113. The Neck, Back and Loins consist of *Vertebrae*, or *Spondyli*; in which we are now to recite some things in general, and also in particular.

114. The

114. The Particulars observable in the *Vertebræ* in general, are the following, *viz.* their Number, which is twenty four, and in each of them the Body, or Basis; their seven Processes, one of which is spinous, two transversal, two superior, and two inferior; the Cartilaginous Epiphyses; the Articulation, by which each receives one, and is in like manner receiv'd by another; one great proper Hole, which is for the Passage of the Spinal Marrow; and four common, or half, two in each side, which conjointly make twenty four in each side of this Column, thro' which the Nerves of the Spinal Marrow have their egress. The little Holes, which are observable chiefly in the Body of the *Vertebræ*, are they which give Entrance to the Blood Vessels for Nourishment.

115. In *Adults*, the *Vertebræ* consist of one entire Piece; in *Infants* they are compos'd of three: For the Body and two Sides are distinct Bones, and at this Age the spinous Apophyses are wanting.

116. In our particular Examination of ^{Of the Neck.} the several Parts of the Division of the Spine, we find, that the NECK consists of seven *Vertebræ*; in which, some things are again to be considered in general, and some more particularly.

117. In general, the *Vertebræ* of the Neck are less than the rest, yet they have
a more

a more firm and solid Substance than the Vertebræ of the other Parts: Their Body is as it were compress'd, and less round, hollow above, and convex below. They have nine Processes, and the transversal Processes are perforated, that the Vertebral Vessels may have a free egress to the Head. These Transversals and most of the spinous Apophyses are forked. In these Vertebræ, there are seven Pair of *common Holes*, which transmit the Nerves of the Neck.

118. As to *Particulars*, the first Vertebræ has a peculiar Name, and is call'd *Atlas*; it wants a Body, and spinous Process; its Substance is more solid than that of the rest; it receives above and below, and is not receiv'd. The Head is articulated in its Fore-part, in which Articulation the Head is bent or extended: Its proper Hole is the greatest of all; its transverse Processes are longer than the rest; it has a certain semicircular Ligament peculiar to itself, which embraces the *Processus Dentiformis*, or Tooth-like Process of the following Vertebra^a.

119. In our Review of the next Vertebra, which is call'd *Epistrophæus*, or *Axis*, we take into Consideration the Name, the *Processus Odontoides*, or *Dentiformis*, the

^a Vid. *Vesalius* de human. corporis fabrica, Lib. I. Cap. XV.

Articulation like a Hinge with the first Vertebra^a, and the Motion of the Head upon this Axis.

120. Some give the Name of Axis to the third Vertebra; but without Reason, for it bears not the least Resemblance of the thing, from whence they derive the Name. In this and the other Vertebrae of the Neck, nothing occurs particularly remarkable, we therefore refer the Observer to the general View of the Vertebrae already given.

121. The *Back* or *Thorax* has twelve ^{of the} Vertebrae, in which we in general take ^{Back.} Notice of the Magnitude, which seems to be a medium between them of the Neck, and those of the Loins; the spinous Processes which are longest, and (except the two last) very much bent; the Cartilages between their Bodies, which here are less than in the Neck, in order to hinder that lax and easy Motion observable in the Neck, which is not convenient or necessary for the Breast; the transverse Apophyses, which are thicker than in the Neck, and form'd with Dimples for the Convenience of Articulation with the Ribs; for which end also it is, that in the Sides of the two Bodies of these Vertebrae join'd together, a small excavated Eminence or

^a Ibidem.

Rising is apparent: And lastly, the twelve common Holes in each side, which transmit the twelve Pair of Nerves of the Back.

122. If we examine them particularly, we may observe, that some call the first the *Axillary*, or *eminent Vertebra*; and that the uppermost Rib is join'd to it. Some have given Names to the rest also, but 'tis better to distinguish them by Number.

of the
Loins.

123. The *Loins* have five *Vertebrae*, in which we remark in general, the Bodies which are very thick, and the Cartilages that lye between; the transverse Apophyses which are the longest, yet smaller than those of the Back; the spinous Processes, that are very thick, strait and more distant, or separate than the rest; and the five common Holes in each side for the Nerves of the Loins. Some also have given to these peculiar Names; but it is sufficient to distinguish them by Number.

The Os
sacrum.

124. In the *Os sacrum*, we consider the Name, Situation, Superficies and Connexion; the triangular Figure; the internal and external Superficies; the spongy Substance, Basis, and Point; the two large lateral Processes for Articulation with the *Ossa innominata*; the two little superior Apophyses with the Glenoide Cavities for Articulation with the lower Vertebra; the inferior Process for Articulation with the *Os Coccygis*,
or

or Hip-bone; the *Canal* for the end of the spinal Marrow; and the anterior and posterior Holes, of which, there are sometimes four, and sometimes five Pair.

125. The *Use* of the *Os sacrum* is 1. To be a Basis for the Spine; 2. To form a *Pelvis* or Basin, and to defend the Parts contain'd in it; 3. To contain its Canal, the lower part of the spinal Marrow, or rather the *Cauda equina*, or Horse's Tail, as it is so call'd. 4. To afford a due Insertion to the Muscles. 5. To allow a Passage to the great Nerves of the strait Gut, the Bladder, the Genitals, and to the Crural and Ischiadic Nerves, thro' its anterior Holes; but the posterior emit either nothing, or only Nerves, that are scarcely perceptible.

126. In Adults 'tis only one Bone, yet it always shews the Division of four or five Pieces; but in Children and Infants it consists of many Pieces.

127. The *Os Coccygis* also, in Adults, is ^{*Os Coccy-*} for the most part only one Bone; but in ^{*gis.*} those who are younger, it is compos'd of three or four. In this we take into Consideration the Name, Situation, Connexion, Figure, Substance, Basis, and Point or Apex, its small transverse Processes, its glenoide Cavity, where 'tis join'd to the *Os sacrum*; its Motion; State in Women; and its Use for the Support of the strait Gut.

128. In

128. In *four footed Animals* it is long, and consists of very many Pieces; in these it is reflected or turned outwards, and constitutes the Tail, for which Reason it is call'd *Os Caudæ*; in Men 'tis short, and turn'd or bent inwards for various Causes.

Of the Thorax.

The Tho-
rax.

129. The second Part of the TRUNK is call'd THORAX or the BREAST: And 'tis those Bones that form that Cavity, in which the Heart and Lungs are contain'd.

130. In our Demonstration of this we make Remarks upon the Structure of this Part, which is both bony and musculous, and endeavour to account for this Method of Composition; we also consider its Figure and Circumference, its Magnitude, and its three Parts, namely, the *Vertebræ*, the *Ribs*, and the *Sternum* or Breast-bone. An Account of the *Vertebræ* has been given above; it therefore remains, that we discourse of the *Ribs*, and *Sternum*.

The *Ribs*.

131. In the RIBS, which in *Greek* are call'd *Pleuræ*, we observe the Situation, and their very different Magnitude; for the middle *Ribs* are the greatest, but the upper and lower are less; their Number which is twelve in each side, their Division into true and false, and their Use.

132. The

132. The *Substance of the Ribs* is partly bony, and partly cartilaginous; the latter is observable in the fore part, and the former in the hind part. Their *Figure* is crooked or arched, concave within, and convex without, for the better Conformation of the *Cavity* of the Breast.

133. The Parts of a *Rib* are the Body and the Extremities. In the Body, we consider the internal and external Superficies, the inner and outer, the upper and lower Lip, and the Furrow or Sinus in the upper Lip, which is made in the first nine or ten Ribs, in order to hide the costal Vessels. By some they are call'd by *proper Names*, but less Trouble to the Memory; and less Obscurity and Confusion is occasioned, if they be distinguished by Number.

134. In the *anterior Extremities* the Cartilages of the seven true Ribs are join'd to the *Sternum*; the eighth, ninth, and sometimes also the tenth cohere, or are join'd to the seventh, and sometimes to one another by the Assistance of transverse Cartilages; the anterior Extremities of the rest lye loose among the Muscles of the Abdomen; in most of the posterior Extremities of the Ribs, or at their Articulation with the *Vertebræ* small Heads are observed, by which they are join'd to the *Vertebræ* of the Back.

E

135. In

135. In the STERNUM we must attend to the Situation, and Figure, which resembles a Dagger, and its State in Infants, the Number of its Pieces in Adults, in whom there are sometimes but one, sometimes two, and sometimes three; its fungous Substance; its upper part call'd *Manubrium* or 'Handle', in which on both sides there is a Cavity for Articulation with the channel Bones; its middle part which is very narrow, and the lower which is broader; to which is join'd the Cartilage, call'd *Ensiformis*, or *Xyphoides*, because of its Resemblance of the Point of a Sword; this is sometimes forked, and often entirely bony. While 'tis under Inspection, we must also observe the seven lateral Cavities, in each side for Articulation with the nine Ribs. The Use of the *Sternum* is, 1. To form the anterior or fore Part of the Breast. 2. To support the Ribs and Channel-bones. 3. To defend the parts inclos'd within the Breast. 4. To serve for the Insertion of the *Mediastinum*, to bear up the Heart and various Muscles.

Ossa innominata,
Ileum Ischium, and
Os Pubis.

136. The two Bones commonly call'd INNOMINATA, make the third part of the *Trunk*. These in Infants and Children, are compos'd of three very distinct Pieces, every one of which has its own Name. The upper is call'd ILEUM, the anterior OS PUBIS, the lower and posterior OS ISCHI-

ISCHIUM. These are join'd by the Interposition of a Cartilage almost in the middle ^a of that remarkable Cavity, call'd *Acetabulum*, and even to the Age of Puberty they may be seen distinct: But afterwards they grow together, and become one Bone, so as to leave no Mark of the former Division.

137. They are join'd in the posterior part on each side, to the *Os sacrum* by Cartilages and Ligaments, and form there a strong and firm Juncture, and with this Bone they make up that Cavity, which is call'd *Pelvis*. In the anterior part, the Bones of the *Pubes* are conjoin'd with one another, by the Intervention of Cartilages, where, sometimes, but seldom, they recede a little from one another by the Extension of the Cartilage in a difficult Delivery, especially in Women who are young ^b, in order to facilitate the Emission of the Foetus. Moreover these Bones also cohere on each side, with the *Os sacrum* by two peculiar strong *Ligaments*, a Finger's Breadth in Diameter, and three or four Fingers long; the upper of which passes from the posterior acute Process of the *Ischium* to the *Os sacrum*;

^a 'Tis therefore asserted without Reason by some, that the *Acetabulum* exists in the *Ischium* alone, whereas 'tis common to all the three. ^b Autores varii, qui hoc observarunt, citantur in *Morgagni Adversar. Anat.* III. p. 28.

but the lower joins the *Tuberculum Ischii* to the *Os sacrum*.

138. In these *Ossa innominata* the Figure is to be considered with the external and internal Superficies, that are for the Origin of several Muscles; the two anterior Processes, the upper and the lower; and the two posterior, the large, and the acute; the great Incisure between these two posterior Processes; the *Crista Ilei*, the *Tubercle*, or *Tuberosity* of the *Ischium*, giving Rise to several Muscles and a Ligament; the *Hole* of the *Os pubis*, which is the greatest in the Bones; the *Acetabulum* for the Articulation of the *Os femoris* or Thigh-bone; in which the lesser Cavity is for a commodious Situation of the mucilaginous Gland, and the *Incisure* for an Entrance of Vessels into this Gland, and the Ligament of the *Femur*; the *Place* where this Ligament is inserted; and lastly, the *Supercilia* or Brows with their Use; all which Particulars are deserving of our Cognizance.

139. Lastly, we must not omit this Consideration of the *different Constitution of these Bones in Women and in Men*: In Women they are more distant, or separate from one another, and are smaller than in Men, especially the *Os pubis*; that by this Means, the Cavity of the *Pelvis*, and the Angle between the *Os pubis* and *Ischium*, may be made the greater, for the more
commo-

commodious bearing of the *Fætus*, and the more easy Exclusion of it in Birth.

140. The *Uses* of those Bones, besides these already mentioned, are, 1. To be a *Basis* or Support to the Spine of the Back, and all the upper Parts; 2. A Juncture or Connexion of the rest of the Body with the Thigh-bones. 3. The Origin of many Muscles; and 4. The Formation of the *Pelvis*, and Defence of the Parts contain'd within.

Of the Extremities or Limbs.

141. The *Extremities* are either the up-^{Of the}per or the lower; the *upper* are the Arms^{Arms.} and Hands; the *lower* are the Thighs, Legs, and Feet.

142. The *upper* comprehend the *Scapula* or Shoulder-blade, the *Clavicle* or Channel-bone, the *Os humeri* or Shoulder-bone, the *Cubitus* or Fore-arm, and the *Hand*.

143. In Demonstration of the *SCAPU*-^{The Sca-}
LA, in *Greek* call'd *Homoplata*, we consider^{pula.}
the Number, Figure, Connexion, Situation, the *Head* with the Glenoide Cavity, the *Neck*, the *Basis*; the two *Angles*, upper and lower; the Edges call'd *Costæ* upper and lower, the Concave anterior Superficies, where it lies upon the Ribs, and the unequal posterior Superficies; the *Spine*, the *Crest*, the *Acromion*, the Cavity above,
E 3 and

and below, the Spine, the Process, *Coracoides*; the two Incisures, one between the *Acromion* or Neck, the other behind the Process *Coracoides*, and the strong *Ligament* joining the *Acromion* and the *Coracoides*. The Use of the *Scapula* is, first, to sustain and connect the Arm with the Trunk; secondly, for the Insertion of various Muscles; thirdly, and in some Measure to defend the Contents of the Thorax.

The Clavicle.

144. In our Review of the CLAVICLE, we observe, the Number, Situation, and Figure resembling a long *S*, and therefore call'd *Sigmoide*, the spongy and brittle Substance; the Body for the fix'd Point of the pectoral Muscle, the *Deltoides*, and the *Mastoides*, &c. the *Protuberance* for the subclavian Muscle; and the two Extremities, the rounder, which is articulated with the *Sternum* and first Rib; and the more plane with the *Acromium*. The Use of the Clavicles are, 1. To support the Arm; 2. To be an Origin for several Muscles; and 3. To defend the subclavian Vessels.

Os Humeri.

145. When the OS HUMERI falls under Examination, we consider, first, the Situation, the Connexion, the Magnitude, and then the Body, in which many Muscles are inserted; above, 'tis thicker and rounder; below, 'tis smaller and more compress'd: We also take into our Cognizance the rough *Protuberance* about the Middle, which serves

serves for Insertion of the *Deltoide* and pectoral Muscle; the external and internal Spine terminating in two *Condyl*i or Knuckles; the remarkable Cavity containing Marrow and the Motion of this Bone, which is by much the greatest and most extensive of all the Bones.

146. In its upper Extremity, we examine the Head, the Neck, in which a Ligament and several Muscles are inserted; and the *Sinus* or Furrow in which is inclos'd one of the Heads of the *Musculus biceps*.

147. In the *inferior Extremity*, we take Observation of the Figure and Articulation of this Part, with the Bones of the *Cubitus* or Fore-arm by the Assistance of three little Heads and two Cavities; of the two *Condyl*i or Tubercles, the external of which bestows a fix'd Point to the *Extenders*, and the internal to the *Benders* of the *Carpus*; of the two Cavities, the anterior and posterior, which receive alternately the two Processes of the *Ulna* in the Extension and Flexion or bending of the *Cubitus*.

148. In the CUBITUS we observe in *Cubitus*. general the Situation, the Number of the Bones which are two, one of which is call'd the *Ulna* or *Cubitus* strictly speaking, and the *Radius* so nam'd, because of the Diversity of its Motion or Flexion, their different Magnitude and Thickness, their Connexion

as well with one another, as with the *Os Humeri* and *Carpus*; the Ligament with which both their Bodies are tyed together, 1. For the firmer Connexion; 2. For the commodious Insertion of the Muscles, which are numerous here.

Ulna.

149. When we proceed to demonstrate these Bones in particular, in the *ULNA*, which is also call'd *Cubitus*, we remark its interior Situation, its Length, being greater than that of the *Radius*; its three Angles or *Spines*, in the exterior of which, the Ligament already mentioned (148) is inserted, as several Muscles are in the two internal. The Motion of this Bone is both Flexion and Extension.

150. In the *superior Extremity*, we remark, 1. The considerable Cavity, call'd *Sigmoide* or *Semilunar* with an Eminence in the Middle answering to the Prominencies and Cavity of the *Os Humeri*. 2. The superficial Cavity in the external side for Articulation with the Crest of the *Radius*, the two Processes, namely, the *Coronides*, and the *Olecranium* or Elbow, and their Uses; and lastly, the Tubercle for Insertion of the internal brachial Muscle, the Bender of the *Cubitus*.

151. In the *lower Extremity*, we observe the little Head which is small and round; in this there is 1. A small Cavity for Articulation with the *Carpus*; 2. The little *Styloide* Process

Process for the greater Firmness of the Articulation; and thirdly, the Crest for Articulation with the *Radius*.

152. In our Lectures upon the *RADIUS*,^R we animadvert upon its exterior *Situation*; its *Length*, it being shorter than the *Ulna*; its *Spine*, in which the Ligament (148) is inserted; and its *Motion*, which is both Pronation, or turning of the Palm of the Hand down; or Resupination, which is the turning of it up.

153. In the *upper Extremity* of this Bone, we observe the little Head with the glenoide Cavity for Articulation, with the small Head of the *Os Humeri*; its *Crest*, which is articulated with the *Ulna*; its *Neck*; and lastly, the *Tubercle*, which is for the Insertion of the Muscle call'd *Biceps* or two headed.

154. In the *lower Extremity*, we review the little Head, which forms a greater Angle, and is more thick than that of the upper; in the End, there is a *large Sinus*, or *Cavity* for Articulation with the *Carpus*; in the interior side, we may observe a Dimple, which conduces to the easy Rotation of the Crest of the *Ulna*; in the exterior side, a short thick *Apophysis*, for encreasing the Firmness of the Articulation; and in the posterior Superficies, some small Incisures, in which are plac'd the Tendons of

of the Muscles, that extend the Hand and Fingers, but especially the Thumb.

The Hand.

155. We now come to an Examination of the HAND, which is divided into the *Carpus*, *Metacarpus*, *Fingers*, and the little Bones, call'd *Sesamoidea*, because of their Resemblance of the Grains of *Sesamum* in Bulk and Figure.

*The Car-
pus.*

156. In the CARPUS or Wrist, the following Particulars are deserving of our Observation; namely, the *Definition*, *Situation*, the *eight Bones*, their irregular *Figure*, *Connexion*, Convex external Superficies, and Concave internal, for the more commodious Passage of the Tendons and Vessels to the Hands and Fingers; and lastly, their double Order, the former of which makes a small Head, above, for Articulation with the *Radius*, below, a Cavity for Reception of the latter Order, which is join'd with the Bones of the *Metacarpus*. From this short View, it may appear, that the *Articulation* of the Bones of the *Carpus* is threefold; 1. With one another; 2. With the *Cubitus*; and 3. With the *Metacarpus* ^a.

*Metacar-
pus.*

157. In the METACARPUS or Back of the Hand, we take into Consideration the *four Bones*, and their threefold *Articu-*

^a There are some, which give different Names to the little Bones of the *Carpus*, which in our Judgments is superfluous and useless, but if they are to be distinguished, 'tis better performed by Number.

lation; and in every Bone, the Body and its Extremities. In the Bodies, we observe their Figure, which is somewhat round; the Cavities for Marrow, and their Bulk, they being greater than those of the Fingers. Their gibbous Part makes the *Back*, and their Concave the *Hollow* of the Hand. Their Bodies are distant from one another, and the Interstices or Spaces between are fill'd with Muscles, call'd *Interossei*, that move the Fingers; but their Heads or Extremities are join'd and contiguous. *They differ from one another in Magnitude or Bulk*; for that which sustains the little Finger is the least, the following towards the Thumb gradually become longer otherwise than the Bones of the Fingers. The Extremity join'd to the *Carpus* is of an irregular Figure, but that which touches the Fingers has small Heads of considerable Bulk, which are articulated with the glenoid Cavity of the Fingers.

158. In the FINGERS we consider the *The Fingers.* Situation, Number, and the Names peculiar *gers.* to each; as the *Thumb*, the *Index* or Forefinger, the *middle Finger*, the *Ring-finger*, and the *Auricularis* or little Finger. In each of these there are three Bones, which compose three *Ranks* or Rows call'd *Phalanges*, the upper of which are much greater than the lower. Their exterior Superficies is gibbous; the interior Plane and Concave
for

for the Conveniency of laying hold or grasping. The first Rank, where it is join'd with the small Heads of the *Metacarpus*, has a glenoide Cavity and a Motion every way: In the other Extremity there are two little Heads join'd to the two Cavities of the second Phalange, which are for the same Use in the second and third: In the upper Extremity of the second and third Phalange between the two Cavities, there is an Eminence of the same Use with the *Olecranon*. The last Extremity of the third Row has a Point somewhat broader than the Body.

The Thumb. 159. The THUMB, if we examine it in particular, has the thickest Bones, the first of which agrees in Figure, Articulation, and Situation with the Bones of the *Metacarpus*, but it differs from them in Motion: But the Articulation of the first Phalange with the second, and of the second with the third, agree with the Connexion and Motion of the second and third of the Fingers; in the other Fingers, nothing, but what has been already taken notice of, occurs, that is deserving of a particular Observation.

Of the lower Extremities.

160. The Parts call'd the LOWER LIMBS, are the *Femur*, or Thigh-bone, the *Tibia*, and the *Fibula*, which two are the *Bones of the Leg*, the *Foot*, the *Patella* or Knee-

Knee-pan, and the *Ossa Sesamoidea*, which Extremities support the whole Fabrick of the Body.

161. Upon the Review of the *Femur*, ^{Os Femoris.} which is the greatest Bone of the Body, we observe the Situation, Number, Figure, the Body and the Extremities.

162. In the *upper Extremity* we consider its great Head, and in this we take Notice of the *Sinus* or Dimple, which is form'd for the Insertion of the round Ligament, by which 'tis join'd to the *Acetabulum*, the Place where it adheres to the *Acetabulum*, the oblique Situation, and the Articulation of this Bone with the *Acetabulum*. 2. The *Neck*, and its Progress, which is not perpendicular, but almost horizontal, bending outwards, that the Thighs may be duly disjoin'd or kept at a proper Distance, by which Mechanism, the Motion of the Body in Walking, &c. becomes more firm, and the several Muscles are aptly plac'd; the *Porous* and Brittle *Substance*, and the *small Holes* for the Entrance of the Vessels; and 3. The two Processes call'd *Trochanteres*, the greater and less serving for the Insertion of the Muscles of the *Femur*, which before the Age of Puberty are *Epiphyses*.

163. In the *lower Extremity*, the following Particulars are to be demonstrated; namely, 1. The *small Heads* and the middle Cavity, by which 'tis connected with the *Tibia*.

Tibia. 2. The posterior Cavity, thro' which the Vessels have a safe Passage to the *Tibia*. 3. The anterior Cavity for the Situation of the *Patella*; and 4. The two *Condyl*i or Tubercles nigh the little Heads, which are the fix'd Point of the Muscles that move the Feet; in the exterior of which an *Os sesamoides* is often found contain'd in a peculiar Sinus: In the other Tubercle also, a less is found, and especially in those who are far advanc'd in Years ^a.

164. We observe in the Body of the *Femur*, that the anterior Superficies is convex, and that the posterior is concave; that it has a singular Obliquity or natural Incurvation, that its Strength is considerable, that it has a Spine for the Insertion of the *Triceps*, or three-headed Muscle, and a great Cavity to contain Marrow.

Patella.

165. The P A T E L L A, which is also call'd R O T U L A, offers the following Particulars to our Consideration; namely, the Situation, the figure, the Number, the Magnitude or Bulk, the different Thickness, the anterior and posterior Superficies; the spongy and brittle Substance; the Connexion by Tendons and Ligaments with the *Femur* and *Tibia*; the ascending and descending Motion in the Flexion and Extension of

^a See their Representation, Tab. I. Fig. 2, 3 and 4.

the *Tibia*; and lastly the Use. In Infants, it is altogether cartilaginous.

166. In the TIBIA we may in gene-*Tibia.*ral remark the Situation; the two Bones, namely, the *Tibia* strictly so call'd, and the *Fibula*; the different Magnitude and Thickness of these Bones; and the Articulation of both with one another, with the *Femur*, and with the Foot.

167. If the *Tibia*, in particular, falls under Examination, its Situation in the interior Part of the Leg, the Body, and the Extremities are to be observ'd. In the *upper Extremity*, the Thickness, the two glenoide Cavities for Articulation with the *Femur*, in which, two movable semilunar Cartilages lye; the Eminence in the middle, which seems divided into two for the Insertion of the Ligaments of the *Femur*; and the Cavity behind this Eminence, in which the mucilaginous Gland is plac'd, must be examined. In the anterior Superficies, are demonstrated the Tubercle, in which the Extensors of the *Tibia* are inserted; the two Tubercles on the sides, which are a fix'd Point to some Muscles of the Foot, with the exterior of which the *Fibula* also is connected, yet so, that it contributes nothing to the Articulation with the *Femur*.

168. In the *inferior Extremity*, the Cavity for Articulation with the *Tarsus* is to be

be observed; in the exterior side of which we view the Cavity for Connexion with the *Fibula*; and in the interior of the same, the thick and strong Process, call'd the internal Ankle, which is form'd for the firm Articulation of the Foot.

169. In the *Body* we take into our Cognizance the three Angles or Spines, to the exterior of which, the Ligament call'd *Interosseum* is join'd, connecting the *Fibula*; the anterior is the sharpest, being cover'd only with the Skin and *Periosteum*; on which account Contusions in this Part occasion very sharp Pain; lastly, it has a Cavity within in which Marrow is contained.

Fibula.

170. In the FIBULA, which is also call'd PERONE, we examine the Situation and Connexion, the Length and Thickness, which in this Bone is but inconsiderable; the *upper little Head*, which is not connected with the *Femur*, but join'd to the *Tibia*; the lower, call'd the external Ankle, which is articulated with the *Tarsus*, its Eminence strengthens the Connexion, and so prevents an easy Luxation. The Body is almost triangular, and distant from the *Tibia*; the Ligament call'd *Interosseum* is inserted in its sharper Spine, which, with the whole *Fibula*, serves for a more commodious Insertion of the Muscles of the Foot.

171. In

171. In the FOOT we consider the Si-^{The Foot.} tuation, the Length, which in Man is greater than in any other Animal, in order to render Walking more firm; the *Back* of the Foot; the Sole, which is concave, that the Vessels may not be compress'd in standing or walking; the Parts, on which we properly stand, and the Division of it into the *Tarsus*, *Metatarsus*, the *Toes*, and the *Ossa Sefamoidea*.

172. These several things deserve our Observation which occur in the Examination of the TARSUS; viz. the Situation,^{Tarsus.} the Number of the Bones, being seven, as the *Astragulus*, the *Calcaneum*, the *Os naviculare*, the *Cuboides*, and the three *Cuneiformia*; their irregular Figure; their Articulation with the *Tibia* with one another, and with the Bones of the *Metatarsus*; and lastly, their Connexion by very strong Ligaments.

173. When we examine each Bone in particular, we observe in the *Astragulus*, or first Bone of the *Tarsus*, which is also call'd *Talus*, the Situation, the Figure, the Connexion with the *Tibia*, *Fibula*, and *Calcaneum*, and its little Head for Articulation with the *Os naviculare*.

174. The Situation and Bulk, the Articulation with the *Astragulus*, and *Os Cuboides*, and the *Apophysis*, which is protuberant behind, and makes the Heel to pre-

vent falling backwards, into the posterior Part of which the *Tendo Achillis* is inserted, are to be demonstrated, in the *Calcaneum*, or Heel-bone. In the interior Side of this Bone there is a Hollow, or Sinus for the safe Passage of the Vessels to the Metatarsus and Toes.

175. In the *Os naviculare* or *Scaphoides* so call'd from its Resemblance of a Boat, the Situation, Articulation, Glenoide Cavity for Articulation, with the Head of the *Astragulus*; and the three anterior convex Heads, which receive the *Ossa Cuneiformia*, offer themselves to our Consideration.

176. In the *Cuboides* so named, because 'tis somewhat like a Cube, we review its Situation, in the external Side of the *Tarsus*, where it sustains the utmost Bone of the *Metatarsus*, which is articulated with the little Toe; its Connexion with the neighbouring Bones, and the *Incisure*, in its inferior Part, in which one of the *Ossa Sesamoidea* is frequently found in the Tendon of the Muscle *Peronæus posticus*.

177. In the three *Ossa Cuneiformia* or Wedge-like-bones, we take Care to demonstrate their Situation, different Magnitude or Bulk, and their Connexion with the *Os naviculare* and the four Bones of the *Metatarsus*.

Metatarsus.

178. We now proceed to the METATARSUS, in the Consideration of which, we observe the

the Situation the five Bones, whose Bodies are almost round, convex above, and concave below; the Spaces between for placing of the *Musculi interossei*, or Muscles between the Bones; the little posterior unequal Heads join'd to the *Tarsus*; the little anterior round Heads for Articulation with the Toes, which are eminent or jet out, that they may increase the Force of the Muscles, that bend the Toes; the different Bulk of these Bones; the Process in the posterior little Head of the utmost or fifth Bone, upon which the Foot, and therefore the whole Weight of the Body makes a strong Pressure.

179. In the TOES and FINGERS the Circumstances are much the same; but in the former for the most Part thirteen Bones only are found in Adults, which are much less and smaller than those of the Fingers, (if the big Toe be excepted.) The Motion of the Toes is more close and less free than that of the Fingers; the great Toe hath only two Bones, and those of the rest become gradually less.

180. It now remains, that we proceed to the OSSA SESAMOIDEA, these are small ^{*Ossa Sesamoides.*} Bones, observable in those who are advanc'd in Years, or very old, somewhat resembling the Seeds of *Sesamum*, from which they derive their Name. Their most frequent Situation is, 1. In the Thumbs and Great-toes, in each of which two, and often

only one is found. 2. In the Junction or Connection of the *Metacarpus* and little Finger, in the *Abductor* of which Finger one very often sticks ^a; 3. In the external Condyle of each *Femur* one is often found ^b; 4. One is found under the *Os Cuboides* of the *Tarsus*, in the Tendon of the *Peronæus posticus*. These fourteen are for the most Part found in old People, and such as are advanc'd to a middle Age, and sometimes one is found in the internal Condyle of the *Femur*, but very seldom. Sometimes also, I have found one of these in the external Face of that Bone of the *Metacarpus*, which sustains the Fore-finger in the Tendon of the Muscle *Abductor*; but one is often wanting in one of the Thumbs: It therefore very rarely happens, that there are found more than sixteen, but frequently fewer; hence it appears, that they are mistaken, who ordinarily number more than forty, and ascribe two to each Joint of the Fingers. They all are situated in the Tendons of the Muscles, excepting such as are found in the *Condyli* of the Thigh-bones, for these grow in the Beginning of the Muscles; their Figure is different and irregular. In the younger, they are cartilaginous, therefore they are more easily

^a See its Figure and Situation, Tab. I. Fig. 5. ^b Tab. I. Fig. 2, 3, and 4.

found in those who are ag'd. They are like so many Pulleys subservient to the Muscles, in order to increase their Force. Compare with this the Note under this Mark. (*)

Of the Number of the Bones.

181. All the Bones of the Body being thus demonstrated, it will now be easy to know their Number, in determining of which Authors differ very much. We can scarcely discover more than two hundred and sixty in Adults and old People: However in Children, the Number is greater, but uncertain, because many afterwards coalesce or unite into one.

In the Head, we have demonstrated sixty nine, of which the Skull together with the Bones of the Ears has

The *Maxilla superior* 14

Maxilla inferior 13

The Teeth in both Jaw-bones 1

Os Hyoides 5

Larynx 4

In the Trunk there are fifty five Bones, viz.

Vertebrae 24

Costae 24

Sternum, (altho' it often consists of two Pieces) 1

Os sacrum 1

F 3 Os

Of the Number of the BONES.

Os Coccygis 1

Ossa innominata 2

In the Extremities there are 138, viz.

Scapulæ 2

Claviculæ 2

Ossa Humeri 2

Ulnæ 2

Radii 2

The Bones of the *Carpus*, in each Hand

Eight, 16

Metacarpus, ——— Four, 8

Fingers, ——— Fifteen, 30

Femur 2

Tibia 2

Fibula 2

Patellæ 2

The Bones of the *Tarsus* of each Foot 14

Metatarsus 10

Toes 26

Ossa Sefamoidea seldom above 16

Therefore the whole Number or ———

Sum will be ——— 260

182. In the Bodies of Persons arrived to the Age of Puberty, about an hundred and twenty four distinct *Epiphyses* may be demonstrated, which, if they be added to the two hundred and sixty now mention'd, the compleat Number of the Bones of a humane Body will be three hundred and eighty four.

Of

Of the ARTICULATION of the BONES.

183. We must now proceed to that Part of *Osteology* which treats of the ARTICULATIONS of the BONES, without a due Knowledge of which, no Surgeon can be accounted a Master of his Art. The Anatomists generally begin their Discourses on the Bones, with a Description of these, yet I am of Opinion, that it is more proper to refer it to the End, because after the Bones have been demonstrated, these are more easily understood.

184. The Antients have given them *Greek* Names borrowed from the Figure of the Joint or Medium joining; but because Anatomists differ very much in their Explinations of them, I will only give a Syllabus of them here, as they are to be met with in the Writings of *Galen* and *Hippocrates*; and refer what might be said more fully upon this Subject to some other more favourable Opportunity.

185. SYNTHESIS SYNTAXIS or Conjunction of the Bones is the general Term, which these Authors make Use of to express every kind of Juncture, as well with, as without Motion, and this comprehends two different Species or Sorts, *viz.*

Arthron, that is, a Joint or Juncture which denotes the Contact of the Bones, without respect to Connexion; of this there are also two Species, *viz.*

Diarthrosis, which has a manifest Motion; in this are comprehended

Enarthrosis, which is when a round Head is receiv'd into a round Cavity, as the Articulation of the *Os Femoris* with the *Acetabulum*.

Arthrodia, when a Head is articulated with a superficial Cavity, as the *Humerus* with the *Scapula*.

Ginglymus, when a Bone receives and is received, as in the Juncture of the *Humerus* with the *Cubitus*, &c. To which *Trochoides* is added by *Fallopious*, when there is a circular Motion like that of a Top about an Axis, as the Articulation of the first *Vertebra* of the Neck with the second. To these *Ampharthrosis* is added by some Moderns, which according to them comprehends all Junctures with manifest Motion differing from the former either in Figure or Motion.

Synarthrosis, which has either

An *obscure Motion* as the Bones of the *Carpus*, *Metacarpus*, *Tarsus*, *Metatarsus*, &c. or

No Motion at all, of which there are three Sorts, *viz. Sutura, Harmonia,* and *Gomphosis.*

Symphasis or *Union*, shewing the Connexion of the Bones ; and it is either

Without a Medium, (namely another, or different from the Bone in Adults) as in the *Os frontis*, the lower Jaw, the *Ossa innominata*, and the *Vertebrae, &c.* or

With a Medium (namely another, different from the Bone) according to the Diversity of which there are three Sorts, and each with and without Motion, as

Synchondrosis, in the *Ossa Pubis, Vertebrae* with one another, *&c.*

Synneurosis, in all the Junctionures of the *Limbs, Sutures* of the Skull, *&c.*

Syssarcosis in the *Scapulae, Os Hyoides, Gums, &c.*

Of the PERIOSTEUM, MARROW, LIGAMENTS and CARTILAGES,

As Parts pertaining to the BONES.

186. The PERIOSTEUM is a nervous and muscular Membrane, endued with a very acute and active Sense, which immediately invests externally and internally all the

The Periosteum.

the Bones, excepting the Teeth, as far as they appear above the Gums, and the Places where the Muscles are inserted: Hence it is divided into the *internal* and *external Periosteum*, and where it covers the Bones of the Skull, 'tis call'd *Pericranium*.

187. It constitutes the Rudiments or first Principles of the Bones in the Womb, and is the Organ that secretes the bony Matter. The Bones under this receive their Nourishment and Increase or Growth; for its Blood-vessels in innumerable Places penetrate the Bones. It imparts Sense to the Bones; for being depriv'd or stripp'd of this, they may without any Sense of Pain be either burnt or cut; from this the Bones receive their Bounds and Figure, for where this is damag'd, *Exostoses*, *Caries*, *Tophs*, &c. gradually arise. Its Thickness is different in different Parts; but the internal is more thin than the exterior, and communicates Nourishment to the Bones within; it receives Blood-vessels and Nerves, thro' particular Canals form'd in the Bones, which communicate with the Marrow. 'Tis generally suppos'd, that it takes its Original from the *Dura Mater* of the Brain: But this cannot be supported with any Shew of Reason, because it is generated in the *Fætus* together, and at the same time with the *Dura Mater*.

188. The MARROW which formerly ^{The Mar-}
was accounted a shapeless Mass, consists of ^{row.}
an oily fat subtil Substance, and very small
membranous Vesicles, in which this fat
Substance is secreted from the arterious Blood,
almost in the same manner as the Fat, and
is contain'd in most Cavities of the cylindric
Bones. The medullary Vessels penetrate
into the inner Substance of the Bones, thro'
the forementioned Canals, which are observ-
able here and there in the Bones. The Ar-
teries bring the medullary Substance to the
Vesicles, the Veins carry back the super-
fluous Blood; and the Nerves communi-
cate some tho' imperfect Sensation. *It nei-*
ther increases nor decreases according to
the Increase or Ware of the Moon, as some
have thought, but according to the diffe-
rent Degrees of Motion, and the Quantity
or Quality of the Food received. This sub-
til Fat or Oyl insinuating itself into the
Interstices or Pores of the bony Fibres,
contributes to preserve the Bones from
Dryness or Brittleness; but does not sup-
ply them with Nourishment as was former-
ly believ'd.

189. The LIGAMENTS of the BONES ^{Ligamenta.}
are strong Links or Bands, sometimes mem-
branous and sometimes cartilaginous, and
sometimes nervous or tendinous, or round,
design'd chiefly for tying or uniting the
Parts together. There are also other Liga-
ments

ments besides these, which tye the Bones; under which we always comprehend the membranous Parts that bind others together.

Cartilages. 190. Lastly, the CARTILAGES belong to the Bones, which, as has been mention'd before, (31) are elastic Parts somewhat resembling Bones, but containing nothing of a marrowy Substance.

191. They are cover'd with their *Perichondrium* or proper Membrane; and conduce 1. To conjoin the Bones; 2. To cover their Extremities, and render them smooth and even where their Motion is required; and 3. To form the Cavities of the Joints. They are also very necessary for constituting the *Aspera Arteria*, the *Larynx*, the *Bronchia*, the Nostrils, the Ears, the Brims of the Eye-lids, and other Parts.

Of SARCOLOGY:

And first, of the Common Teguments of the Humane Body.

192. Having thus far consider'd the Bones, and the Parts belonging to them as the Props or Support of the humane Machine, we proceed now to the Examination of the soft

soft Parts, the Doctrine or Account of which we have call'd SARCOLOGY (35.)

193. This may be divided into 1. The Doctrine of the *Common Teguments* of the humane Body; 2. *Splanchnology*, or the Doctrine of the Bowels. 3. *Angiology*, or Doctrine of the Vessels. 4. *Neurology*, or Doctrine of the Nerves. 5. *Myology*, or Doctrine of the Muscles; and 6. *Adenology*, or Doctrine of the Glands.

194. In *Splanchnology* we consider, 1. the *Viscera* or Bowels, call'd *Chylopæa*, or such as are employed in digesting the Aliments, or making the Chyle; and these are the Stomach, Intestines, Liver, Spleen and *Pancreas*. 2. The *Uropæa* or such as secrete the Urine, and these are the Kidneys, Ureters, urinary Bladder, &c. 3. The *Organs of Generation*; 4. The *Parts serving Respiration*, and the *Circulation of the Blood*, situated in the Thorax and Neck, as the Lungs, Heart, Diaphragm, and the Parts pertaining to these; and last of all the Brain and Organs of the Senses seated in the Head.

195. But before we proceed to the interior Parts, the COMMON TEGUMENTS covering the whole Body, are first to be consider'd: The Number of which is greater in Beasts than it is in humane Bodies; for in the former there are several, but in the latter only three, *viz.* The CUTICLE
or

or *Scarf-skin*, the SKIN and the *Membrana Adiposa* or Fat; which Parts, together with the rest that follow, we will now exhibit in the *Form of Tables*, as they call them; that in Dissections young Students may with one View as it were see and perceive all the Particulars occurring in every Part, which are necessary to be observ'd, and committed to Memory.

Of the
Cuticle.

196. The CUTICLE or *Scarf-skin* is a thin Membrane closely surrounding the whole Skin, of which it seems to be a Part, and therefore in *Greek* 'tis call'd *Epidermis*; in this we are to observe the following Particulars, *viz.*

Its close Adhesion to the Skin, the *Corpus reticulare Malpighii* lying between; so that in dead Subjects, it may, by boiling Water, be separated from the true Skin, and at other times the same Effect may be observ'd in living Bodies by the Application of an actual Cautery or blistering Plaisters.

Its Regeneration in such as are alive, is easy; however,

Its Rise or Origin does not proceed from the Exhalations of the Body condens'd by the ambient Air, as the Antients suppos'd, but rather according to *Leeuwenhoek*, from the Expansion of the excretory Ducts of the Skin; or according to *Ruyfch*, from the Expansion of the nervous

vous *Papillæ* of the Skin, which form little Scales or thin Membranes cohering to one another, or perhaps from both together, which to me appears the most reasonable.

Its Structure or Substance consists of very minute Membranes or Scales, closely cohering together, which Contexture was first discovered by *Leeuwenhoek* with the Help of a Microscope; in these there are very numerous

Little Holes, giving a Passage to the Hairs, insensible Transpiration and Sweat; of which these last are commonly call'd *Pores*. There are some who attribute *Valves* to these Holes for moderating the Efflux of the Sweat; but this, I am more inclinable to believe, is perform'd by the Elasticity of these Vessels themselves.

Its Thickness is various, being greatest in the Soles of the Feet and Palms of the Hands, but in other Places very thin.

Its various Furrows or Lines are every where perceptible, but more particularly in the Palms of the Hands, by which some vainly pretend to foretel Events. In the Ends of the Fingers they are spiral, and seem to defend the excretory Ducts of the Skin, which are here rang'd in exact Order.

Its

Of the CORPUS RETICULARE.

Its Vessels cou'd not be discovered by the most subtil Injections which *Ruyfch* made Use of, nor can they be demonstrated by others; however, it must of Necessity be nourish'd by some fine and active Fluid.

Its Use is, 1. To defend the Skin from the painful Impressions of hard Bodies, and so to modify the Sense of Feeling. 2. To moderate also the Excretion of the Skin.

*Corpus Re-
ticulare.*

197. The CORPUS RETICULARE is a very thin little Membrane perforated with innumerable very small Holes, like a Net, lying immediately under the Cuticle, and adhering to it; and by Art or Chance it be separated from the Skin: In this we are to consider,

The Place where 'tis mostly found; 'tis generally believ'd that it is to be found under the Cuticle thro' the whole Body; but 'tis scarcely to be observ'd in any other Places, but those in which the Sense of the Skin is strongest, and most exquisite, namely in the Palms of the Hands, and Soles of the Feet. 'Tis also very perceptible in the Tongue, in which its Nature and Constitution are more evident than in all the other Parts.

Its Use; thro' its little Holes it transmits the Hairs, the *Papillæ cutaneæ*, and the excretory Ducts of the Skin; all which it detains in a certain and determinate Order,

der, that they may not be easily remov'd from their Place. It also seems to be design'd to preserve the Softness of the *Papillæ*, and render the Extremities of the Nerves susceptible of the slightest Impressions.

Compare with this Account *Malpighi de Tactus Organo*, as also *Ruysch's* first Epistle, *Fig. 4, 5, 6 and 7*. Which latter Author hath egregiously illustrated the Discoveries of the former.

198. The SKIN is a Membrane thick as ^{The Skin.} a Hide investing the whole Body; in which we must consider

Its Connexion: Its upper Superficies coheres with *Malpighi's Corpus Reticulare*; its lower with the *Membrana adiposa* or Fat, in some Places loosely, and in others very closely.

Its various Thickness in different Parts of the Body, and in different Animals, as may appear by their Hides.

Its many Furrows or Lines common with those of the Scarf-skin.

Its Holes, which are either

{ *Greater*, as in the Mouth, Nose, Ears,
 &c. in which Parts the Skin appears
 rather turn'd back, than perforated;
 or

{ *Less*, commonly call'd *Pores*, and these
 also are either *greater* or *less*, for
 the Passage of the Hairs, and the

Matter of insensible Transpiration and Sweat. The greater are perceptible by the naked Eye, especially in the Nose; but the less are only discoverable by *Microscopes* and the Passage of Mercury thro' the Skin.

Its *Structure* or *Substance*, which consists

{ of *tendinous Fibres* wonderfully interwoven, of a very great Number of *Blood-vessels*, first duly discovered by *Ruysch's* surprising Injections; see his Writings, and

{ of *very many Nerves*, constituting the *Papillæ Pyramidales*, that jet out into the Cuticle thro' the *Corpus Reticulare*. These are most perceptible in the Palms of the Hands, especially about the tips of the Fingers and in the Soles of the Feet, after the Cuticle has been rais'd, and these constitute the principal Organ of the Sense of Feeling^a.

An infinite Number of miliary Glands, according to most of the Moderns, after *Steno* and *Malpighi*, are discoverable in the Skin. These, according to them, separate the perspirable Matter, however, scarcely any, or at least very few of them, can be demonstrated, and the Function

^a *Ruysch. Epist. Tab. XVII. Fig. 2.*

attributed to them can be discharg'd by the small Arteries alone ^a.

The *Cutaneous Receptacles* ^b, are perhaps the *sebaceous Glands* mentioned by others.

The *Use* of the Skin is, 1. To involve and defend the subjacent Parts; 2. To be the Organ of the Sense of Feeling; and 3. To be an universal Emunctory of the Blood, by discharging the Matter of Transpiration and Sweat, both which are of great Service to prevent the Dryness of the Skin.

199. The H A I R S (32) also are generally ^{The Hairs} referr'd to the Skin; those of the Head are the most remarkable, and in *Latin* call'd *Capilli*; in Examination of these, we consider

The *Part without the Skin*, which is round, and being viewed with a Microscope transparent; often knotty, but 'tis neither hollow, nor branch'd; the Extremity is often cloven, and resembles a small Brush.

The *Part within the Skin*, which is call'd the Root, and this is round and bulbous; in all Likelyhood 'tis hollow and vasculous, as Bird's Feathers at the Ends of the Quills ^c, which vasculous Part is con-

^a Vid. *Ruyfch. Advers. Anat.* Dec. I. Pag. 9. ^b They are describ'd in the same Place. Consult the Note with this Number (2.) ^c *Leeuwenhoek, Acta Erud.* An. 1683. Pag. 511. *Ruyfch. Epist.* 1. also in *Thesaur. Anat.* X. Pag. 1. ad 4.

tain'd in a Follicle or small Bag ; very perceptible in Bristles and the larger Hairs.

Their *Original*, which is in Fat within the Skin, and probably deriv'd from Nerves ; which Opinion seems to be supported by the Pain which is occasion'd when they are pluck'd.

The *Matter nourishing* them, which is the same as that of other Parts ; and not excrementitious, as the Antients thought ; neither do they grow after Death, as is commonly believ'd ; the Truth of which Assertion I have learn'd by undoubted Experiments.

Their *Colour* ; which in very hot Countries is very black ; in temperate brown , or black ; in cold Countries 'tis yellow , reddish, and brownish ; in old People the Colour every where is chang'd into grey ; and in those who are employed in Copper, it becomes green.

Their *Length* ; which is different according to the *different Parts of the Body*, for in the Head they are longest, and *according to the Persons and Countries* ; under the torrid Zone they are very short and curl'd ; in the more temperate, they are longer.

Their *Consistence, in relation to the Touch* ; this is different, i. according to the Diversities of *Persons and Countries* : In *Ethiopians*, and such as are of a dry Habit,

Habit, they are hard; in Infants, and those who are of a moist Constitution, they are soft. 2. According to the Diversity of Place: In the Privities and Arm-pits, they are very hard; in the Head they are softer, in the other Parts of the Body they are very soft.

The *Time of their Rise*; some are brought into the World with us, as the Hair of the Head, the Eye-lashes, and Eye-brows, and some sprout out at a certain Age, as in the Privities and Arm-pits. Some always grow, and others never after Nativity.

The *Use of the Hairs of the Head*: Here it seems to be formed to heat and adorn it. But the Use of the Hair of the other Parts, excepting the Eye-lashes and Eye-brows is not so evident.

200. The *Situation*, Number, Figure, Magnitude and Colour of the NAILS are known to all; but besides these, the following Particulars demand our Observation, *viz.* the *Parts*: The extreme Part of the Nails is call'd *Apex* or the End, the opposite, the Root or Beginning; the latter is thinner and softer, the former thicker; the brightish Semicircle at the Root is named *Lunula*, and in *English* 'tis call'd the White of the Nail.

The *Substance*: they consist of Cutaneous Papillæ lengthen'd out, harden'd, and firmly

ly conjoin'd in a parallel Order; wherefore in the Root, where the *Papillæ* are more tender, they are very sensible, but at the Extremity they may be cut without any Sense of Pain. The *Papillæ* both of the Root and the inferior Part arise from the Skin; therefore toward the Extremity, because of the greater Number of the uniting *Papillæ*, they are thicker and stronger, and by their Means it is, that the Nails so firmly cohere to the Skin. Nevertheless, they are easily separated in dead Bodies, if hot Water be made Use of.

Their *Nutrition*; as the other cutaneous *Papillæ* have Vessels by which they receive their Nourishment, so these also have theirs in their Roots; the *Papillæ* next these, (as is also observable in the Nutrition of the Hairs) thrust forward those that are immediately above them; and this is the only Method of their Nutrition and Accretion, without the Assistance of any Fluid flowing thro' Tubes from their Roots to their Extremities. After Death, all Accretion ceases; the contrary of which, tho' false, is still maintain'd by many.

Their *Use* is first to defend the Fingers, so that they may not be easily hurt by external Injuries. Secondly, to render the Hands more capable to lay hold on small things; Thirdly, to assist us in scratching

scratching the Parts that itch, and scraping away a Variety of things, particularly Dirt; Fourthly, to make the Fingers more beautiful; and Fifthly, to strengthen the Motion of the Feet, and to prevent painful Impressions, &c.

Some *Animals* (in which there is an Analogous Conformation) seize and tear their Prey with them, as Cats and Lions, &c. In others they serve instead of Hooks, for their greater Facility in climbing, as in Apes and Squirrels, &c. Some use them instead of Shoes, and others they serve instead of Arms, as Horses, Oxen, &c. While they defend themselves and assault their Enemies with them.

201. In the *Membrana Adiposa* or F A T, *The Fat.* we are to remark the *Situation*; almost every where under the Skin thro' the whole Body; 'tis also among the Interstices of the Muscles, in the Cawl, Mesentery, about the Kidneys, and in several other Places.

Its *Substance*, consisting of

{ A thin transparent Membrane, having innumerable little Cells or small Lobes communicating with one another, and a

{ fat oily Matter, (the buttery Part of the Blood) filling those small Cells secreted from small Arteries, and not by Glands. In those who are very

much emaciated there is only this Membrane, all the little Cells being void of Fat.

According to the *Distinction* of Authors between the *Adeps* and *Pinguedo*, there is no such thing as *Adeps* to be found in Men.

The *Blood Vessels*, namely, the Arteries and Veins, are numerous from the neighbouring Parts, and they surround the Membranous Cells. The *Nerves* are few, since it has but a dull and very imperfect Sense.

Vasa Adiposa or Fat-vessels are added by some; but these I suppose are no way different from the lateral Vessels of those that convey the Blood, or from the fore-mentioned small Cells.

The Circulation, Motion, or Return of the Fat to the Veins, is abundantly evident from the quick Consumption of it in certain Diseases, and the violent Motion of Animals.

Its *Use* is 1. To defend the Body from Cold; 2. From the Acrimony of the Salts of the Blood; 3. To preserve the Flexibility of the Skin, Muscles, and other Parts; 4. Perhaps in some Measure to serve again for Nourishment in the Time of Want. 5. To fill up the empty Places, in which respect it first conduces to render the Parts beautiful, as in the Face, Neck, &c.

&c. Secondly, while it fills up the Spaces among the Fibres of the *Anus*, *Vagina uteri*, and *Ossa Ischii*, it contributes to the due Extension and Dilatation of the foresaid Parts in the Exclusion of the *Fæces*, and *Fætus*; and 6. To prevent painful Attrition or Contusion, as in the Soles of the Feet and Region of the Pubes.

202. The PANNICULUS CARNOSUS or *Panniculus* fleshy Membrane is by many describ'd *Carnosus*. for the fourth common Tegument: This is a muscular Membrane, which in Beasts lies between the Skin and Fat, by the Assistance of which they move their Skin and drive away the Flies; but in humane Bodies 'tis no where found, but in the Face; without Doubt, because reasonable Creatures, being furnished with Hands and Cloaths, have any Occasion for it any where else.

203. The COMMON MEMBRANE of the *The common Membrane of the Muscles.* MUSCLES is also described by some for a common Tegument; this lyes under the Fat, and is said to surround all the Muscles, but 'tis without Reason accounted an universal Tegument, because it is not expanded over the whole Body; and only found in a few Parts; but wanting in many.

204. The common Teguments being thus discuss'd, the CONTAINING PARTS of the ABDOMEN, or PROPER TEGUMENTS, name-

Of the MUSCLES of the ABDOMEN.

namely, the *Muscles of the Abdomen*, and the *Peritonæum* now follow; for we first proceed to examine those Parts of the *Abdomen*, because these on account of the *Fæces*, which they contain, are most liable to Corruption, and that the rest may afterwards be more freely handled and preserv'd from Stink.

*Muscles of
the Abdo-
men.*

205. In our Demonstration of the Muscles of the *Abdomen*, we must observe,

The *Situation*; they occupy and make up the whole Circumference of the *Abdomen*.

The *Linea alba* or white Line, extended thro' the Middle of the *Abdomen*, from the *Sternum*, or Breast-bone, to the Junction of the *Os Pubis*, is made of the Tendons of these Muscles, in the Middle of which is the Navel.

Their *Number* is commonly believ'd to be five Pair.

1. The first Pair is the *Musculus rectus*, this takes its Rise in the *Os Pubis*, and terminates in the *Sternum* and several of the Ribs; and in this there are three or four tendinous Distinctions or Coarctations of its fleshy Fibres.

2. The second is the *Obliquus Descendens*; this takes its Origination from several Ribs, *Vertebrae* of the Loins, and the Bones of the *Ileum* and *Pubes*; it has an Aponeurosis or Tendinous

- dinous Expansion, by which it is inserted in the *Linea alba*.
3. The third is the *Obliquus Ascendens*, this arises from the *Ossa innominata* and *Vertebrae* of the Loins, and is inserted partly in the lower Margin of the false Ribs, and partly in the *Linea alba*.
 4. The fourth is the *Musculus transversalis*, this has the like Origination and Insertion.
 5. The fifth is the *Pyramidalis*; this is very small, it arises from the Junction of the *Os Pubis*, and terminates in the *Linea alba* below the Navel: But sometimes this Pair is entirely wanting, and sometimes there is only one Muscle.

Their *Vessels*; they have *Arteries* and *Veins* from the Mamillary, the Intercostals, the Epigastric, and those of the Loins; their *Nerves* are sufficiently great, and spring from the Lumbals and Dorsals, or those which belong to the Loins and Back.

The *Perforation* or *Ring* in the lower Part of the *Obliquus Descendens*, the *Ascendens* and *Transversalis*, for the Passage of the Processes of the *Peritonæum* and spermatic Vessels in Men; in Women, transmits the round Ligaments of the Womb, and in Ruptures gives way to the Intestines and Cawl. The

The *Ligaments* of *Poupartius* is between the Spine of the *Ileum* and the *Os Pubis*; consult the Note under the Number (3.)

Their *Use* is 1. To contain and defend the Contents of the *Abdomen*; 2. To assist by their perpetual Motion, Digestion, and the Progress of the Chyle; 3. To promote the Exclusion of the Fæces, Urine, Fœtus, and Secundine or After-birth in the Time of Delivery; 4. To assist Respiration; 5. To help the Flexion of the Body; 6. To facilitate Vomiting; and perhaps to contribute also to leaping or dancing.

Peritonæum 206. The PERITONÆUM adheres next to the transversal Muscles of the *Abdomen*. This is a thin polish'd and slippery Membrane, investing the whole *Abdomen*, and containing most of its Contents as it were in a Bag; it coheres likewise with the Diaphragm and all the Bowels of the *Abdomen*; it entirely involves the *Stomach*, *Intestines*, *Mesentery*, *Cæwl*, *Liver*, *Spleen*, and *Pancreas*, which therefore are said to be situated in the *doubling of the Peritonæum*. But it only covers the upper Part of the *Kidneys*, *Ureters*, *Bladder*, and *larger Vessels of the Abdomen*.

It forms 1. The Ligament that suspends the Liver, call'd *Suspensorium*; 2. The two broad Ligaments of the Womb. It

It has two Processes which pass out of the *Abdomen*, and form a Covering or Sheath for the spermatic Vessels and Testicles; in the Examination of which we must observe

1. Their *wonderful Course* thro' the Rings of the Muscles of the *Abdomen*.
2. The *Hole* in the *Abdomen* of Dogs, which is wanting in that of Men.

It gives an *Involucrum* or Case to the round Ligaments of the Womb in Women, the interrupted Courses of which are delineated by *Nuck. Adenogr. fig. 39. and 40.*

It receives *Arteries* and *Veins* from the *Epigastrics*, *Mammaries*, *Lumbals*, and *Diaphragmatics*.

Its *Nerves* proceed from the *Diaphragmatics*, *Dorsals*, *Lumbals*, and those of the *Os sacrum*.

Lymphatic Vessels are added by some.

Some also affirm, that there are *Glands* observable in it, which however are not conspicuous in a natural State; consult the Note under this Number (4.)

Its *Use* is 1. To contain the *Viscera* of the *Abdomen*; for when it is too much dilated or broken, they slip from their Place, and Ruptures arise; 2. To give Coats to the Testicles, and almost all the Contents of the *Abdomen*, which are therefore commonly said to receive their
1
external

external Membrane from the *Peritonæum*.

The Con-
tents of
the Abdo-
men.

207. A VIEW of the CONTENTS of the
ABDOMEN;

When the *Peritonæum* is prudently opened,
the following Parts are seen, *viz.*

The *Vessels* call'd *Umbilical*, which in Adults
are chang'd into Ligaments, these are two
Arteries, one *Vein*, and the *Urachus*,
which almost entirely disappear in Beasts
that are old, or at least are less visible
than in Men ^a.

The *Omentum* or Cawl, in *Greek* call'd *Epi-
ploon*, lying upon the Intestines.

The *Guts* taking up the greatest Part of the
Abdomen.

In the Middle, are the *small* and *thin*
Guts.

In the Circumference, are those call'd
great and *thick*.

The *Mesentery* or Membrane joining the
Intestines.

The *Stomach* situated in the upper Part, and
more to the left than right.

The *Liver* and *Gall-bladder* in the right
side, or *Hypochondre*.

The *Spleen* in the left side adheres to the
Stomach, and lyes against the false Ribs.

The two *Kidneys* conceal'd under the Intes-
tines, and lying upon the Loins.

^a See more of this in the Chapter, where we discourse of
the *Fœtus*.

The *Bladder* at the Bottom of the *Abdomen*, call'd *Pelvis*, connected with the Bones of the *Pubes*.

The *Pancreas* or Sweet-bread, which is a great Gland plac'd under the Stomach.

Some Parts of *Generation* ;

{ In Men the *seminal Vessels*, &c.

{ In Women, the Womb, its Ligaments, the Ovaries, the *Tubæ Fallopianæ*, and other Parts pertaining to it.

The great *Artery*, or *Aorta*.

The *Vena Cava*.

The *Vena Portæ*.

The *Iliac*, the *Emulgent*, the *Mesenteric*, and other Arteries and Veins, &c.

208. The OMENTUM or CAWL is a *The Cawl*, membranous Part, generally furnished with Abundance of Fat, lying under the *Peritonæum* upon the Intestines.

Its *Synonymous Terms* in *Latin*, are *Rete*, and *Reticulum*, from its resemblance of a Net, and in *Greek* *Epiploon*, because it seems to float or swim upon the Intestines.

Its *Situation* ; for the most it takes up the upper Part of the *Abdomen*, and is also often extended to the lower.

Its *Weight* in Adults, who are neither fat nor lean, is about half a Pound, but in Brute Creatures, it varies very much according to the Fat.

Its

Its *Connexion*;

In the *lower Part*, it is free and fluctuates.

In the *upper*, { Before, it is join'd to the Bottom of the Stomach, the *Duodenum* and Spleen. Behind, to the *Colon* and *Pancreas*.

Its *Substance* consists,

of a very fine double Membrane, whose Cavity resembles a Bag, and therefore 'tis call'd *Bursa*.

of Fat contain'd in little Cells, which seem to form so many Ducts.

of *Vessels*, { which are very numerous Arteries from the *Cæliac*. Veins from the *Vena Portæ*, especially the splenic Branch.

Nerves, from the *Intercostal*, and *Par Vagum*.

and *Lymphatics*.

The Spaces among the *Anastomoses* of the Vessels are call'd *Areolæ*.

For the most Part there are little Holes in it, from which it receives the Name *Rete*.

The *Ductus Adiposi* of *Malpighi* are nothing but the lateral Vessels of those that carry the Blood, which surrounding the Blood-vessels, deposite the Fat into little Cells; which also have a Communication with the Veins; (consult the Note under

under this Number (5.) as is observable in other Fat ^a (201.)

Its *Use* is, 1. To assist the Motion of the Intestines, by its Lubricity or Slipperiness; 2. To defend the Intestines against Cold; 3. To help the Preparation of the Bile; 4. To allay the Acrimony of the Humours; and 5. Perhaps to supply Nourishment, where there happens to be a Deficiency of Food as has been already mentioned (201.)

209. The STOMACH is a hollow Mem-^{The Sto-}
branous Part, whose Figure resembles a mach.
Bag-Pipe, form'd for the Reception and Digestion of the Aliments: We consider, Its *Situation*; which is oblique under the Diaphragm between the Liver and the Spleen. Its *Division*; into two Orifices and the Bottom.

Its *Bottom* is the greatest and lower Part.

Its <i>Holes</i>	{ are the left call'd <i>Cardia</i> , which is higher than the right, the Gullet is a Con- tinuation of it, and 'tis fur- nish'd with many Nerves. and the right call'd <i>Pylorus</i> , to which the Intestines are join'd, where there is a par- ticular Valve, having an in- clin'd Situation ^b .

^a There is a very fine Delineation of these Arteries in *Ruyssch's* Thesaur. Anatom. II. Tab. V. Fig. 1. ^b This is delineated in the sixth Figure.

Its *Magnitude* is various, in Gluttons for the most Part it is very large; 'tis also greater in Men than in Women.

Its Number: In Humane Bodies there is only one; in various Beasts there are more.

Its *Vessels* are { the *Arteries* call'd *Gastrics* from the *Celiac*.
the *Gastric Veins* go to the *Portæ*, the *Vas breve* passeth to the splenic Branch, and the *Coronary Vein* surrounds the Stomach.

Its *Nerves* are very considerable from the *Par vagum*, especially about the left Orifice, where they enter.
Its *Lymphatics* creep to the Receptacle of the Chyle.

Its *Substance* is membranous, compos'd of four Coats.

{ The first is *Membranous*, whose Fibres are transverse.

{ The second is *Muscular*, in which there is a double Order of Fibres.

{ The *exterior* descends from the upper Part to the lower, and

{ The *interior*, whose Fibres run partly from the upper Part of the Stomach, between both Orifices; and partly from the left side to the right in an oblique Course.

The

The third is *Nervous* forming Wrinkles, and furnished with many Blood-vessels and small Glands, that separate the Liquor that is call'd *Gastric*. These are easily observ'd in Swine, but seldom in Humane Bodies.

The fourth is call'd *Villosa*, 'tis thin and porous^a, and adheres to the Precedent.

Its *Use* is *Digestion*, that is, that it may receive, contain, dissolve, and expel the Aliments thro' the *Pylorus* into the Intestines; and 2. To excite Hunger.

210. The INTESTINES are great Mem-^{The Guts,}branous Canals, extended from the Stomach to the *Anus*; in these we must observe

Their *Length*, being six Times longer than the Body from which they are taken.

Their *wonderful Circumvolutions* and their *Use*.

Their *Connexion* by the Assistance of the *Mesentery* with the *Vertebrae* of the Loins.

Their *Number*: Properly speaking they are but one; but generally divided into six; three of which are call'd the *small* or *thin Guts*.

Ruyfch. Thesaur. Anatom. II. Tab. V. Fig. 2.

Of the small GUTS.

1. The first of these is call'd *Duodenum*, because 'tis twelve Inches long; it takes its Rise from the *Pylorus*, and runs first perpendicularly, then horizontally, from the right Part of the *Abdomen* towards the left Kidney. At the Distance of three or four Fingers from the *Pylorus*, two Canals open into it call'd *Ductus Cholidochus*, and *Ductus Pancreaticus*; from the one, it receives the Bile, from the other, the *Pancreatic Juice*. The Thickness of its Coats is greater than that of the rest of the small Guts, but its Cavity is commonly less. It receives an Artery from the *Coeliac*; and like the rest of the Guts, it has its Vein from the *Porta*. *Brunnerus's* Glands are very numerous here for the Secretion of a thin Liquor^a.
2. The second is call'd *JEJUNUM*, because 'tis generally found empty, on Account of the Fluidity of the Chyle, the Sharpness of the Bile, and the great Number of the lacteal Vessels. Its Situation is above the umbilical Region; It has many connivent Valves or Wrinkles. It begins where the *Duodenum* ends, and ends where

^a Tractat. de Glandulis Duodeni.

the Valves are not observable. Hence it is, that I have observ'd its Length different in different Subjects; for sometimes it was longer, and sometimes shorter than the *Ileum*; and therefore it has been sometimes thirteen, and sometimes sixteen Hands Breadth long.

3. The third is named *Ileum*, because its Situation is chiefly below the Navel, nigh the Bones of the *Ileum*. Its Length sometimes scarcely exceeds fifteen, and at other Times twenty Hands Breadth; it has its Beginning where the Valves disappear, and terminates where the thick Guts begin; at which Place 'tis inserted in a particular manner, in the left side of the Colon^a. It has no Valves but that great one, in the End of which the *Bauhins* call the Valve of the Colon. It generally has more Glands at the End than any where else.

There are three great or thick Guts, so call'd The great Guts. because of their greater Bulk.

1. The first of these is the COECUM; it is situated by the right Os *Ileum*: It begins where the *Ileum* ends, and terminates with an Appendage or Worm-like Process. The Length of

^a See our Dissertation on the Valve of the Colon.

this Intestine does not exceed that of three or four Fingers; some Glands are observ'd in the Appendage, which together with its erect Situation intimate, that its Use is to secrete some Fluid. In Hens, &c. this Appendage is double; in Fishes it is manifold^a.

2. The second is the COLON; this is situated in the Circumference of the small Guts, and in different Subjects has different and wonderful Windings and Turnings: Its Beginning is where the *Ileum* ends; and it terminates at the *Os sacrum*. It is *connected* with the *Os Ileum*, the right Kidney, the Gall-bladder, the Liver, Stomach, Spleen, and left Kidney, &c. Its *Length* sometimes scarcely exceeds five, but very often it is more than seven Hands Breadth: As to *Bulk*, it is the greatest of all. It has three Ligmaments running in Length, and ending in a Worm-like Process^b. The adipose external Appendages serve for Lubrication: The *connivent Valves* in this Intestine are very great, and the Coats are stronger, than in the small Guts.

^a Grew's Comparative Anatomy. ^b Morgagn. Adversar. Anat. III. Pag. 27.

3. The third is call'd *RECTUM*, because its Situation is straight above the *Os sacrum*; its *Length* is a Hand's Breadth and an half, or two; its Breadth is that of three Inches. It begins at the lowest *Vertebrae* of the Loins, and its Extremity or End is call'd *Anus*; it has three Muscles, the first is the *Sphincter*, which is compos'd of annular Fibres, to shut the Passage of the Guts: The other two are call'd *Levatores Ani*, they draw up the *Anus*, of which in Myology. In Men this Gut is connected with the *Coccyx* and the urinary Bladder: In Women with the Neck of the Womb. Its Coats are the thickest, and the most fleshy of all; there are not any Valves here as in the Colon, but only Wrinkles; that the Exclusion of the *Fæces* might not be retarded. Its Glands are distant from one another, but greater than those in the rest: It is surrounded with much Fat for its Dilatation in the Exclusion of the *Fæces*.

211. The STRUCTURE of the INTESTINES is membranous, compos'd of five Coats. *The Structure of the Intestines.*

The first is *membranous* or common from the *Peritonæum*.

The second is call'd *Cellulosa Ruyschii*, this is to be discovered by Inflation, and often contains Fat in fat Animals. Thef. Anat. VI. Tab. V. Fig. 2.

The third is muscular compos'd of a double Order of Fibres, longitudinal and circular for the peristaltic Motion of the Guts.

The fourth is *Nervous*, furnish'd with numerous Vessels and Glands; this is larger than the rest, and therefore forms the Valves and Wrinckles.

The fifth is call'd *Villosa*; this sustains the Extremities of the excretory, and the Orifices of the lacteal Vessels; hence it is, that upon accurate Examination it appears Sieve-like; therefore it may justly be accounted the principal Organ for straining the Chyle.

Its Vessels are very numerous, viz.

The *Mesaraic Arteries*; the upper for the small Guts, and the inferior for the great.

The *Mesaraic Veins* go to the *Porta*.

The *Nerves* come from the *Par vagum* and Intercostal.

The *Lacteals* and *Lymphatics* shall by and by be demonstrated apart.

The *Rectum* receives Vessels from the Hypogastrics.

The

The *Peyerian* and *Brunnerian* Glands in the small Intestines are generally conglomerate, little, miliary, and sometimes also *solitary*, or set at a Distance from one another; greater towards the *Duodenum*, but less towards the great Guts; depositing a Fluid in the Intestines, for refining and attenuating the Chyle.

In the thick Guts and the Worm-like Appendage, they are *greater* and *solitary*, as also lenticular, secreting a Fluid for moistening the *Fæces* and lubricating the Intestines, lest the Exclusion of the *Fæces* should be too troublesome.

The Use of the *small Intestines* is to promote the Attenuation and Secretion of the Chyle, and to thrust down the *Fæces* to the great Guts.

The *great* to collect the *Fæces*, and to expel them at a proper Time.

212. The MESENTERY is a thick fat Membrane situated in the Middle of the Intestines, from which Position it derives its Name. In this are to be considered, The *Substance*; which consists of Membranes, Fat, all kind of Vessels, and many Glands.

The *Connexion*; in the upper Part it is join'd with the three superior *Vertebræ* of

of the Loins; in the lower, with all the Intestines, to which it gives the external or common Coat.

Its *Division*; That Part, which touches the Colon, is by some call'd *Mesocolon*: But the rest is nam'd *Mesenterium* or *Mesaraum*.

Its *Circumference*, in which, if it be separated from the Intestines, we observe,

{ Its *Folds*, which bear the Resemblance of *Ruffles*; and

{ Its *Length*, which is about three Ells; to which however, the Intestines, which are four times longer, are connected.

Its *Membranes* or Coats are two, the upper and the lower; between which there is plac'd a *Cellulous Substance* containing Fat, as also *Mesaraic Vessels*; some take this for a third Coat, and call it the *Membrana Cellulosa* or *Adiposa*^a.

Its *Vessels*, which are

{ *Blood-vessels*, the same with those of the Intestines, forming here wonderful Anastomoses, Windings and Turnings^b.

{ *Nerves* derived from the *Par vagum*, and the Intercostal.

{ *Lacteals* and *Lymphatics*, of which anon.

^a Warthonus Adenograph. Cap. VIII. Ruysch. Thef. Anat. VI. ^b Optime ab Eustachio in Tab. anatom. & Cheselden, Tab. 15. & 16, delineata.

Its Glands are many, dispersed thro' the whole Mesentery, whose

Number, Bulk and Situation are very various. In Dogs, instead of many, there is only one; but it is larger than in Men, call'd *Pancreas Asellii*.

The Use of these is to secrete a Liquor, and with it to dilute the Passing Chyle, for the lacteal Vessels pass by them.

Its Use is {
 1. To connect and retain the Guts in their Situation.
 2. To sustain the Lacteals and Blood-vessels of the Guts.
 3. To make the Way of the lacteal Vessels to the Receptacle much shorter.

213. The CHYLIFEROUS VESSELS The lacteal Vessels. are the LACTEALS and the THORACIC DUCT: The former are small Canals in the *Mesenterium*, carrying the Chyle; in Examination of which we are to remark

Their *Inventor*, viz. *Asellius*, who discovered them *An.* 1622. They were formerly observ'd by *Erasistratus* and *Galen*, but by these they were taken for Arteries of Milk.

The *most proper Time for discovering them*; and this is two or three Hours after eating, in Beasts that have been well fed, and

and newly kill'd, because they then are swell'd with Chyle; for after the Time of Digestion, they only carry a pellucid Lymph.

The *Method of demonstrating them best*; this is by tying the Thoracic Duct with a Thread.

The *Difficulty of demonstrating them in Humane Bodies* arises from hence, because they are not cut up warm or soon enough; for they generally disappear in cold Subjects.

Their *Original* is chiefly from all the small Intestines, by many and far more numerous Roots in Humane Subjects^a than in Dogs; consult the Note under this Number (6), and lastly, but very seldom, from the great^b.

The *Distinctions of the Lacteal Vessels* into those call'd

Lactea primi generis, extending themselves from the Intestines to the Glands of the *Mesentery*; and those call'd *Lactea secundi generis*, which go from the Glands to the Receptacle, where they terminate; these are larger than the former, but fewer; some also affirm, that there are those which are

Lactea tertii generis.

^a See our Draught of them Fig. 8. taken from a Man; for the Draughts which others have given, have been taken from Beasts. ^b See our Observat. in Ephemer. N. C. Cent. V. P. 234.

Their semilunar, double and opposite *Valves* opposing or hindring the *Reflux* of the *Chyle*; but these are not so frequent and numerous here, as in the *Lymphatic Vessels* ^a.

Their *Use* is to convey the *Chyle* from the *Intestines* to the *Cistern* or *Receptacle* of the *Chyle*.

The *Want* of them in winged *Creatures*, in which the *Chyle* enters the *Mesaraic Veins*.

214. The THORAIC or CHYLIFE-*The Thoraic*
ROUS DUCT is a very tender Canal, *Duct.*
receiving the *Chyle* from the *Lacteal* and
the *Lymph*, from the *lymphatic Vessels*,
and carrying them to the *subclavian Vein*;
in which we are to observe,

Its *Inventor*, viz. *Pecquet* ^b, An. 1651.
but this was taken Notice of long be-
fore that by *Eustachius* ^c, tho' too ob-
scurely describ'd by him.

Its *Beginning*; this is call'd the *Cistern* or
Receptacle of the *Chyle*, and is situated
in the left side of the upper *Vertebræ* of
the *Loins*, under the *Aorta*, and *Vessels*
of the left *Kidney*; 'tis larger than the
rest of the *Duct*, and of an irregular
Figure.

Its *End*; it terminates in the *subclavian*
Vein, and that generally the left.

^a *Ruyfch.* Dilucidatio valvular. ^b *Pecquet* Experimenta Ana-
tomica. ^c *Lib. de vena Azygos.*

Its *Progress* and *Situation*; under the *Aorta* sometimes with a single, and sometimes a double Trunk.

Its *Latitude* being about a Straw's Breadth, where it is undivided.

The *best Method of demonstrating it in Animals* is, if for Instance, in a Dog that was well fed and newly kill'd, it be tyed with a Thread in the Thorax, nigh the subclavian Vein, by which means, both it and the Receptacle with the lacteal and lymphatic Vessels will become very obvious to the Sight; or according to *Salzmannus*^a, if, in a Man any Time after Death, the great lymphatic Vessel running down by the left emulgent Vein be inflated or receives an Injection of Wax or any Liquor; or 2. If the same be tryed upon a lacteal Vessel of the larger or second Size, which must be search'd out in the Center of the Mesentery, according to the new Description of *Henningerus*^b; or 3. If the *Pleura* between the Vein *Azygos* and the *Aorta* be cut, it may for the most Part be discovered there.

Its *Substance* consists of a very tender and fine Membrane.

^a In a particular Dissertation, on this very Method publish'd An. 1711. ^b In Ephemer. Nat. Curios. Cent. IV. Append. P. 120.

It has *Valves* thro' its whole Length, in order to hinder the Reflux of the Chyle: There are more of these in Humane Bodies than in Beasts.

It has a *semilunar Valve* covering its Extremity in the subclavian Vein.

Its *Use* is to convey the Chyle from the Receptacle, and the Lymph from the Lymphatic Vessels into the Mass of Blood.

215. We now proceed to the LYMPHATIC VESSELS, because their Structure is like that of the Lacteals, and they are demonstrated at the same Time with them. In these we observe

Their *Description*: They are fine, tender, pellucid Vessels, which commonly carry an aqueous Humour, call'd Lymph; but in the Intestines, especially the small, at the time of Digestion, they carry Chyle; and then, as has been said, they are call'd *Lacteals*, which in the Intestines are the same Vessels.

Their *Discoverers* were, *Thomas Bartholine* and *Rudbeckius*, An. 1651^a. But the *English*, as *Glisson*^b, and others, give the Glory of the Invention to *Joly* their Country-man.

^a Vid. *Bartholin.* de Vasis lymphaticis & lacteis. *Rudbeck* de Ductibus Hepaticis aquosis. *Hemsterbusii* Messis aurea.

^b Tractat de Hepate. Cap. XXXI.

Their *Situation* ; which is in the Superficies or Surface of almost all the Parts, especially the Liver.

Their *Structure* is of a very fine Membrane, as in the Lacteals.

Their *Valves* are very numerous, semilunar, and double, these have been exactly demonstrated by *Ruysch*, in his Book of the Valves of the Lymphatics. Consult Number (7).

Their *Beginning* is in most Parts of the Body ; for altho' it is probable, that they are in all ; they have not been as yet demonstrated.

Their *End* or Insertion.

1. Into various greater Veins, especially the *Cava*, *Portæ*, &c.
2. Into the *Cistern* or Receptacle of the Chyle.
3. Into the *Thoraic Duct* it self.

The Manner of demonstrating them either is by

tying the Thoraic Duct or *Vena cava*, the *vena Portæ*, the Splenic, Renal, or any larger Vein in an Animal, as yet alive or new kill'd, — or by strongly inflating the Veins, Arteries, or the excretory Ducts of the Viscera.

Their *Use* is to carry back the superfluous Lymph, which is not spent in Nutrition, from the Parts, either to the Mass of Blood,

Blood, or to the lacteal Vessels; for this Lymph conduces again to dilute the Chyle and Blood.

216. The PANCREAS, or *Sweet-bread* is The Pan-
a great smooth Gland of a flesh Colour creas.
lying behind the Bottom of the Stomach,
and extended across from the *Duode-*
num, towards the Spleen; in which are
to be considered

Its *Connexion*: With the *Duodenum*, *Me-*
sentery and *Spleen*; it is single in Humane
Bodies but in Dogs and Cats it appears
as divided into two.

Its *Length* is about eight or nine Fingers
Breadth, and it is about one *thick*; its
Weight is about three Ounces.

Its *Figure*: In Humane Subjects it is like a Dog's
Tongue, being broader nigh the *Duode-*
num, but narrower towards the Spleen.

'Tis *surrounded with a Membrane*, which is
a Continuation of the *Peritonæum*.

Its *Substance* is glandulous, it being one of
the conglomerate Kind, compos'd of
smaller Glands.

Its *Vessels* are *Arteries* from the *Cæliac* and
Spleenic Branch; *Veins* also from the
Spleenic, *Nerves* from the *Par vagum* and
Intercostal, but its *Lymphatics* are un-
certain.

Its *Excrerory Duct* is compos'd of many
smaller; the first

Discoverer of which was our Country-tryman *Mauricius Hoffman* at *Padua*, *An. 1641*, who found it in an *Indian Cock*, and after him it was found in a Man by *Wirfungus*, as *Thomas Bartholine* testifies, who at the same time saw it ^a.

Its Number: In Humane Bodies 'tis for the most Part single, and sometimes double, which is common in Geese, Ducks, Drakes, Pheasants, and other Fowls; but in Cocks, Pigeons, and Eagles, &c. it is triple.

Its Situation is in the Middle of the *Pancreas* resembling an empty Vein. Its *Thickness* is equal to that of a small Straw.

Its End or Aperture is in the *Duodenum*, four or five Fingers below the *Pylorus*, and for the most part it opens into the same Orifice with the *Ductus Cholidochus*: But sometimes it has a double Aperture. In most Beasts it is inserted in a peculiar Orifice into the *Duodenum*, at a remarkable Distance below the *Ductus Cholidochus*.

The *Use* of this Gland is to secrete a Liquor call'd *Succus Pancreaticus*, which is

^a Anatom. Reform. Lib. 3. Cap. 13. & *Johan Mauric. Hoffman Dissertat. in Hornii Microcosm. P. 164.* Item in *Idea Machin. Human. P. 42.*

of the same Nature with the Spittle,
and serves to attenuate the Chyle.

217. The LIVER is a very great and red *Viscus*, The Liver! situated in the right *Hypochonder*,
and form'd for the Secretion of Bile, in
which the following Particulars are re-
markable, *viz.*

The Reason of its Bulk, namely, that a
large Quantity of the Gall might be
secreted.

Its irregular Figure: The upper Superficies
is convex, smooth, and equal, the lower
is concave and unequal, containing the
Gall-bladder.

Its Eminence, call'd *Porta* or Rising, where
the *Vena Portæ* enters the Liver.

Its Division into Lobes, in Dogs, which are
not in Humane Bodies or Calves.

Its Weight, which is about four Pounds.

Its Connexion, by the Means,

{	1. Of Ligaments, <i>viz.</i>	{	the broad with the
			<i>Diaphragm.</i>
{	{	{	the round with the
			Navel, which Li-
			gament was the
			Umbilical Vein in
			the <i>Fœtus</i> .

2. Of Vessels, especially the *Vena Cava*,
and the *Vena Portæ*.

The Membrane surrounding the Liver is
thin, and derived from the *Peritonæum*,
of which 'tis a Continuation.

The *Capsula Glissonii* is a strong Coat from the *Peritonæum* inclosing within the Liver Branches of the *Vena Portæ*, and the *Biliary Ducts*.

Arteries for Nutrition, 1. From the *Celiac*; 2. The *Diaphragmatics*; 3. And sometimes also from the upper *Mesenteric*.

Veins: 1. From the *Vena Portæ*, which performs the Office of a Vein and Artery; it brings Blood to the Liver, and serves for Secretion, concerning which consult the Description of the *Vena Portæ*; 2. The *Vena cava* for the Return of the superfluous Blood to the Heart.

Its *Vessels* are

Nerves: from the *Plexus Hepaticus* of the intercostal Nerve.

The *Biliary Vessels* are the *Ductus communis Cholidochus* opening obliquely into the *Duodenum*.

Ductus Cysticus, arising from the Gall-bladder, and terminating in the *Cholidochus*; in Men this is Winding, and often furnish'd with special Valves

Valves See Note (8).

Ductus Hepaticus from the Liver to the *Cholodochus*.

Ductus Hepatico-cysticus, and *Radices Felleæ*, in Oxen. And the *Poribilarii* distributed thro' the whole Liver.

The *Lymphatic Vessels* are discovered, 1. By fixing a Ligature upon the *Vena Portæ* in living Animals; 2. by inflating the Artery or Hepatic Duct.

The *Canalis venosus* in a *Fætus*, and the great Sinus of the *Vena Portæ*.

Its *Substance* according to

{ the *Antients*, is made up of Blood concreted about the Blood-vessels.

{ *Malpighius*, and most of the Moderns, 'tis glandulous. Note (9).

{ *Ruysch*, 'tis vasculous, being a Composition of very minute Vessels.

The GALL-BLADDER in Figure resembles a Pear, 'tis situated in the Concave Part of the Liver; and

The Gall-bladder.

{ Its *Magnitude*, for the most Part, is equal to a small Hen-egg.

{ Its *Neck* has a peculiar *Sphincter*.

{ Its *Bottom*, which, while we are in an erect

erect Posture, is downwards with its Neck upwards, lyes upon the Colon; and tinges it with a yellow Colour.

Its *Cohesion* is 1. By a common Membrane, 2. by Vessels.

Its *Ductus Cysticus* terminates in the *Cholidochus*, as above mentioned.

Its *Structure*; 'tis compos'd of four Membranes, the first is common; the second vasculous; the third is muscular, compos'd of strait, oblique and transverse Fibres; the fourth is nervous, wrinkled, or reticular, within besmear'd with an unctuous or clammy Humour; in which Membrane very small Glands now and then appear; which Structure is also observable in the Biliary Ducts.

Its *Vessels* are common to it and the Liver, but here they are call'd *Cystic*^a.

The *Radices felleæ* are observable in Oxen, but not in Humane Bodies^b.

The *Manner by which the Bile is conveyed into the Bladder*, is this: In Men the greatest Part enters by the *Cystic Duct*, from the *Ductus Hepaticus* and *Cholidochus*; a Part also proceeds from the Substance of the Bladder: But in Oxen, by the *Hepati-cystic* Ducts, and

^a These are very well delineated by *Ruyfch.* Epist. V. where you may also see other things relating to this Head.

^b Yet Mr. *Chefelden* delineates them, Tab. XVIII.

the *Radices felleæ* delineated by *Verheyen*,
Tab. XI. Fig. 6.

of the *Liver* is to secrete the Bile from the Blood of the *Vena Portæ*; but according to the Antients, it is to make Blood; of the *Gall-bladder*, is to refine it, to collect the Bile, to keep it inclos'd till a proper Season; and lastly, to discharge it into the Intestines. The Use of the Bile, is to attenuate the Chyle to intermix the oily and aqueous Parts to stimulate the Intestines, to change in some Measure the Acidity of the Chyle.

There are two Sorts of Bile, viz. the *Hepatic* which is almost insipid, thin, and scarcely colour'd, and the *Cystic*, which is thicker, of a deeper Colour, and very bitter.

218. The SPLEEN is a *Viscus* of a blackish red, situated in the left side of the Stomach, in which these are deserving of our Observation, viz. *The Spleen*

The *Number*; commonly there is only one, but sometimes there have been two ^a.

Its *Figure*; somewhat resembles a Tongue, 'tis concave towards the Stomach, but

^a Mr. *Chefelden* says, that he found three in a Woman; *Anatom. P.* 109.

convex towards the Ribs; however, 'tis often irregular, and here there seems to have several Fissures.

Its *Connexion* with the Stomach is by the *vas breve*, and with the *Pancreas*, *Omentum*, *Diaphragm*, and left Kidney by its Membranes.

Its *Magnitude* is various, but its *Length* is about five or six Inches; in Swine and Dogs, &c. 'tis much longer, but thinner. Its *Breadth* is about three Inches, its *Thickness* one; and its *Weight* about twelve Ounces.

Its *Membranes*: In Men there is only one, as also in Dogs, and Swine, but in Calves there are two; the exterior is *common* strong and loosely adhering by the Blood-vessels to the interior, which is the *proper*; when this latter is separated from the former, it emits a *Flatus* thro' the Orifices of the Blood-vessels, broken by this Separation, if we attempt to inflate the Spleen by the Artery or Vein.

The Vessels of this Part, in Consideration of its Smallness, are very considerable; these are

An *Artery*, from the *Cæliac*, easily transmitting injected Water thro' the Veins in Humane Bodies, call'd *Splenica*.

The *Splenic Veins*, which in Calves, immediately after their Entrance, are chang'd into little Cells, but in Men, they

they are distributed thro' the whole Spleen as in the other *Viscera* ^a In Calves both Vessels enter into one external Branch; but in Humane Subjects, various distinct Branches thro' the whole of the internal Superficies.

The *Nerves* are from the *Plexus Splenicus*; it has not any excretory Duct.

The lymphatic Vessels terminate in the Receptaculum, Chyle.

Its *Substance* is generally accounted *Cellulous* and *Glandulous*; in Calves it is *Cellulous*, but in Men *Vasculous* and *Fibrous*; for *Ruysch* has demonstrated, that those are small Vessels, which others take for Glands. Consult Note (10.)

A *Lymphatic Gland*, about the Bigness of a Bean, or Hazel-nut, is often found without the Spleen, about the Place where the Vessels enter into it.

The *Use* of this Viscus, which to me seems the most reasonable, is to render the Blood of the Liver, from which the Bile is to be secreted, more fluid; and by this means, to promote the Secretion of the Bile; turn to Note (11.)

219. The KIDNEYS are two red *Viscera*, *The Kid-* representing the Shape of a Kidney-bean ^{neys}. situated in the Loins, one on each side,

^a *Ruysch* demonstrates this Position against most of the Moderns, in Epist. IV. Tab. 4. who commonly gave a Description of a Calve's Spleen, instead of a Man's.

their concave Part being inwards; and their convex outwards. In these we are also to consider

Their *accurate Situation*, under the two lowest false Ribs; yet so as to be plac'd sometimes at an equal, and sometimes at a different Height; at one Time the left is higher than the right, and at other Times the Right higher than the left, contrary to the Opinion commonly received.

Their *Connexion* with the Loins, the lower Ribs, the Renal Glands with the Renal Vessels, and the *Ureters*.

Their *Membranes* are two; the first is common and strong, call'd *Adiposa*, loosely surrounding the Kidneys, and furnish'd with its own Vessels, the other is a *proper Membrane*, thin, and closely cohering in all Parts to the Substance of the Kidneys.

Their *Magnitude*: their Length is about five or six Finger's Breadth; their Breadth three, and their Thickness one and an half.

Their *Superficies* in Adults is equal, united and smooth; but in a *Fætus*, Calves and Oxen, &c. it is divided into various Inequalities and Lobes.

Their Vessels are inclos'd in a Membrane or Case, and these are

large

{ large *Arteries* and *Veins*, call'd Emul-
gents and Renals, the latter of which
come from the *Vena Cava*; and the
former from the *Aorta*.

{ *Nerves* from the *Plexus Renalis*, an
excretory Duct call'd the *Ureter*.

{ *Lymphatics*, which go to the Receptacle
of the Chyle.

Their *Substance*, which is firm and hard, is
observ'd to be *double*.

{ The *Exterior* or *Cortical*, according to
Malpighi, is glandulous, but according
to *Ruyfch*^a, the whole is a beautiful,
vasculous Contexture. See Note (12.)

{ The *Inner* is Tubulous, call'd *Bellini's Tu-
buli urinarii*, terminating in ten or
twelve small *Papillæ*; and opening by
many small Holes into the *Pelvis* or
Bason^b.

The *Pelvis* is a Membranous Cavity
of the Kidneys, emitting Productions
call'd *Tubuli Pelvis*, which surround the
Renal Papillæ.

The *Use* of these is to secrete the Urine
into the *Pelvis*, in order to depurate the
Blood, and afterwards to discharge it by
the *Ureters* into the Bladder.

220. The GLANDULÆ RENALES or *The Renal
Renal Glands*, call'd also *Renes Succen-*^{Glands.}

^a Vid. Thesaur. Anatom. III. Tab. 4. Fig. 2. & 3.
Thesaur. IV. Tab. I. Fig. 1. ^b *Ruyfch*. Thesaur. III.
Fig. 3. & Thesaur. IV. Tab. I. Fig. 1.

turiati, and *Capsulae Atrabiliariae*, first describ'd by *Eustachius*^a, are two yellowish and compressed Glands, on each side one, lying upon the upper Part of the Kidney, in which there is a narrow Cavity, containing a brown and sweetish Liquor.

In these are to be considered

The *Figure*: This is irregular, square, triangular, oval, &c.

Their *Magnitude* is various in Adults about the Bigness of a large *Nux vomica*, but in a *Fætus* 'tis greater, and equal to the Kidneys, and sometimes larger.

They have a fine *Membrane* closely surrounding their glandulous Substance, and connecting it with the Kidneys.

Their *Blood-vessels* spring sometimes from the Aorta, and Cava, and very often from the Emulgents. They receive *Nerves* from the *Plexus Renalis*, and have many Lymphatics.

No *Excretory Duct* has as yet been discovered in them, and therefore their Use is uncertain, but what ever it is, it seems to be of greater Importance in the *Fætus*.

The Ure-
ters.

221. The URETERS are two membranous and almost cylindrical Canals, about the Thickness of a Quill, but of an unequal Diameter, one of which is extended from each Kidney to the Bladder.

Their

^a Lib. de Renibus.

Origination is in the Kidneys, where being enlarged like a Funnel, they form the *Pelvis*. Their

Insertion is in the lower and Fore-part of the Bladder, where they run some Space obliquely between its Membranes, and terminate by narrow Orifices in the Bladder, by which Mechanism, they, like a Sphincter, oppose the Reflux of the Vessels.

Their *Figure* is not strait, but somewhat resembles the Form of a long *f*.

Their *Substance* is Membranous, compos'd of three Coats. The first is *common*, from the *Peritonæum*; the second is thin and *Muscular*; the third is *Nervous*, besmear'd with a clammy Humour; in this some Glands are often found. They receive their *Blood-vessels* and Nerves from the neighbouring Parts.

Their *Use* is to receive the Urine secreted by the Kidneys from the *Pelvis*, and to convey it to the Urinary Bladder, for if these be obstructed, the Urine is restrained; therefore the Urine has a Passage no other Way to the Bladder.

Their *Preternatural Largeness* is often remarkable; this is sometimes occasioned by the Passage of Stones from the Kidneys to the Bladder. *Vid. Ruysch. Observat. XV.*

The Bladder.

222. The URINARY BLADDER is a membranous *Viscus*, resembling the Figure of a Pear, situated in the *Pelvis* of the *Abdomen*; and destin'd for the Reception and Expulsion of the Urine; in the Review of which, we are to examine Its *Magnitude*: In Adults, it contains about a Pound of Urine.

Its *Connexion*; 1. With the *Os Pubis*, by means of the Peritonæum; 2. With the Parts of the Generation by the *Urethra*; 3. With the Navel by the *Urachus* and Umbilical Arteries; 4. With the *Intestinum rectum*, or strait Gut in Men; 5. With the Neck of the Womb in Women.

Its *Division*, into Neck and Bottom; the Coats of the latter are thinner, but those of the former thicker.

Its *Vessels* are

Its *Arteries* and *Veins* arising from the *Hypogastrics* and *Hæmorrhoidals*, but in Women from the *Spermatics* also.

Nerves from the *Intercostals*, but particularly from the *Os sacrum*.

Its *Lymphatics* are mentioned by none as I know, but *Zellerus* ^a.

Its *Structure* is Membranous, consisting of three Membranes.

^a Disputat. de Administr. vasor. Lymphat. P. 3.

The first is call'd *Common*, arising from the *Peritonæum*, under which Fat is generally observ'd. See Note (13).

The second is *Muscular*, compos'd of a various Course of Fibres, especially longitudinal and transverse.

The third is *Nervous*, covered with a mucous Humour, secreted in the Glands of this Coat, which are sometimes conspicuous about the Neck ^a.

The *Sphincter* is a Series of transverse Fibres, surrounding and shutting the Extremity of the Neck of the Bladder, in order to hinder the involuntary Efflux of the Urine; in Men it coheres with the strait Gut, in Women with the Fibres of the Neck of the Womb.

It has *three Holes*, two where the Ureters enter the Bladder, thro' which the Urine has Admittance; and one larger, thro' which the Urine passes into the *Urethra*.

Its *Use* is apparent by the Definition.

223. The URETHRA is a Membranous ^{The Ure-} and almost Cylindrical Canal, adjoining ^{thra.} to the Neck of the Bladder, of which it is a Continuation and excretory Pipe for the Passage of the Urine. In Women its Length scarcely exceeds two Finger's Breadth; but in Men it is much longer. Of

^a Graaf de organ. Gener. Tab. V. Drake's Anatomy, Tab. III. Fig. 1. lit. h.

this we give a larger account in the Description of the *Parts of Generation*.

The Testicles.

224. In examining the PARTS of GENERATION in MEN, we are to consider, first the TESTICLES, which are two, and contain'd in the *Scrotum*; whose *Figure* and *Magnitude* are known to all. Their *common* and *proper* Membranes or Covers are,

1. The SCROTUM or little Purse hanging down below them, and furnish'd with Hair, in which are to be considered

The *Suture*, by which 'tis divided into the right and left side.

The *Substance*, which consists of a Cuticle, Skin, and muscular Membrane, call'd *Dartus*, by means of which 'tis wrinkled.

The *Septum*, which is made of the Duplication of the *Dartus*, by which the *Scrotum* is divided into two Cavities, Vid. *Rau de septo Scroti*.

The *Vessels* which arise from the *Pudenda*, and *Hypogastrics*. The *Nerves*, from *Os sacrum*.

The *Use*; namely, to contain the Testicles.

2. Three COATS.

The first is the *Musculus Cremaster*, or *Elevator Testiculi*.

The

The second is call'd *Vaginalis*, this loosely surrounds the Testicle, and springs from the *Peritonæum*.

The third is the *Albuginea*, which is strong, and closely coheres to the Substance of the Testicle: This receives the spermatic Vessels, and transmits them to the Testicles.

The *Vessels* are,

Spermatic Arteries, arising with a narrow Origin from the *Aorta*.

Spermatic Veins, the right from the *Vena cava*, the left generally from the *Emulgent*. These are destitute of *Valves*, and form the *Corpus Pampiniforme* or *Pyramidale*.

Nerves from the *Plexus* of the *Pelvis*, and from the second Pair of the *Lumbals*; but this latter is very often not to be found.

Lymphatics in living Animals may be seen very numerous.

Their *Substance* is *vasculous*, consisting of very fine Vessels call'd *Seminal*, roll'd up after the same manner as the *Intestines*^a, which appear very plain, if the Testicle be macerated in *Vinegar*; but there is no Appearance of any *Glands*.

The *Corpus Hymori*, in the Middle of the Testicles, is for a Support to these Vessels,

^a The unravelling of which, see in *Ruyseh. Thesaur. IV. Tab. I. Fig. 2.* & *Thesaur. IX. Tab. III. Fig. 3.*

and to this a Cavity is ascribed for receiving the Seed.

The *Use* of these is to generate Prolific Seed, in which there are living Animals^a.

The Para-
state.

225. II. The EPIDIDYMIIDÆ or Parastates are two, upon each Testicle one. They are oblong Parts almost of a Cylindrical Figure, lying like a Silk-worm upon the upper Circumference of the Testicle. In these we observe

The *Connexion* with the Testicle, by means of the *Albuginea*, and with the *Vas deferens*.

Their *Origination* in the Testicles by five or six very small seminal *Vessels*.

Their *Insertion* in the other Extremity, where the *vas deferens* begins.

The *Membrane* surrounding them, which is strong, and a Continuation of the *Albuginea*.

Their *Substance* is also vasculous, as that of the Testicles, but consisting of Vessels not only more conspicuous, but such as may be expos'd to the Sight by *Injections*. But all these Vessels are at last chang'd into one Duct, call'd *Vas deferens*.

The *Vessels* are the same with those of the Testicles, and are call'd *Spermatic*.

^a *Leuwenhoeck* in several Places; also *Harris's* Lexicon. Techn. where they are delineated. *Boerhaave's* Institutions, the second Edition p. 256.

The *Nerves* are Branches of those belonging to the Testicles:

The *Use* of the *Parastates* is to receive the Seed from the Testicle, to give an additional Perfection too and to transmit it to the *Vas deferens*.

226. III. The VAS DEFERENS, call'd *vas deferens* also *Ejaculatorium*, is a strong whitish Canal resembling a Nerve about the Thickness of a Straw, arising single from each Parastate, and extended from it to the seminal Vesicles and the *Urethra*. In this we remark

The *Situation* and *Progress*: It ascends from the *Parastatæ* to the *Abdomen*, through the Perforations of the transverse and oblique Muscles, and afterwards is reflected towards the Neck of the Bladder.

The *End*; in the Fore-part of the *vesiculæ seminales*, it partly terminates in the *Urethra*, and partly in a seminal Vesicle, in such a manner, that it may deposit its Fluid in both, according to the different Exigencies of Nature.

The *Substance* is very strong and elastic, like that of a strong *Nerve*.

The *Cavity*, in the Beginning and Progress scarcely admits a Bristle: Near the Bladder 'tis much larger, in the End 'tis again more narrow, transmitting nothing into the *Urethra*, except it be in the venereal Heat.

The *Use* is to convey the Seed from the *Parastates* to the *Vesiculæ seminales*, but in Copulation to the *Urethra* also; and perhaps it contributes also to the more perfect Elaboration of the Seed.

The semi-
nal Vesicles.

227. IV. The VESICULÆ SEMINALES are two membranous and cellulous Receptacles adjoining to the lower Part of the Neck of the Bladder to receive the Seed from the *Vasa deferentia*, to give a further Perfection to it, and at a proper Season to eject it thro' the *Urethra* into the Womb. In these we are to observe

The *Length*, which is about three Inches, and their *Breadth* one.

Their *Substance* is compos'd of a strong, vasculous Membrane, forming various little Cells, communicating with one another; and another deriv'd from the *Peritonæum* by which it is surrounded. These little Cells now mention'd, may be aptly compar'd to one small *Intestinum cæcum* ^a.

The *Excretory Duct* is double, one from each Vesicle, terminating commonly by a double Orifice in the *Urethra*: Contrary to the Opinion of *Leal*, who delineates only one Duct and one Orifice ^b.

The *Arteries* and *Veins* are numerous, from the Vessels of the Bladder and strait Gut.

^a *Leal* *Lealis* de Partibus semen conficientibus, Fig. II.

^b *Ibidem*. Consult Note (14.)

The *Nerves*, are from the *Plexus* of the *Pelvis*, and some report, that they have observed *Glands*. Their *Use* is manifest from the Definition.

228. V. The *PROSTATÆ* are one globose ^{The Prosta-}
Body, resembling the Shape of a Heart, ^{ta.}
situated just before the Neck of the Bladder, and in a great Measure, surrounding the Beginning of the *Urethra*; in this are to be examined

The *Magnitude*: Which is about the Bigness of a Wall-nut.

The two *Prominencies* in the lower Part, call'd *Natifformes*.

The *Eminence*, call'd *Caput Gallinaginis*, in the upper Part with the two Orifices, which are common to the Ejaculatory Vessels, and the *Vesiculae seminales*.

The *Substance*; this is glandulous, and furnish'd with small Caverns, as also surrounded with a Membrane.

The *little Holes* or *excretory Ducts* of this Gland, discharging into the *Urethra* a whitish Humour; in Human Bodies, there are but about ten or twelve, but in Dogs they are very numerous.

The *Vessels* are common to it, and the *Vesiculae seminales*.

The *Use* is to secrete a whitish Liquor, which is not a true Seed, altho' it be ejected in Coition, but secreted by this Gland.

Gland, chiefly to lubricate the *Urethra*;
and to be a Vehicle for the Seed.

The Yard. 229. VI. The PENIS or Yard is the principal
Organ of Generation, in which we
observe

The *Synonymous Names*; such as *Membrum*,
Virile, *Virga*, *Colis*, *Priapus*, &c.

The *Figure*, *Number*, *Situation*, and *Magni-
tude* are known to all.

The *Structure* or Parts are

The *Cuticle* and *Skin*, which are the
common Teguments.

The *Præputium*: This is the Skin
doubled, and covering the Glands or
Nut; in the lower Part of which is
the *Frænum* or Bridle, both which
are furnish'd with nervous *Papillæ* and
Glands, call'd by Dr. *Tyson* *Odo-
riferæ* ^a.

The proper *Coat* is strong and of a
Tendinous Nature, inclosing the Sub-
stance of the *Penis*; this Membrane
is sometimes double, with the Inter-
position of a cellulous Coat, and af-
ter it has been inflated and dryed, this
Tunic will appear conspicuous ^b.

The two *Corpora cavernosa* or *spongio-
sa*, of which the *Penis* is chiefly

^a *Comper* Myotom. Reform. p. 228.

^b *Ruyfch*. Epist. XV. Tab. XIX. *Ruyfch* himself shews in
Adversar. Anatom. Decad. I. p. 21. that this cellulous
Coat is not always to be found.

compos'd, have two distinct, beginnings from the lower side of the *Ossa Pubis*; which afterwards are join'd and extended to the Glands; into which two, if a Liquor or Air be forc'd, the *Penis* becomes stiff.

The *Septum* between the two cavernous Bodies in the posterior Part is thicker, and stronger than in the Forepart, and is perforated like a Sieve.

The *Ligamentum suspensorium Vesalii* is that, by which the *Penis* is join'd to the *Ossa Pubis*.

The *Muscles* are three Pair ^a.

1. The *Erectores*; they arise from the *Os Ischium*, and terminate on both sides in the *Corpora cavernosa*.
2. The *Acceleratores*; these spring from the Sphincter of the *Anus*, surround the posterior Part of the *Urethra*, terminate on both sides in the *Corpora cavernosa*, and constrict the *Urethra*.
3. The *Transversales*; arise from the *Os Ischium*, terminate in the Bulb of the *Urethra*, and serve to dilate it.

^a *Comper Myotom. Reform. Fig. X. XII. Bidloo Anat. C. H. Tab. 47.*

The Glans. The GLANS, or *Nut*, which is also call'd *Balanus* is the Fore-part of the *Penis*; its Figure and Colour are known, but in this we must observe also

The *Superficies*, which is smooth and polish'd.

The *Extremity* of the *Urethra*, which is narrower than any other Part of it; under this is the *Frænum*.

The *Corona* is the posterior Circumference of the *Glans*, in which some affirm they have observ'd *Glands*^a.

The *Nervous Papillæ* are conspicuous in the same, when the *Penis* is erected: Hence it is, that this Part is of an exquisite Sense, but these can be scarcely distinguish'd from the fore-mentioned *Glands*.

The *Substance* consists of the *Cuticle* and *Corpus cavernosum*, which is a Continuation of the *Urethra*, and expanded here into a globular or bulbous Body^b.

The Urethra.

The URETHRA is a membranous Canal almost Cylindrical, adjoining to the Neck of the Bladder, and extending itself to the Extremity of the *Glans*. In this, the following Particulars fall under our Observation,

^a *Littrius* Hist. Acad. Reg. 1700. *Morgagn.* Advers. Anat. prim. Tab. IV. Fig. 4. k. ^b *Ruysh.* Observ. Anat. Chirurg. Obs. 100.

Its *Situation*, in a certain Furrow which is form'd in the lower Interstice of the two cavernous Bodies.

Its *Progress* is not strait, but bends after a singular manner ^a.

Its *Length* is twelve or thirteen Inches.

Its *Magnitude* is about the Thickness of a Quill.

Its *Substance* consists of two strong Membranes, the interior and exterior, between which there lyes the *Substantia cavernosa*, where some affirm, they have observed Glands ^b.

The *Bulb* or Protuberance of the *Urethra* is its posterior Part, which is thicker than the rest; it is situated next to the *Prostatæ*, and about an Inch long. It receives its Name from its Figure.

The interior *Superficies* has various little Holes round and oblong, from which a viscid Liquor may sometimes be squeez'd out, which is the same that defends the *Urethra* from the Acrimony of the *Urine* ^c.

The *Use* of this is to transmit the Urine and Seed.

^a As *Alghisius* admirably delineated it in his Treatise of Lithotomy.

^b So *Terreneus* affirms, Lib. de Glandulis p. 32.

^c Ibidem Tab. 2. & *Morgagn.* l. c. Tab. 4. Fig. 4. c.

Cowper's
Glands

230. The GLANDULÆ COWPERI, or Cowper's Glands must not be omitted in this Review of the *Penis*: Three of which he has lately discover'd and describ'd ^a.

1. Two in each side of the *Urethra*, one situated between the *Acceleratores*, and the Bulb of the *Urethra* of an oval Figure, somewhat compressed, and of the Bigness of a small Bean, each of which transmits into the *Urethra* a diaphanus and viscid or mucous Liquor, thro' a particular excretory Duct above two Fingers Breadth long, which perforates both Membranes of the *Urethra*. The Use of this Liquor seems to be to defend the *Urethra* against the Sharpness of the Urine. Nevertheless, I have not found these Glands in various Subjects, which I have carefully examined; therefore I find some Reason to doubt, whether these Glands are always to be found in every Subject. See Note (15).

2. One, which is the third, is said to be situated in the Angle of the Curva-

^a Descriptio Glandular. Nuper Detectar. *Londin.* 1702.
Drake's Anatomy Tab. IV. V. Teren. Lib. de Gland. p. 65.
They are describ'd by *Littrius* *Histor. Acad. Reg.* 1700.

ture of the *Urethra*, under the *Os Pubis*, within the cavernous Body of the *Urethra*, and by him is delineated as resembling a *Lens*, which I have not as yet been able to discover.

231. The GLANDULA LITTRII is a *Littrius's Gland.*

Gland situated between both Membranes of the *Urethra*, immediately below the *Prostatae*. 'Tis of an obscure reddish Colour, an Inch Broad, two Lines thick, encompassing the inner Membrane of the *Urethra* like a Girdle, and perforating it with many small Holes, or very little Ducts, thro' which it pours out a mucilaginous Liquor into the *Urethra* to besmear its Membrane.

232. The *Vessels* of the *Penis*, *Urethra*, and these Glands, are

{ *Arteries* and *Veins* from the *Hypogastrics*.

{ *Nerves* from the last of the *Os sacrum*.

{ *Lymphatics* beautifully delineated by *Cowper* and *Drake*.

233. The *Principal Use* of the *Penis* is for Coition and Procreation, but the *Secondary* is for the Excretion of the *Urine*.

234. In

234. In the PARTS of GENERATION proper to WOMEN, the following Particulars occur to be observ'd, viz.

The EXTERNAL PARTS, or those that offer themselves to view without Dissection or Cutting; as

The *Pudendum* below the *Pubes*, in the middle of which there is a great Chink or *Fissure*, and in the lower Part the *Frænulum* and *Perinæum*.

The two *Labia* and *Mons Veneris*, protuberant with the Fat beneath, and covered with Hair.

The CLITORIS; in which we may observe

The *Situation*, in the upper Part of the Chink, almost entirely hid under the Skin or *Præpuce*.

The ordinary *Figure* and *Magnitude* of this Part are like a small Grape, but the extraordinary are so great, as to equal the *Penis*^a.

The *Glans* or Extremity is not perforated.

The *Prepuce* covering the Glans, arises from the Skin of the *Pudendum*, and is furnish'd with

^a Instances of which are to be met with in *Panarollus*, *Platerus*, *Plazzonus*, *Rhodius*, *Graaf*, and *Tulpius*.

nervous Papillæ, from whence its exquisite Sensibility proceeds. The *two Crura*, which are spongy Bodies, that compose the *Clitoris*, are three times longer than it, and spring from the *Os Pubis*.

The two *Cavernous Bodies*, with the *Septum medium*, are much the same as in the *Penis*, and constitute its Substance. These are surrounded with a nervous Membrane.

There are two Muscles call'd *Erectores* as in the *Penis*, which have their Original from the *Os Ischium*, and are inserted in the *Corpora cavernosa*.

The *Vessels*, which are also common to the other external Parts, are

{ *Arteries* and *Veins* from the *Hypogastrics* and *Pudenda*.
Nerves from the *Os sacrum*,
 & remarkable Branches of which run along the Back of the *Clitoris*, from whence this Part is susceptible of the very slightest Impression.

The Nym-
pha.

The *Use* of this Part is to excite a grateful Sense of Titillation, and to heighten the venereal Pleasure in Women.

The N Y M P H Æ are two membranous, red and cavernous Parts resembling Pullet's Gills, and join'd to the interior side of the *Labia*; in which are to be observ'd

The *Nervous Papillæ*, which in these are very numerous, and therefore render them very sensible.

The *small Glands* that secrete a sebacious Substance ^a.

Their *Use* is to encrease Pleasure in Copulation, and to direct the Course of the Urine, that the Feet may not be expos'd to the Efflux.

The ORIFICE of the VAGINA, which is encompass'd with a cavernous Substance, swells in the venereal Act. In Virgins it is narrow, but in such as have receiv'd the Embraces of their Husbands, or brought forth, 'tis wider; yet it is always narrower than the rest of the *Vagina*.

^a Morgagn. Advers. Anat. prim. Tab. III. cc.

The H Y M E N is a Membrane, sometimes circular, sometimes semilunar, and sometimes of another Form ^a: In Virgins it straitens the *Vagina*, and in young Girls it is always to be found. (See Note (14.)

[In whom it has a small Hole into the *Vagina*; but

In Adults this Hole is generally larger. In the first Act of Copulation this Membrane is torn, and upon this there is an Effusion of some Blood.

The *Carunculae Myrtiformes* arise from the Laceration of the *Hymen*, and sometimes two or three, and sometimes four, are observ'd exactly in that Place, where the *Hymen* was. These are always wanting in Infants.

The *Urethra* or Urinary Passage offers these Particulars to our Observation, viz.

[The *Situation*; this is strait below the *Clitoris*, discovering itself by a small Eminence.

The *Length* is about two Finger's Breadth.

^a See its Figure, as in *Ephemer. Natur. Cur. Cent. VII.* as it was described by me. An. 1711. in a Girl about 14 Years old.

The Diameter is greater than in Men, admitting of a greater Dilatation in the Extraction of the Stone.

The little Ducts excrete a mucous Liquor to defend it against the Acrimony of the Urine, as is observable in that of Men, which they derive from Glands ^a.

The *Lacuna Graffi*, or Holes observable about the *Urethra*, are little Ducts arising from small Glands, which discharge a Humour for lubricating the *Vagina*, and encreasing the venereal Titillation.

235. The INTERNAL PARTS of Generation are

*Vagina
Uteri.*

I. The VAGINA UTERI, or Neck of the Womb, which is a large Canal, not much unlike a small Gut, but more strong, extended from the Orifice of the *Vagina*, between the Bladder and the *Rectum*, to the Womb: Whose

Length, without Distraction is six or seven Finger's Breadth.

Magnitude is almost that of a small Gut; but in different Cases, especially at the Time of Birth, it is va-

^a Morgagn. Advers. Anat. prim. §. 10. *Terraneus de Glandulis* P. 44.

rious : But its Orifice is always straiter than the rest.

Substance is membranous , wrinkled within, nervous, papillary, according to the Observations of *Ruysch* ; and hence, of an exquisite Sense. Its Extremity is muscular , with which it gently contracts and embraces the Yard.

The Wrinkles of the *Vagina* are not circular as in the *Jejunum*.

In *Virgins* they are very great, especially in the Fore-part.

In those who often receive Embraces, they are less by frequent Attrition ; and

After frequent Births, they almost entirely disappear.

The Use of these is, 1. For increasing the venereal Pleasure both in Man and Woman : 2. For the easier Dilatation of the part at the Time of Birth.

Lacunæ are also found here and there thro' the whole *Vagina* , and upper Orifice of the Womb, as well as about the *Urethra*. These are so large, as to admit Bristles. They arise from Glands beneath, and pour out a mucous Liquor ^a.

^a *Bidloo* Anat. Tab. 51. *Morgagn.* Advers. prim. §. 31. *Verheyen* Anat. C. H. Tab. XVII. Fig. 2.

The *Musculus Vaginae constrictor* is a great Series of muscular Fibres, embracing the lower Orifice, and inserted under the *Clitoris*. In the same Place the *Corpus cavernosum* and *Plexus of the Vessels* encompass the Orifice of the *Vagina*, which being distended with Blood in Coition, the Orifice is straiten'd, that it may more agreeably affect the *Penis*, and receive a pleasing Titillation from the Friction of the Yard.

The Use of the *Vagina* is to receive the Yard and Seed, and to transmit the *Fætus*, *Menses*, and *Lochia*.

The Uterus. 236. II. The MATRIX or Womb in Women is a part situated between the Bladder and strait Gut, form'd for a natural Habitation of the *Fætus*: In which are to be remark'd

The *Connexion*: The *hind part* is free, the *anterior* coheres above with the Bladder, below with the *Rectum*; the *lateral Parts* by Ligaments, which are of two Sorts:

The *Broad* are membranous, and call'd *Alæ Vespertilionum*, they spring from the *Peritonæum*, and join the Womb on each side to the Bones of the *Ileum*. I have lately observ'd, that they consist of a double Membrane with the Inter-

Interposition of one that is cellulous, almost after the same manner, as is observable in the *Mesentery*. These may be easily discover'd by Inflation.

The *Round* arise from the hind Part of the Womb, and pass thro' the Rings of the Muscles of the Abdomen, and terminate in Fat nigh the Groins. These consist of a double Membrane and a vasculous *Plexus*.

The *Figure*: In a natural State it resembles a compress'd Pear; but in Women with Child it is various, according to the different Spaces of Time.

The *Division*: The hind Part is call'd *Fundus*, or the Bottom; the fore Part *Cervix* or the Neck: And in this the internal Orifice of the Womb offers itself to view.

The *Magnitude*: In Women not with Child, its *Length* is three Inches; its *Breadth* in the hind Part two; in the fore Part one: Its Thickness is half an Inch. In Virgins it is yet less.

The *internal Orifice of the Womb* is of the same Figure with the Nut of the Yard, opening into the *Vagina*; this in Virgins is very small, scarcely

ly admitting the *Specillum*; in those who have brought forth, and in such as are with Child, it is somewhat larger; in these latter it is clos'd with a glutinous Matter, yet in the time of Birth it admits of such a surprizing or miraculous Dilatation as to yield a Passage to the *Fœtus*.

The *Substance* is muscular, compos'd of a various *Plexus*, or Web of fleshy Fibres, with the Interposition of very numerous Vessels. In those who are not with Child, 'tis compact and firm; in others, who are pregnant, it is capable of a wonderful Dilatation. Without it is surrounded with a strong Membrane derived from the *Peritonæum*; but within in its Cavity, which in Virgins can scarcely contain a Bean, with a Membrane which is porous and nervous.

The *little Holes* in the Neck of the Womb seem to be Ducts, which discharge a mucous Liquor.

Vesicles, or little globular Bodies are sometimes observ'd in the Neck, and about the Orifice of the Womb, containing a mucous Humour. These, by many, are accounted *Hydatides*^a,

^a See the Authors mentioned by *Morgagnius* *Advers. Anat.* 1. §. 32. and *Ruyfch.* *Advers. Anat.* Decad. 1. p. 5.

by some Glands ^a, they secrete a glutinous Liquor, which in pregnant Women closes up the Orifice of the Womb. Others take them for a NEW and TRUE OVARY, in which the *Fætus* is form'd ^b. By some, they are call'd the *Vesiculæ seminales* of Women ^c, from which they suppose a prolifick Seed is pour'd out in Coition ^d; from these different Opinions, it may appear that their *Use* is doubtful.

The *Blood-vessels* are very winding, making innumerable Inosculations, and very much dilated in Child-bearing Women.

The *Arteries* are 1. *Spermaticks*; these arise from the *Aorta*, and form Inosculations and *Plexus's*; 2. Those from the *Hypogastriks*, which are very large and numerous; and 3. From the *Hæmorrhoidals*; all these have a wonderful Communication with one another; insomuch, that if Wax or Mercury be injected in-

^a Morgagn. ibidem & Verheyen, l. c. Cap. XXXIII.

^b Naboth. Dissert. de Sterilitate, printed at Lipsick An. 1707. and against this Opinion Gælike Hist. Anat. p. 183. and Etmuller's Epistle de Ovario Novo. ^c Lettres des Dames p. 70. & Blegny Zodiac. Tom 1. p. 20. ^d Henrici Dissert. de vesiculis feminalibus mulierum.

to any one of them, all the rest of the other side also are fill'd.

The *Veins* also are triple, of the same Name, and without Valves, thro' which Air may be often forc'd into the Cavity of the Womb, and *Vagina*; and on the contrary thro' the *Vagina* into the *Veins*^a; they have the like Inosculations, with the Arteries, which in these are more conspicuous.

The *Nerves* arise from the Intercostals, and those of the *Os sacrum*.

Lymphatic Vessels are only observ'd in Beasts; for those which are represented in the Human *Uterus*, seem to be fictitious or feign'd.

The Ovaria.

237. The III. OVARIA, or WOMENS TESTICLES are two Bodies, somewhat globular, and of a whitish Colour, on each side one, annexed to the Bottom of the Womb. In these we consider,

The *Connexion*;

1. *With the Bottom of the Womb* by a round Ligament, which the Antients call'd the *Vas deferens* of Women, but this has not any Orifice towards the Womb.

^a Fanton, Anat. Human. Corpor. p. 186.

2. With

2. With the *Tuba Fallopiana*, by the broad Ligament of the Womb.

3. With other Parts, by means of the Spermatic Vessels.

Their *Figure* is almost oval, gibbous on one Side, but depress'd on the other.

Their *Magnitude* is various, according to the Difference of Age and Constitution.

In those who are in the Bloom of their Age, and in such as are desirous of venereal Pleasures, their Weight arises to a Drachm and an half; but in old Women they appear dry, small, and wrinkled, scarcely weighing half a Drachm.

The *Membrane*, with which they are encompass'd, is white and strong, deriving its Original from the *Peritonæum*.

Their *Substance* is membranous and fibrous, interwoven with a great Number of Vessels, among which round Vesicles appear, whose Number is greater or less according to the Diversity of Age and Constitution. These are fill'd with a Humour, which when boil'd, acquires the Colour, Consistence and Taste of the boil'd White of an Egg.

Hence, because of the Analogy ; they are call'd Eggs, the greatest of which scarcely equals a Pea. Sometimes ten or twelve, and more, are found in one Ovary, and sometimes one or two can scarcely be observ'd.

Their *Use* : It is commonly believ'd, that they constitute the material Principle of the *Fœtus*, in which its Rudiments are contain'd.

Preternatural Hydatides are also often found in the same Place, which sometimes prove the Cause of Dropsies in Women.

The Fal-
lopian
Tubes.

238. IV. The TUBÆ FALLOPIANÆ are two winding and almost conic Canals, on each side one, connected to the Bottom of the Womb, so call'd by *Fallopian*, because they seem to resemble a Trumpet. In these we observe, that

Their *Connexion* with the *Womb* is close, by means of their Membrane, which is a Continuation of that of the Womb ; with the *Cavities* 'tis lax, being made by the Membrane of the broad Ligaments.

Their *Length* is six, seven, or sometimes about eight Finger's Breadth.

Their *Magnitude* about the Middle almost equals a little Finger.

Their

Their Extremities are narrower than the other parts, and that which is join'd to the Womb, and opens into it, is the least, scarcely giving Admittance to a Hog's Bristle. The other Extremity, floating loosely in the Abdomen, is larger, and admits a small Tube; this is adorn'd with several muscular Fringes, which, when Occasion offers, embrace the *Ovarium*.

Their *Substance* is membranous and cavernous, consisting of a double Membrane; the exterior of which is a Continuation of the *Peritonæum*; but the interior, of the inner Substance of the Womb; within it is wrinkled, and besmear'd with a clammy Humour, but not cellulous as in Beasts.

Their *Vessels* are very numerous, forming a *Corpus cavernosum* within their Membranes, by which they may be erected or become stiff, when they are to be applyed to the Ovary by which also they are moistened within^a.

Their *Use*: In the time of Coition, they are erected by a copious Influx of the

^a So *Drake* delineates and describes them Tab. X. Fig. 2. Consult about this Note (17.)

Blood and Spirits, and by a natural Motion, the free Orifices, with the Assistance of the muscular Fringes, are applied to the Ovaries, and transmit the Prolifick masculine Seed^a; afterwards they receive the impregnated Egg from the *Ovarium*, and convey it into the Womb.

They are call'd *Cornua Uteri*, or Horns of the Womb in Beasts, because of their Figure; but in Hens, and other Birds, they are distinguished by the Name of *Oviducts*.

239. The Use of the Womb is to admit the Seed, to receive the impregnated Egg from the *Ovarium* and *Fallopian Tube* to contain and nourish the *Fætus* for the Space of nine Months, and by its muscular Force to expel it thro' the *Vagina*.

240. After *Impregnation* there is a new Production of Parts in Women, which continue till the time of Delivery. The Principal of these is the *Embryo* or *Fætus*^b; the rest, as the *Membranes* of the *Fætus*, the *Placenta*, the *Navel-string*, the *Umbilical Vessels*, and the *Waters*, in

^a Ruysch. Thesaur. Anat. V. Tab. V. Fig. 1. & Advers. Anat. Dec. 1. p. 3. Fallop. Observ. Anat. & Graaf de Org. de Gener. Mul. Cap. XIV. ^b Vid. Ruysch. Thes. Anat. VI. Tab. 2, & 3. Thes. X. Fig. 3.

which

which the *Fætus* swims, are all form'd to be serviceable to it.

141. In considering a perfect F O E T U S, these several things occur, viz.

I. The M E M B R A N E S, which enclose it The Membranes of the Fætus. in the Womb.

1. The *Exterior* call'd C H O R I O N is thick, spongy, and furnish'd with very numerous Blood-vessels; 'tis contiguous to the Womb, and divided into various *Lamellæ*.

2. The *Interior*, or second, is call'd A M N I O S; this is thin and transparent, contiguous to the former, in which very few or no Vessels are to be discovered, but a gluey pellucid Humour, and the *Fætus* are contain'd in it.

3. In some Beasts, especially Cows, a third Membrane, call'd A L L A N T O I S, is found with the *Urachus* open, of which it is a Continuation, but no such Discovery can be made in Humane Creatures. The Use of this is to receive and collect the Urine flowing from the *Urachus*².

In Cows it is about twelve Foot long: Its Figure resembles a Pudding, whose Diameter is above a Foot,

² See our Observations on the Allantois publish'd in Eph. N. C. Cent. VI. Obs. 24.

there-

therefore it is a great and surprising Part. Some maintain, that it is as necessary in Humane Creatures as in Beasts; and hence they infer, that its Existence is necessary in them also. Some affirm, that they have found it between the *Chorion* and *Amnios*; but unless they can give a better Demonstration of it than has been hitherto produc'd, it cannot be admitted, especially because the *Ura-chus* is found for the most Part clos'd in the Humane *Fœtus*; and other considerable Reasons can be shewn to incline us to think, that the Author of our being has not incumber'd Women with such a Burthen. 'Tis commonly believ'd, that this Membrane is not furnish'd with Blood-vessels, but I have found that they are numerous in it, and have delineated them in another Place ^a.

The Placenta.

242. II. The PLACENTA by the Antients, call'd *Hepar Uterinum*. In this are to be considered

The Number, which in Women answers to the Number of the *Fœtus*; yet so that in Twins they often unite: But in many Beasts, especially Cows, several, and sometimes a hundred,

^a Ibidem.

are found for one *Fætus*, and these are call'd in them *COTYLEDONES*.

The *Figure* is circular and plane, its Diameter of eight Inches, and Thickness about an Inch.

The *Connexion*: Its convex and spongy Part adheres to the Womb by the Interposition of a very fine villous Membrane, that is a Continuation of the *Chorion*: The Concave, which is towards the *Fætus*, is join'd with the Navel-string, and is encompass'd with a smooth Membrane, derived from the *Chorion* and *Amnios*.

The *Place* to which it adheres is not always the same, but for the most Part it is connected with the Bottom.

Its *Substance*, according to most of the Modern Authors, is *glandulous*, compos'd of innumerable lesser Glands, which cannot be discover'd. Therefore it is more reasonably determin'd to be vasculous by *Ruysch*, and several others who embrace his Opinion, consisting of mere Vessels, namely, the umbilical Arteries and Veins divided into very minute Extremities^a; for to what End should

^a *Ruysch*. Theat. Anat. V. Tab. 1.

those Glands conduce, since that which enters the *Placenta* from the Womb, has already been secreted?

The *Use* of this Part is 1. To receive the nutritious Juice from the Womb, or to absorb it as the Intestines imbibe the Chyle^a; and to transmit afterwards to the *Fætus*, thro' the umbilical Vein. 2. And perhaps to transmit the Urine as well as Blood from the *Fætus* to the Mother^b.

The Umbilical Vessels.

243. III. The UMBILICAL VESSELS after Birth, turning into the Ligaments mention'd, (207.) are

Two *Arteries*, arising for the most Part from the *Iliacs* of the *Fætus*, sometimes from the *Aorta*: They march forward in both sides of the Bladder to the Navel: From thence thro' the Navel-string by spiral Windings to the *Placenta*, where being divided into an infinite Number of Branches, they terminate and transfer the Blood from the *Fætus* to the *Placenta*; and from thence perhaps also to the Mother again^c: Why are

^a Ibidem. p. 16. ^b As *Meryus* proves by a certain Observation in Hist. Acad. Reg. Ann. 1798. where he mentions, that a Woman big with Child dyed of a Wound, and no Blood was found in the *Fætus*.

^c See the Observation of *Meryus* now quoted.

there

there two Arteries and not one only, as there is but one Vein? Perhaps that there may not arise a mortal *Hæmorrhage*, if perchance the Navel-string be broken.

One Vein; twice larger than the Arteries arising in the *Placenta*, from innumerable small Branches united into one Trunk; it proceeds from thence with the like spiral Contortions between the Arteries thro' the Navel-string, and afterwards thro' the Navel, to the Liver of the *Fætus*, where it terminates in the *Sinus* of the *Vena Portæ*; into which it pours the Blood and nutritious Juice, receiv'd in the *Placenta*; from thence, for the most Part, they immediately pass into the *Vena cava*, and Heart, thro' a particular Canal, call'd *Venosus*^a, which is Cylindrical and as it were opposite to the Umbilical Vein.

The *Urachus* in a Calf, Sheep, &c. is a Pyramidal Canal, extended from the Bottom of the Bladder, first to the Navel, and after into the *Allantois* (241. 3) where it terminates, and into which it conveys the Urine from the Bladder^b. In a Humane *Fætus* this is not entire-

^a Turn to Fig. 12. ^b In Ephem. Nat. Cur. Cent. VI. Observ. 24.

ly pervious^a, or at least very seldom; but for the most Part it is found solid like a Ligament; hence it may appear evident, that in a Humane *Fætus* it does not perform the Office of a Canal.

The Navel-string.

244. IV. The N AVEL-STRING is a Part twisted like a Rope about an Inch thick, which is compos'd of one Vein and two Arteries, call'd *Umbilical*, surrounded with a thick and common, but soft Membrane, derived from the *Amnios*, whose

Rise is in the *Placenta*, and End in Navel of the *Fætus*.

Its *Length* is about four Hands Breadth ;
1. That the *Fætus* may move itself without tearing the *Placenta* from the Womb ; 2. That a mortal Hæmorrhage may not easily arise, altho' a Ligature be not made upon the Vessels immediately after the *Fætus* is excluded ; 3. That by this the *Placenta* may commodiously be extracted after the Birth.

The *Use* appears, from what has been said of the Umbilical Vessels.

^a Cent. III. & IV. Obs. 194. p. 465.

245. V. The NUTRITION of the FOETUS in the Womb: Which we think The Nutri-
tion of the
Fœtus,

[In the *first Month* thro' the Umbilical Vessels alone.

[But in the *last Month*, for several Reasons, thro' the Mouth also, by a gluey Liquor, surrounding the *Fœtus*, which seems to be secreted from the *Amnios*; for 1. Such a Liquor is found in the Mouth, *OEsophagus* and Stomach, as well in the Humane *Fœtus*, as in that of Beasts; 2. We find this changed in the small Guts; 3. A large Quantity of Excrements is found in the great Guts; 4. A great Plenty of this Liquor surrounds the *Fœtus* in the first Months, and but little very often in the last, which cannot in all Likelihood be consum'd any other way, than by the *Fœtus*; 5. Because this Liquor seems so fit for the Nutrition of the *Fœtus*, that none more proper can be desir'd; 6. it seems improbable, that the perpetual Resistance of the Womb and Pressure of the abdominal Muscles, and the circumambient Air^a, should not force this Liquor into the Mouth, *OEsophagus* and Stomach; 7. That

^a See the Note under this Number 20.

the *OEsophagus*, Intestines, lacteal Vessels and Thoracic Duct may be kept open, and gradually accustomed to their destin'd Function, &c.

The Situation of the Fœtus.

246. VI. The SITUATION of the FœTUS in the Womb, is

In the *first* and *middle Months* various and uncertain :

But in the *last Months*, it is commonly observ'd sitting, with its Head and Neck bending down, its Knees towards its Cheeks, and its Heels clinging close to its Buttocks : Its Hands for the most part hang down, and seem to embrace its Feet.

A little while before its Birth, it generally so turns its self, that the Head falls down to the Orifice of the Womb, and the Buttocks and Feet are raised up.

The Term of Delivery.

247. VII. The BIRTH ; which is the natural Exclusion of a perfect *Fœtus*, from the Womb thro' the *Vagina*.

All the *exciting Causes* of which, that are commonly mentioned by Authors, are doubtful and uncertain.

The *legitimate Time* are nine solar or ten lunar Months or Forty Weeks.

The *Premature* is seven or eight Months, after which the *Fœtus* may survive.

The

The too *Premature*, is if the *Fætus* be excluded before the seventh Month, which Birth is call'd ABORTION or *Miscariage*; and after this the *Fætus* cannot live.

The *ordinary* or natural Manner is, if the *Fætus* attempts an Exit with its Head downwards; its other Situations at this Time are call'd præternatural, and are the Causes of a difficult Birth, and sometimes of an impossible one; unless amended by Art.

248. The most remarkable DIFFERENCES, The Difference between a Fætus and an Adult. which are observ'd between a *Fætus* and an Adult before or a little after Birth are these

In the *Abdomen*,

The *Umbilical Arteries* and *Veins* and the *Canalis venosus* in the Liver are pervious, but in Adults solid.

The *Liver* is very big.

The *Processus vermiformis* of the *Cæcum* is for the most Part larger than in Adults.

The *Renal Glands* are also larger.

The *Kidneys* themselves have an unequal Superficies as in Calves.

In the Thorax,

The *Gland Thymus* is greater than in Adults.

The *Lungs* which have not as yet given Entrance to the Air, are found collaps'd, and being thrown into Water sink to the Bottom.

In the *Heart*, the *Foramen ovale*, between the right and left *Auricle*^a and the *Canalis arteriosus* between the *Pulmonary Artery* and *Aorta* are open for a peculiar Circulation of the Blood in the *Fœtus*, because there can be no Respiration in the Womb.

In the Head,

The *Bones* of the Skull are separate, especially where the *Bregma* is, and as yet are without Sutures.

The *Teeth*, being as yet imperfect, lye hid under the Gums in their Sockets.

The *Meatus Auditorius* is not as yet perfect, and is clos'd up with

^a The Use of this Hole is the Cause of great Controversy between *Meryus* (who contends, that the Blood flows thro' it from the right *Auricle* into the left) and *Duverney*, *Taunay*, *Sylvester*, *Buffiere*, and *Verheyen*, who are of the contrary Opinion.

a cer-

a certain peculiar small Membrane deriv'd from the *Epidermis*, which after Birth disappears ^a.

The *Bones* of the whole Body, a few excepted, are as yet either softer, or imperfect; and some are entirely cartilaginous. The Articulations also are not as yet perfect.

Of the THORAX,

The second Part of the TRUNK.

249. The THORAX, or Breast is that ^{The Tho-} great Part of the Body, which is situated ^{rax.} between the *Abdomen* and the *Neck*: In our Review of this, we are to consider

The *Parts*, which are either
 [Containing, or forming the Cavity,
 and these are *common*, viz. the
 Cuticle, Skin, and Fat, (§. 197,
 198, 201.) the last of which is
 in great Plenty here; or
 Proper, viz. the Breasts, the rec-
 toral and intercostal Muscles, the
 Diaphragm, Pleura, and lastly

^a Kerkring Osteog. 222. Ruysch. in various Places.

the Bones; as the twenty four Ribs, the *Sternum*, and the twelve *Vertebrae*, of which in *Osteology* : or

Contain'd in the Cavity, as the *Mediastinum*, Lungs, Heart, and *Pericardium*, with the great Vessels arising from thence, especially the Trunk of the Aorta, and pulmonary Artery, the Cava and pulmonary Vein; the *Ductus Thoracicus*, and lastly, the greatest Part of the *OEsophagus*, or Gullet, &c.

The Use: Which is to perform the vital Actions principally, and these are Respiration, and the Circulation of the Blood, to which may be added the Preparation of the Milk in Women.

The Breasts. 250. The M A M M Æ or *Breasts* are therefore to be describ'd here, first, whose Situation, Number, and Figure are known to all: In Men they are of no great Moment; but those of Women are rather to be considered: In which we are to observe

The *Circumstances requisite to render the Breasts beautiful*, which are a moderate Bigness, a due Distance, a tender and white

white Skin, a Substance somewhat hard , not flabby or pendulous, and a rosy Nipple.

The *Magnitude* is various : In Virgins they are of a moderate Size ; in pregnant Women, and such as give Suck, they are very big ; In Girls before Puberty, and in old Women they are very little. 'Tis also various in different Countries.

The *Time of their swelling* is about the fourteenth Year, in which they are said to begin to shew

The *Time of their Decrease* is various generally about the fiftieth Year.

The *Nipple*, which is a cylindric Eminence in the middle of the Breast, surrounded with the *Areola* ; whose Figure, Magnitude and Colour are known to all : But

The *Substance* is cavernous, almost like that of the *Penis* ; hence by handling, and suckling of Infants, it usually has an Erection : This consists of *nervous Fibres*, yielding a very acute Sense, numerous *Blood-vessels* from the *Mammaries*, *Extremities* of the *lacteal Tubes* , and the *Cuticle* inclosing the rest.

The *little Holes*, or Orifices of the *lacteal Pipes*, which are very conspicuous in those that give Suck, are

about seven, eight, or ten in Women.

The *Areola*, which is a Circle round about the Nipple, in Virgins is of an agreeable red, in younger Women, of an obscurer or a pale brown; but in old Women, of a livid Colour.

The *Use* is for Suckling, which could not be perform'd without the Nipple.

The *Substance* of the *Breasts*:

Besides the *common Teguments* of the *Body*, namely, the Cuticle, a tender Skin, and much Fat, they consist of a particular whitish and glandulous Substance, not unlike to that in the Udders of Beasts, occupying chiefly the Middle of the Breasts; which a great Quantity of Fat surrounds on every side, constituting a considerable Part of the Substance of the *Mammæ*.

But the *globular Bodies* describ'd and delineated for Glands by *Nuck*^a, and particularly *Verheyen*^b, as also others who have followed them, are not Glands, but Fat.

In this glandulous Substance, are interspersed the *lacteal Ducts* or Pipes

^a Adenograph. Fig. 2. ^b Anatom. Corp. hum. Tab. XVIII. Fig. 2. & 4.

join'd to one another, by Inosculations, collecting and containing the secreted Milk in those who give Suck, and communicating with the Arteries and Veins; as the former of these appears evident by the Generation of the Milk, so the latter is manifest by the dispersing of it.

All these may easily be observ'd in *turgid and large Breasts*, and especially in such as give Suck, but scarcely or imperfectly in Girls, old Women, or emaciated Subjects, or such as have us'd means to contract their Breasts.

The *Vessels* are *Arteries* and *Veins* from the Subclavian and Axillary; the former are call'd the internal Mammaries, the latter the external.

Their *Nerves* are from the Dorsals of the spinal Marrow.

Wharton adds *Lymphatic Vessels* ^a.

Their Use is,

1. To secrete the Milk from the Arteries in the glandulous Substance, to collect it in the lacteal Tubes, and at a proper Season to yield it to the Infant thro' the Nipple.
2. To be an Ornament to the fair Sex.
3. To raise an Inclination for Venery in both.

^a Adenograph. Cap. XXXVI.

251. When the Breasts are remov'd, the things that offer themselves to View, are

1. The two greater *Pectoral Muscles*, on each side one, situated under the *Mammæ*, and bending to the Arms.
2. The twenty two external *intercostal Muscles*, and the same Number of the internal, which assists Respiration in elevating the Ribs, of which we will give a larger Account in the Myology.
3. The *Membrane* call'd *Pleura* investing the whole Cavity of the *Thorax*, which will be particularly examined immediately.

The Media-
stinum.

252. These being shewn, the Breast is to be opened, in the performing of which it must be observ'd, that the Dissection is to be made on each side in the cartilaginous part of the Ribs, near to the bony; and that the *Sternum* is to be elevated and turn'd back, towards the Head: which being done

253. The MEDIASTINUM appears, which is a double Membrane, arising from the *Pleura*, situated under the *Sternum*, and closely adhering to it: This divides the *Thorax* lengthways exactly into two equal Parts, so that nothing can pass from the one into the other: In this we are to consider

The

The *cellulous Interstice* between the two Membranes, that is here very remarkable, in which Inflammations and Abscesses sometimes arise.

The *Connexion* with the *Pleura*, *Sternum*, *Pericardium*, and other adjacent Parts.

The *Vessels*: *Arteries* and *Veins* from the Mammaries and Diaphragmatics, and sometimes those call'd *Mediastinal*, springing from the *Aorta* and *Cava*, which are proper.

The *Nerves* are small, and arise from the Diaphragmatics and *Par vagum*.

The *Lymphatic Vessels* go to the Thoracic Duct.

The *Use* is,

1. To divide the *Thorax* into two Length-ways, for several Advantages, but especially, that when one side of the Thorax or Lobe of the Lungs is wounded or ulcerated, the other may not be immediately affected :
2. That Pus, Water, &c. contain'd in one Cavity of the Thorax, may not at the same Time affect both Lobes of the Lungs.
3. That when one side of the Thorax is wounded, Respiration may notwithstanding be kept entire in the

the other, to prevent the immediate Death of the wounded, &c.

II. To support the Heart for its freer Motion, especially, when we lye on our Backs.

254. The *Mediastinum* being dissected, and the *Sternum* remov'd, we consider next, The SITUATION of the PARTS in the THORAX.

of the *Diaphragm*, in the lower Part,
of the *Gland Thymus*, in the upper
of the *Lungs*, in each side,
of the *Heart*, in the middle,
of the *OEsophagus*, or Gullet,
of the larger *Vessels*, the *Vena cava*,
Vena Azygos, and the *Aorta*, in the
hind Part.

The Pleura. 255. But before these be examin'd more particularly,

The PLEURA is first to be consider'd, which is a smooth, strong and tense Membrane, investing the whole Cavity of the Thorax: in this are to be observ'd,

I. That it consists of two Bags, each of which covers one side of the Thorax, and contains one Lobe of the Lungs; and that from the Conjunction of those two, the *Mediastinum* arises in the Middle of the Breast (253.)

2. That

2. That it is compos'd of a double and very vasculous *Lamella* or fine Membrane.

3. *The Vessels are*

{ very numerous *Arteries* from the Intercostals, Mammaries, and Diaphragmatics^a.

{ *Veins*, from those of the same Name with the Arteries, which empty themselves in the upper Trunk of the *Vena Azygos*, as also of the Cava.

{ *Nerves*, from the *Vertebræ* of the Thorax, and Diaphragmatics.

{ *Lymphatics*, marching to the Thoracic Duct.

4. The *Use* is to invest and strengthen the whole Thorax.

256. The THYMUS is a Gland very considerable in Infants, situated in the upper Part of the Thorax, immediately under the *Sternum*, lying on the Trunk of the *Aorta* and the upper *Vena cava*. The Particulars most remarkable in this are as follow.

{ Its *Extension*, from the *Pericardium*, according to the Situation of the Trunk of the *Aorta* to the Beginning of the *Carotides*, with which it coheres.

^a *Ruyfch. Epist. II. Tab. 2. Fig. 1.*

Its *Figure* is uncertain, various or irregular; see Figure 14. and 15. Tab. IV.

The *Colour* in Infants is a pale red; but in Adults 'tis more obscure.

Its *Magnitude*, in Infants new born, is very great, its Length is about three Inches, its Breadth two, and Thickness half an Inch; in Children it gradually decreases, and in Adults, and old People, it almost entirely disappears.

Its *Substance* is glandulous, conglomerate, and surrounded with a Membrane.

Its *Vessels* are,

Arteries and *Veins*, which arise sometimes from the subclavian Mammaries, or *Mediastinal*; and sometimes from the *Carotides* and *Jugulars*.

Lymphatics, which go sometimes to the Thoracic Duct, and sometimes to the *Vena Cava*: These for the most part are without Valves.

The *Nerves* arise from the *Par vagum* or the Intercostal.

A *Milky* or *Chylous Humour* is sometimes found in it, in Infants newly born.

It has no Excretory Duct as yet known, and therefore

Its *Use* is uncertain perhaps it secretes a *Lymph*, and empties it thro' the Lymphatic Vessels into the Thoracic Duct, for the Dilution of the Blood and Chyle, as is observ'd in the Mesenteric Glands for diluting the Chyle. The Use of this is more considerable in the *Fætus*, than in those that are born, because they are depriv'd of the Attenuation of the Blood, which depends upon Respiration. *Bellinger* is of Opinion, that it prepares the nutritious Liquor of the *Fætus*, and discharges it thro' particular Ducts into its Mouth^a.

257. The DIAPHRAGM is a large muscular and convex Part distinguishing the Cavity of the Thorax from the Abdomen. In this we take under our Observation

The *Situation*, which is transverse and oblique, between the Abdomen and Thorax; so that the Fore-part is higher, and the posterior much more declining.

The *Connexion* with the *Sternum*, the false Ribs, and *Vertebræ* of the Loins.

The *Figure*, which is almost circular, is compar'd to a Racket or Ray

^a *Bellinger* of the Nutrition of the *Fætus*, printed in London An. 1717.

Fifth, 'tis convex towards the Thorax, and concave towards the *Abdomen*: See Fig. 13. Tab. III.

Three Holes are usually observ'd in it, The *first* is in the left side for the Passage of the *OEsophagus*.

The *second* is in the right, thro' which the lower *Vena Cava* passes.

The *third* is between the two Heads of the lower Muscle, and this transmits the *Aorta*, *Vena Azygos*, and Thoracic Duct.

The *Vessels* are call'd Phrenic, for $\Phi\rho\epsilon\nu\epsilon\varsigma$ signifies the *Diaphragm*.

The *Arteries* are 1. From the *Aorta* or *Celiac*; 2. From the subclavian or Mammary; And 3. From the Intercostals and *Lumbals* ^a.

The *Veins* are from the *Cava*, the *Azygos*, and the Subclavian.

The *Nerves* are 1. Two great Diaphragmatics, arising on each side from the *Vertebrals* of the Neck, which are almost wholly inserted into it; 2. Small Branches from the Intercostal and *Par vagum*.

The *Lymphatics* pass to the Jugular Vein ^b.

Russch. Epist. IX. p. 13. ^b *Nock.* Adenograph. p. 142.

It is surrounded with a Membrane from the *Pleura* on its upper side; and by the *Peritonæum* on its lower side. Its *Substance* is muscular, consisting of two Muscles.

The *upper* of which is almost orbicular, large and thin, and arises from the false Ribs and *Sternum*; and its Tendon or *Aponeurosis* makes the nervous Center of the Diaphragm.

The *lower* arises by two Productions from both sides of the *Vertebræ* of the Loins, and is inserted almost in the Center of the former.

Its Use is,

1. For *Respiration*, for in Inspiration it is mov'd downwards, but in Expiration upwards into the Cavity of the Thorax.
2. For promoting the Motion of the Contents of the *Abdomen*, the Stomach, Intestines, Liver, Spleen, Chyle, Gall, &c.
3. For assisting the Expulsion of the Excrements, Urine, *Fætus*, Secundine, &c.

258. The LUNGS are the greatest *Viscus* The Lungs. of the Thorax, in which we consider, Their *Situation* in both sides of the Thorax, containing the Heart in the Middle.

N

Their

Their *Connexion*, 1. with the *Sternum* and *Vertebræ* by means of the *Mediastinum*; 2. With the Heart, by the pulmonary Vessels: 3. With the *Aspera Arteria*.

Their *Colour* in Infants is an agreeable red, but in Adults and old People livid, or variegated with white and black.

Their *Figure*, if they be inflated, in some Measure, resembles an Oxe's Hoof, being convex above, and concave below.

Their *Division* into two great Lobes, the right and left, each of which is again divided into two or three lesser, and these into innumerable very small Lobes.

The *Membrane*, with which they are surrounded is a Continuation of the *Pleura*.

Their *Substance* is spongius, compos'd of very minute elastic Vesicles, and various Vessels; which are

The *Bronchia*, compos'd of cartilaginous Rings, and contractile Membranes, which being first divided into Branches, and afterwards into innumerable small Branches, terminate at last in those very minute Vesicles, which principally compose the Substance of the Lungs, and adhere to the small Branches, like so many Clusters of Grapes.

The *Pulmonary Artery and Vein*, divided after the same manner as the *Bronchia*, accompany them every where,

where, and at length form, with their utmost small Branches, about the Vesicles, the *Rete vasculosum* of *Malpighi*, thro' which the Blood circulates in the Lungs.

The *Arteria Bronchialis* of *Ruysch*, appointed for the Nutrition of the Lungs, arises single or double, and sometimes triple from the *Aorta* or Intercostals, and coheres closely with the *Bronchia* ^a.

The *Vena Bronchialis* takes its Original from the Intercostals, or *Vena Azygos*: See Note (18.)

The *Nerves* spring from a *Plexus* of the Thorax, the *Par vagum*, and the Intercostal.

The *Lymphatic Vessels* empty themselves in the Thoracic Duct.

The *Glandulæ Bronchiales* are blackish Glands, adhering externally to the Divisions of the *Bronchi*: Their Use is uncertain.

The *Use* of the Lungs is Respiration, by which the Attenuation and Circulation of the Blood are promoted; 2. Speech, 3. They are also an Emunctory of the Blood.

^a *Ruysch*. Valvular. Lymphat. Dilucidatio p. 61. & Epist. VI.

The Wind-
pipe.

259. The TRACHEA ARTERIA, or Wind-pipe, is a Canal extended from the Jaws to the Lungs. In this we examine, The *Situation* which is in the middle and Fore-part of the Neck.

The *Connexion*, with the Jaws, Lungs, and Gullet.

The *Division* into the *Larynx*, and *Aspera Arteria*, strictly so call'd.

The *Larynx* is the upper and thicker Part or Head of the *Aspera Arteria*, in which there are

An *Aperture* or Orifice call'd *Glottis* capable of Contraction and Dilatation for the Variation of Sounds.

Five *Cartilages* of a particular Figure and Connexion, the first of which is call'd *Thyroides*, or *Scutiformis*, this makes that Protuberance in the Throat, call'd *Pomum Adami*: The second is call'd *Cricoides*, or *Annularis*; the third and fourth are the two *Arytænoides*; the fifth, the *Epiglottis*, with its *Ligaments* and very small *Glands*^a for covering the *Glottis*.

The *Sinus's* or *Ventricles* of the *Larynx* under the *Epiglottis*.

^a *Ruyfch. Thesaur. Anat. 1. Tab. IV. Fig. 6. D. & Morgagn. Advers. Anat. 1. Tab. II. Fig. 5. and 6.*

The *Glandulous Membrane* investing the internal Part.

Seven *Pair of Muscles*; consult the *Myology*.

The *Trachea*, or *Aspera Arteria*, strictly so call'd, is the rest of the Canal extended from the *Larynx* to the Lungs: In which

The *upper Extremity* or Beginning is circular, and easily admits a Finger;

The *lower* or *End* is somewhat narrower, and divided into *Bronchia*, which are every where distributed thro' the Lungs, as has been already mentioned.

The *Substance* consists of sixteen or twenty cartilaginous Rings and Tunics.

The *Rings* are imperfect; for where they adhere to the *Oesophagus*, they are membranous, to prevent their being a Hindrance to Deglutition or swallowing.

The *Tunics* or Coats conjoin the Rings: The external has annular Fibres, the internal consists of Longitudinal and Muscular Fibres, under which are many Glands^a.

^a Bidloo Anat. Tab. 25. Morgag. ibid. Tab. II.

The *Vessels* are *Arteries* from the *Carotides*, *Veins* from the *Jugulars*.

The *Nerves* spring from the *Plexus cervicalis*, and the *Recurrents*.

Its *Use* is 1. In *Respiration*; 2. In *Sound* and *Voice*; and 3. In *swallowing*.

The *Glandula Thyroides* is a remarkable Gland, lying upon the lower Part of the *Larynx*; concerning which see more in the *Adenology*, or *Description* of the *Glands*.

260. In our *Demonstration* of the *Heart*, we will consider, first, the *Heart* itself, and next the *Pericardium* or little Bag, in which it is contain'd.

The Heart. The HEART is that muscular Part inclos'd in the *Pericardium*, and situated in the middle of the *Thorax*, which is the principal Organ of the *Circulation* of the *Blood* and *Life*. In this are to be observ'd, The *Figure*, which is *Conic*: The larger Part is call'd the *Basis*, the *smaller*, the *Apex*.

The *Connexion*: 1. By *Interposition* of the *Pericardium* with the *Mediastinum* and *Diaphragm*; lest in the various *Motions* of the *Body* it should be disturb'd, inverted, or turn'd out of its *Situation*; which could not possibly happen without imminent *Danger* of *Life*. 2. The *Basis* coheres with the common *Vessels*, but the *Apex* or *Tip* is free, and inclines to the left

left side, where 'tis perceiv'd to beat, and is cherish'd in a certain Cavity of the left Lobe of the Lungs.

Its *Length*, which is about six Inches, its *Breadth* four, and its *Circumference* thirteen.

Its *Substance*: This is muscular, furnish'd with a double Cavity, and invested without and within by a Membrane.

Its *Fat* covers the *Basis* and *Apex*, perhaps to lubricate or render it slippery.

Its *Blood-vessels*, which are either

{ *Proper*, as the *Coronary Arteries* and *Veins*, beautifully delineated by *Ruysch*^a; or

{ *Common*; these are two *Veins*, the *Cava* and *Pulmonary*, and two *Arteries*, the *Pulmonary* and *Aorta*.

Its *Nerves* are not very large, and proceed from the *Par vagum* and *Intercostal*.

Its *Auricles* are two, the right and the left; these are call'd the *Appendages* of the Heart; the former of which is greater than the other: They receive the Blood when the Heart is in its *Systole*, and have a muscular Substance for *Contraction* and *Expulsion* of the Blood into the Heart, when it is in its *Diastole*: Hence it ap-

^a Epist. Problem. III. & Thesaur. Anat IV. Tab. III.

pears, that their Motion and that of the Heart, are at contrary Times.

Its two *Cavities* and *Ventricles*, of which

The *Right*, that is thinner than the left, receives the Blood from the *Vena cava* and right Auricle, and expels it into the Pulmonary Artery and Lungs.

The *Left*, which is far stronger than the right, admits the Blood from the Pulmonary Vein, and left Auricle, and thrusts it with great Force into the *Aorta*.

The *Septum* or Partition between the two Ventricles is strong, and not perforated.

The *Orifices* of the *Veins* of *Thebesius*^a, and *Verheyen*^b, are by *Vioussen*^c injudiciously taken for Arteries, secreting the Ferment of the Heart.

The little fleshy Pillars, with the Furrows betwixt them, which are very numerous in both Ventricles and Auricles of the Heart, are as so many Muscles; by whose Concourse Valves are made in the Heart, plac'd at the Orifices of the Auricles.

The *Valves* of the Heart are of three Sorts, 1. The three call'd *Tricuspides* are, at the Entrance of the *Vena cava*, in the right Ventricle. The two call'd *Mitrales*,

^a Dissert. de Circul. Sang. in Corde.

^b Anat. Cap. de Corde.

^c Nouvelles Decouvertes sur le Cœur.

are in the left Ventricle, at the Entrance of the Pulmonary Vein; these hinder the Reflux of the Blood from the Heart into the Veins, while it is in its *Systole*. 3. The three *Semilunares*, that are situated both at the Beginning of the *Aorta* and Pulmonary Artery, hinder the Return of the Blood from the Arteries into the Heart.

The Fibres of the Muscular Substance of the Heart, have a wonderful Contexture, and are admirably well extricated by Dr. *Lower*^a. The first that occur are strait. The second *Spiral*, common to both Ventricles of the Heart, and of a double Order, the exterior wind from the *Basis*, and *Tendon of the Heart*, to the left; the interior to the right, and intersect the former, and when these are in Contraction, they constringe closely the Cavities of the Heart, and expel the Blood.

The *Use* of the Heart is the Circulation of the Blood. For it receives the Blood from all Parts thro' the Veins, and thro' the Arteries drives it back again: Upon which the Functions of all the other Parts depend.

This *Motion* of the *Heart* is wonderful, continuing Day and Night, without the Intermision of one Moment, and without Fatigue, lasting sometimes for the

^a Tractat. de Corde.

Space of an hundred Years, and beating an hundred thousand times in one Day.

The Circulation of the Blood in the *Fœtus*, while in the Womb, because of the Want of Respiration and the Rest of the Lungs, is perform'd after another manner than what is observable in those that breath; for the Blood, excepting a small Quantity, is not forc'd thro' the Lungs; but passes partly thro' the *Foramen Ovale*, and partly thro' the *Canalis Arteriosus* to the left Ventricle of the Heart and the *Aorta*.

The Pericardium.

261. The PERICARDIUM is a membranous Bag situated in the middle of the Thorax, between the Lobes of the Lungs loosely inclosing the Heart. Its *Figure* is Conic, analogous to the Heart. Its *Magnitude* is such, that it may commodiously contain the Heart.

Its *Connexion* is with the *Mediastinum*, the Middle of the Diaphragm, and the great or common Vessels of the Heart, by which, this together with the Heart, is sustained for the Reasons already mention'd (260.). But in Beasts it has not the same close Cohesion with the Diaphragm.

Its *Substance* consists of a double Membrane,

The

{ The *exterior*, which is common with the Mediastinum.

{ The *interior* is proper and slippery; deriv'd from the Coats of the greater Vessels, in which are innumerable *small Holes*, or *Pores*, most conspicuous in Oxen.

Its *Arteries* and *Veins* spring from the Mediastinals, and Diaphragmatics.

It receives *Nerves* also from the Diaphragmatics.

The *Lymphatics* discover'd by *Cowper*, run to the Thoracic Duct.

The *Liquor contain'd in the Pericardium* is a serous Fluid, which is found in a small Quantity, and seems to be design'd for moistening the Heart, and the Easiness of Motion, which in this part should be very free; for the preserving or collecting of which, this Case or Bag is form'd. Many deduce this Liquor from Glands, which they suppose are in the *Pericardium*, or Heart itself; but since the Existence of these cannot be demonstrated, I am rather inclinable to think, that in the *Systole* of the Heart and Auricles, it is squeez'd out from these, being supported by the Observation of *Bartholine*, made on a Wound of the *Pericardium*^a, and

^a Anat. Reform. Cap. de Pericardio.

the Experiment of *Thebesius*^a: And am willing to believe, that it is rather absorbed again by its Pores, than excreted in it.

The *Use* of this is, 1. To sustain the Heart as a *Pendulum*; 2. To contain the Liquor of the *Pericardium* for the more expeditious Motion of the Heart. 3. To defend the Heart, lest the cool Air entering the Lungs, should be any Disadvantage to it.

The Gullet. 262. The OESOPHAGUS or Gullet is a membranous Canal, extended from the Jaws to the Stomach: In which we observe The *Figure*, this is like a *Funnel*, the upper Part of which is call'd PHARINX.

The *Situation* is behind the Wind-pipe, lying all along the *Vertebræ* of the Neck and Back; but in the *Thorax* it turns a little to the right, to give way to the *Aorta*.

The *Substance* is membranous, consisting of five Coats.

The *membranous* Coat is common, and deriv'd from the Pleura in the Thorax.

The *muscular* Coat is strong: in human Bodies it consists of longitudinal and annular Fibres, but in Oxen of two spiral Lamellæ, decussating or crossing one another. This contracts the Gullet.

The *cellulous* is much the same with that in the Intestines.

^a Differt. de Circul. Sang. in Corde.

The *Nervous* Coat may be divided into various Lamellæ, and is furnished with many Vessels and Glands: for this reason *Verheyen* divides it again into the *Vasculous* and *Glandular*^a. This Coat is a Continuation of the interior Membrane of the Mouth and Stomach.

The fifth is the *Crusta Villosa*, or soft Substance observable upon the inside; this is cover'd with a slimy Humour, to facilitate the Descent of the Aliments.

The *Muscles* of the *Pharynx* are strangely multiplied by *Valsalva*^b, which however may be very well reduc'd to three Pair; namely,

{ Two Pair that dilate.
 { The first of which is called *Stylo-pharingæus*, this springs from the styloide Processes.
 { The second *Cephalopharingæus*, arising from the lowest part of the Skull.

{ And only one Pair that contracts, call'd *Oesophagæus*, or the *Sphincter* of the Gullet; proceeding on both sides from the Os Hyoides and the Larynx; of which we shall discourse more fully in the Myology.

^a Anat. Cap. de Oesophago. man. Tab. V. & VI.

^b Tractat. de Aure Hu-

The *Arteries* take their Original from the Carotides, the Aorta, Intercostals, and the Celiac.

The *Veins* have their Rise from the Jugulars, the Vena Azygos, and the coronary Vein of the Stomach.

The *Nerves* come from the Par Vagum, and perhaps it is also furnish'd with Lymphatics.

The *New excretory Ducts of Vercellonus* ^a, conveying a saltish Liquor into the *Oesophagus* and Stomach, proceed from the following Glands, viz.

The *Gastric*, which are conglomerate, and situated near the left Orifice of the Stomach.

The *Dorsals*, seated about the fifth Vertebra of the Thorax: And

The *Bronchial*, the *Tracheal*, and the *Thyroide*. Vid. Note (19.)

The *Use* is Deglutition and Commixture of the Liquor, assisting Digestion.

^a Differt. Anat. de Gland. Conglomerat. Oesophagi.

Of the NECK,

The third Part of the TRUNK.

263. The NECK is that slender part of the *The Neck.*

Trunk which is situated between the Thorax and Head, and extends it self from the Sternum and Channel Bones to the Head.

This consists

Of *common Teguments.*

Of *Vertebrae*, which are commonly seven.

Of many *Muscles*, that move the Head, Neck, Larynx, and Os Hyoides, &c.

Of very remarkable *Arteries*, namely, the internal and external Carotides, and the Vertebrals.

Of *very large Veins*, viz. the internal and external Jugulars and the vertebral Veins.

Of large *Nerves*, from the Par Vagum, the Intercoastal, the Diaphragmatics, and Brachials.

Of the *Trachea Arteria*, or Wind-pipe, especially the Larynx, in which the Pomum Adami appears prominent:
And

Of a great part of the *Oesophagus.*

264. We have already discours'd of its *Vertebrae* (from 116 to 123) of the *Aspera Arteria* (259.) and of the *Oesophagus* (262.) We will treat of the *Muscles*, *Arteries*, *Veins* and *Nerves* in their proper Place: For the Consideration of this part is not to be neglected or omitted in our Examination of the Humane Body, as is usual among many Anatomists, since it contains Parts of as great Consequence for Life, and as necessary to be known by young Students in Anatomy as the Abdomen. And hence it is that *Aristotle*, *Ruffus*, *Oribasius*, *Coilerus*, *Riolanus*, *Ruysch*, *Morgagnius*, and others, have not omitted it in their Divisions of the Body, but took care to distinguish it from the other Parts, since it cannot be with any shew of Reason referr'd either to the Head or the Thorax,

Of the H E A D:

The fourth part of the Trunck.

165. The H E A D the fourth part of the Trunk, is all that which is situated upon the uppermost Vertebra of the Neck, in examining which we consider,

The Head.

The *Figure*, which is an Oblong round, somewhat Oval, prominent before and behind, but flat upon its sides, yet so that the forepart, especially the Forehead, is not so broad as that behind. A figure contrary to or receding from this, both infers and indicates Deformity, and often also the Defect of Judgement.

The *Magnitude*: that which is proportion'd to the Body is the best, for when it is either too great or too little, it not only produces a fault in the form, but for the most part impairs the Judgement also. However a Head somewhat larger than ordinary is better than one too small, for in such the faculties of the mind are seldom considerable.

The *Situation*: viz. In the uppermost part of the Body, for the more Commodious Position of the Organs of the senses, which are in this exalted Station constituted the Guards and Centinels of the Soul,

The Division of the Superficies or surface into the Part

{ Not covered with Hair, which is call'd the Face, containing the Organs of the Senses — and

{ That which is, the forepart of which is called *Sinciput*, the Posterior *Occiput*, the uppermost *Bregma* and *Vertex*, or the Crown, and the lateral Parts *Tempora* or Temples.

126. The Constituent Parts which are the Containing or Contained.

The Con-
taining Parts
of the Head.

{ The CONTAINING PARTS of the Hairy Scalp are either

{ Common, as in other Parts, namely,

{ The Cuticle or Scarf Skin.

{ The Skin which here is very thick.

{ The Fat. Of this about the Scull there is but little, but in the Cheeks a great plenty.

{ Proper viz. the

{ HAIR, of which we have Discours'd already, page 51.

{ Four MUSCLES of the Skull, which are very thin, two in the forehead call'd *Frontales*, and two in the Hindhead named *Occipitales*; these with their Tendons surround the Head above. Consult the Myology.

{ The PERICRANIUM is a thin but

but strong Membrane, immediately investing the Skull.

It *Coheres* with the Skull, the Neighbouring Muscles and the Dura Mater.

It may be *divided* into two Lamellæ, hence by some it is distinguished into the *Pericranium*, and *Periosteum*, but this Distinction is neither necessary nor useful.

It has numerous *Blood Vessels*, common with the rest of the Head.

Its *Nerves* are divided from the Vertebrae of the Neck, and the seventh Pair of the Brain.

Its *Use* is to sustain the Vessels which convey Nourishment to the Skull,
2. To render the Skull sensible of Impressions, which without this being a Bone, has not the sense of feeling.

The **SCULL** for the defence of the Brain, which is altogether a bony substance, consisting of eight strong Bones join'd together by the help of Sutures of which in Osteology. But this is only to be observ'd here that, in order to view the Interior parts, the upper half or thereabouts, is to be saw'd across and afterwards cautiously separated: when the upper

half is taken off, the red Points shew how it adher'd by Vessels to the Dura Mater beneath, by which tis nourished within.

The PARTS CONTAIN'D are the *Brain*, &c.

267. In the Demonstration of the BRAIN the principal seat of the Soul, the three MEMBRANES called *Menynges* or *Matres*, are first to be observ'd of which

1 The DURA MATER is a strong Membrane, situated under the *Cranium*, and covering all its Cavity, in which,

Little red Points appear, when the saw'd *Cranium* is torn off.

The *Figure* and *Magnitude* are proportioned to the Brain.

The *Connexion* with the Scull in the upper Part is loose, but below close, in like manner it also coheres loosely with the parts underneath.

The *Structure* is of Tendinous and strong Fibres¹

The *Arteries* are Distributed in a beautiful manner, like the branches of Trees,²

The *Veins* are of two sorts, for some are of the same kind with the other Veins of the Body, others are singular of a triangular Figure and are call'd sinus's. In these are to be considered

¹ Pacchion. de Dura Matre. ² Ruysch. Thes. V. Tab. II. f. 4.

The *Number*. Some of the Moderns reckon up several, but the Generality only four which are the principal. Namely first the *Sagittalis* or *Longitudinalis*, this runs from the *Frons* to the *Occiput* throughout the middle of the Brain, and terminates in the two *Laterales*, which represent the Figure of a Greek Circumflex, and discharge themselves on both sides into the internal Jugulars: These may be seen when the Brain is taken out. Lastly the *Fourth* arises from the Region of the *Glandula Pinealis*, and is inserted where the other three meet, and this Place is called *Torcular Herophili*,¹ there are several lesser than these about the *Sella Turcica*, but of no great moment.

The singular *Insertion* of the *Veins* of the *Brain*, into these *Sinus's*.

The *Conglobate Gland* of *Pacchionus*²

The *Chordæ Willisii*, preventing or hindring too great Extension

The *Use* to carry back the Blood from the Brain, like other Veins.

The *Nerves* from the fifth and seventh Pair of the Brain.

The *Lymphatic Vessels* have not as

¹Oftob. de æcon. an. f. 1. Vieussen in Neurograph. ²as Bidloo Anat. Corp. Human. Tab. 8. Fig. 5,

yet been sufficiently demonstrated, The *Processes*; 1 The *Falciformis*, between the two Hemispheres of the Brain, 2 The second is between the *Cerebrum* and *Cerebellum*, 3 The third is in the Division of the *Cerebellum*.

The *Motion*, which according to *Baglivi* and *Pacchionus* is proper, and Muscular, is in reality only derived from the Pulse of the Arteries of the Brain.

The *Use* is 1. to serve instead of a *Periosteum* to the Scull, and 2. to defend the Brain, 3. to prevent by its *Processes* the Compression of the *Cerebrum* and *Cerebellum*, 4. To Communicate Warmth to the Brain, by means of its sinus's.

Of the Arachnoides.

The Arach-
noides.

268. II. The ARACHNOIDES the second Coat of the Brain, is so called because of its Resemblance to a Spiders Web, in this we observe,

The *Situation* under the *Dura Mater*, between this and the *Pia Mater*.

The *Connexion*: in the upper Part, it is connected with the *Pia Mater* and Brain closely, but in the lower part especially about the *Cerebellum*, the *Medulla Ob-*
longata

longata, and the Spinal Marrow, the Conjunction is loose, so that in these Places tis abundantly obvious to the sight, notwithstanding some even of the Modern Anatomists, doubt or entirely deny its Existence.

Its *Extension* over the whole Brain, and Spinal Marrow, but this latter it furrounds very loosely.

No *Blood Vessels* have been certainly discovered in it, although some have given Representations and Figures of them.

The *Use* of this is to constitute a Covering for the Brain, but how far so thin a Membrane, in which no Vessels can be discerned, can answer this purpose, is not as yet evident.

269. III. The P I A M A T E R is the third Membrane, lying under the Arachnoides, and immediately and firmly encompassing the Brain. In this are to be noted,

The *Extension*. It not only covers the surface of the Brain, but insinuates it self into all its windings and folds, and invests the spinal Marrow and Nerves also, on which account its Superficies is far greater than that of the other Membranes.

Its *Cohesion* with

The Brain, in its healthful state is close and firm, but in Hydropics loose.

‡ As Bidloo Anat. Corp. Human. Tab. 8. Fig. 5.

The *Arachnoides*, is close above, and loose below.

The *Dura Mater*, is only by the Veins, that tend to the sinus's.

Its *Blood Vessels* are common with the rest of the Brain, and so very numerous that it seems to be entirely composed of them, as the curious Injections of *Ruyseh* have demonstrated.

These are

Arteries from the Internal Carotides, and Vertebrales.

The *Veins* discharge themselves into the Sinus's of the *Dura Mater*, these into Bags, and the Bags into the Jugular and Vertebral Veins. ²

No *Nerves* have been observed entring into the substance of this Membrane. Neither have any *Lymphatic Vessels* been certainly Discovered in the Brain.

Willis and others affirm that it is furnished with *Glands*, which secrete a liquor for moistening the Meninges, but these are only observable about the *Sinus Longitudinalis*.

The *Use* is to envelop the Brain, and to sustain its Sanguiferous Vessels, that these may be the better Distributed through all its Windings and Folds,

¹ *Epist. Problem. VII. IX. XII.* as also in *Thesaur. Anat.* in various places. ² *Vieussen. Neurograph. Tab. I. and Low. or de Corde, Tab. Fig. 1.*

for a sufficient secretion of the Nervous fluid or spirits.

270. The BRAIN strictly so called: *The Brain.*
in which are to be observed

The *Figure* which is Globular or round, but a little unequal, representing Intestines, by its windings and turnings.

The *Division* into two Hemispheres, by the Interposition of the *Processus Falciformis*, and these in Anterior and Posterior lobes.

The *Magnitude* or Bulk arises to the weight of four Pounds, and therefore it is almost three times larger than an Oxes Brain.

The *Substance*, if it be cut Horizontally appears double, the

Exterior is called the *Cineritious* or *Cortical* Part whose

Thickness is about two lines, and serpentine Windings penetrate deeply into the Brain.

Structure according to

Malpighi, *Bidloo*, and most of the Moderns is Glandulous, but

Ruysch, *Bergerus*, and *Vieussien*, it is entirely *Vasculous*,¹ for if every where in the other Viscera Glands may be discovered, yet I am pretty well assured, that they

¹ *Ruysch* Epistle XII. and *Thesaur. Anat.* in various places. *Bergerus* in *Physiologia*. *Vieussenius*, in his new System of the Vessels.

cannot be demonstrated in this Part.

The *Interiour* is white and called the *Medullary* part, whose

Structure is *Tubulous*, constituting all the rest of the Brain.

Its *Original*, is from the very minute Arteries of the Cortical Substance.

Its *End*, the beginning of the Nerves.

Its *Hardness* is a little greater than that of the *Cortical*.

The *Corpus Callosum* appears in sight, when the Hemispheres or two lobes of the Brain are drawn aside; this is white, somewhat hard, and joyns the lobes of the Brain, in which *Lancisius* places, the seat of the Soul.

The *Ventricles* are remarkable Cavities of the Brain, and are four in number.

The two *Anteriour* or fore Ventricles which are the greatest, appear when the Brain is cut Horizontally, and taken off to the Corpus Callosum. In these we are to observe

The *Plexus Choroideus*, this is furnish'd with numerous Vessels but destitute

of Glands, it is beautifully delineated in *Ruyſch's* Epistles, Tab. 15.

The *Corpora Striata*, are Cineritious being streak'd in the external Superficies

The *Thalami Nervorum Opticorum*, are white without, Cineritious within.

The *Septum Lucidum* or rather *Pellucidum*, is visible between these two Ventricles when the *Corpus Callosum* is raised: This consists of a thin Medullary substance covered with the *Dura Mater*, and distinguishes or separates the Ventricles; by *Galen*, 'tis called *Diaphragma Cerebri*.

The *Fornix* occurs under the *Septum Lucidum*, and is composed of the Medullary substance, whose Anterior part is single, broad and thin, but Posterior divided into two, whence it is called *Crura Fornicis*, also *Pedes Hippocampi*. Between these is

The *Third Ventricle*, in which besides a part of the *Plexus Choroidens*, these following are to be considered viz.

The *Glandula Pinealis*, with the Medullary Processes.

The *Nates*, *Testes*, and under these the *Valvula Major*, and *Sylvius's Aquæduct*, whose Posterior Orifice is called *Anus*, and Anterior *Rima ad Infundibulum*, granting a Communication

cation to the two Anterior Ventracles, with the third and fourth, which is a Continuation of this. All these are more apparent and obvious to the sight, when the Brain is taken off.

The *Fourth Ventricle* is a Cavity, between the Cerebellum and the Medulla oblongata below, when the Brain is taken out and the Cerebellum cut, it then becomes apparent to the sight, by this there is a Communication between the Ventracles of the Brain, and the Spinal Marrow.

The Cerebellum.

271. The CEREBELLUM or little Brain, offers the following Particulars to our Examination, viz.

The *Situation* under the Posterior Lobes of the Brain, in the lower part of the Scull.

The *Figure* is somewhat Globular.

The *Superficies* is less winding than that of the Brain, but in some measure furrowed; the *Furrows* in the middle are greatest, and by degrees becoming less, terminate in the *Processus Vermiformis*.

The *Division*, into the right and left Part.

The *Substance* is almost the same with that of the Brain, but in this the *Cortical* Part is far greater than the *Medullary*, which makes an agreeable representation of small Trees, whose
Trunks

Trunks constitute the *Pedunculi* of the Cerebellum.

No *Cavities* are in the Cerebellum, which is far otherwise in the Cerebrum as has been mentioned.

The *Little Lobes* of the Cerebellum, adhering in bunches to the Branches of the Medullary substance, and surrounded with the *Pia Mater*, constitute the whole Cerebellum: These have not hitherto been clearly described.

The *Pedunculi* of the Cerebellum, consist of three Medullary Processes, the first of which ascends from the Cerebellum towards the Testes, and forms the *Valvula Major* of the Brain; the second makes the Arch called *Willis's Annular Prominence* or *Pons Varolii*; But the third descends to the spinal Marrow.

272. The MEDULLA OBLONGATA *Medulla Oblongata.* is the lower Medullary substance of the Brain, and Cerebellum compacted together in form of a Tail, extended to the great Hole of the *Os Occipitis*, and giving an Original to the spinal Marrow and Nerves of the Brain. In its lower Part

While the Cerebrum is taken cautiously out of the Scull, we may see

The *Ten*, or rather (which is more con-

² *vid.* Fig. 16. Tab. IV.

forma-

formable to Truth,) the Nine pair of the Nerves of the Brain, which are comprehended in the following Verses.

*Olfaciens, Cernens, Oculosque movens,
 Patiensque,
 Gustans, Abducens, Audiensque Vagans-
 que loquensque,*

The Entrance of the Internal Carotide Arteries into the Scull.

The Infundibulum, and its insertion into the Glandula Pituitaria.

The Nervus Spinalis Accessorius of Willis¹,

Afterwards the Brain is taken out.

After the Brain has been taken out, these are to be considered

In the lower part viz.

The Inosculation² of the Carotide and Vertebral Arteries, and their Distribution through the Brain³.

The Crura of the Medulla { of which the
 Oblongata of the Brain, } Medulla Ob-
 The Crura, or Pedun- } longata and
 culi of the Cerebel- } Spinalis are
 lum. } formed.

The Rise of the Nine pair of the Nerves of the Brain.

The Pons Varolii or Annular Protu-

¹ De Cerebro Fig. I. M. M. ² Ridley, l. c. Fig. I. d.

³ Ruysch, Epist. Problem, Tab. XIII. and VX.

berance of *Willis*, this has been badly delineated by *Willis* and others, but rightly by *Ruysch* ¹.

The Beginning of the spinal Marrow, and in this the *Corpora Pyramidalia* and *Olivaria* of *Vieussen*, ² and *Ruysch* ³ — and

The *Tunica Arachnoides*, which here is most Conspicuous.

In the upper Part, after it has been again inverted.

The *Calamus Scriptorius* with its Nib in the middle.

All again which have been described in the third *Ventricle*,

The substance of the *Medulla Oblongata*, which without is *Medullary*, but within contains somewhat of a *Cortical* or *Cineritious* substance.

The Vessels of these Parts, and also of the whole Brain, are

Arteries from the *Carotides* and *Vertebrals*, the *Carotides* enter the Scull through particular Channels of the *Os Petrosum*, but the *Vertebrals* through the great Hole of the *Occiput*.

Veins, these scarcely penetrate the Inner substance of the Brain, but going out of the *Cortical* part, they insert them-

¹ *ibidem* ² Tab. IV. R. S. ³ *Epist.* Tab. XIV. Fig. 4 and 5,

themselves into the Sinus's of the *Dura Mater*.

Neither *Nerves* nor *Lymphatic Vessels* have been certainly Discovered.

The *Use* of the Brain is either

General *viz.* 1. To serve the Functions of the Soul, 2. To secrete Spirits, and to transmit them to the Nerves for Sense and Motion. However the *Cerebrum* is destin'd rather for the Secretion of the Animal, but the *Cerebellum* for the Secretion of the Vital, and Natural Spirits.

Or the *Particular* of each Part, which excepting perhaps some few, is unknown or at least Doubtful.

The Spinal
Marrow.

273. The SPINAL MARROW, is a Continuation of the *Medulla Oblongata*, and as it were the Tail of the Brain enclosed in the Bony Channel of the *Vertebrae*, and extended from the Head to the end of the *Os Sacrum*. Its *Length* agrees with the length of the Spine of the Back.

Thickness equals a Finger, but it is not of the same Diameter in all parts.

Teguments, or proper Covers are six.

1. The Bony Channel of twenty four *Vertebrae*, and the *Os Sacrum*.

2. The *Tunica ligamentosa* which is very strong, and tyes the *Vertebrae* together.

3. The *Tunica Cellulosa* or Adipose Coat, this

this in fat People contains fat, and serves for rendering the former soft.

4. The *Dura Mater*. In the upper part this is stronger, in the lower, thinner, which loosely encompasses the spinal Marrow, and is firmly connected with the posteriour part of the *Vertebræ*.
5. The *Arachnoides*: In the fore part it coheres closely with the *Pia Mater*, but in the Posteriour it fluctuates freely.
6. The *Pia Mater*, which every where very closely surrounds the spinal Marrow, and enters its *Longitudinal Division*.

Division into the Right and left part, as into two Columns, which however does not penetrate to the middle.

Sanguiferous Vessels, Arteries and Veins, from the *Vertebrals* of the Neck, Intercostals and Lumbals which enter in the side of the *Vertebræ* where the Nerves pass out, and make *Inosculation*s.

Spinal Nerves, which are thirty one or thirty two Pair, every one of which rises with many Fibres from the *Anteriour* and *Posteriour* part of the *Medulla*, which afterwards meet together, and being conjoined by Membranes constitute *Nerves*.

Substance of the *upper Part*, to the last *Vertebræ* of the *Thorax*, is the same

with that of the *Medulla Oblongata*, but a little more tenacious. *Without*, it is *Medullary* that the *Nerves* may have a commodious Exit. Within it is cineritious of the same use with the *Cortical Substance* of the Brain. But the Substance of the lower Part, from the last *Vertebra* of the *Thorax* to the end of the *Os sacrum* is *Fibrous* and very tenacious, being called *Cauda Equina*.

The Use is 1. to give Rise to the forementioned *Nerves*, which are distributed chiefly to the Limbs and the External Parts. 2. to prepare Spirits or the *Nervous fluid* for the use of those *Nerves*.

274. There are some other Particulars observable in the Scull which remain yet to be considered, viz.

The Egress of the nine Pair of the Nerves of the Brain.

The Entrance of the Arteries of the Brain and Dura Mater.

The greater Sinus's of the *Dura Mater* have been already describ'd. (267.) I. II. III. and IV. and also the Circular Sinus's and the other lesser ones, together with their passage out of the Scull and their Insertion into the Jugular Veins.

The RETE MIRABILE, which is a net-^{Rete Mirabile} like *Plexus* of the Vessels situated on both sides nigh to the *Glandula Pituitaria* under the *Dura Mater*, 'tis greater in Calves than in Men, but its use is unknown.

The *Glandula pituitaria* is a small *Gland*^{Glandula Pituitaria} situated in the *Sella Turcica* under the *Dura Mater*: Whose

Denomination is deriv'd from the supposed use of Absorbing the Pituite of the Brain.

Membranes are two. It is surrounded and suspended by the *Dura Mater* ² a fine *Membrane* like the *Pia Mater*; which are pervious for the *Infundibulum*.

Magnitude and *Figure* are almost the same with these of a Kidney-bean. However 'tis greater in Proportion to the bulk of the Brain in Beasts than in Men.

Substance is Glandulous, and for the most part somewhat hard and firm.

Vessels are *Arteries* from the *Carotides*, the *Veins* take their Course to the next *Sinus's*, the *Nerves* spring from the fifth *Pair*, the *Excretory Duct* is perhaps the *Infundibulum* (272) for there is no other known.

The *Use* generally attributed to it is that it imbibes the *Pituite* of the *Ventricles* of the Brain, and afterwards conveys it out ¹ but this has not the semblance of Reason.

1. Because it is the Office of *Glands* to secrete.

2. Because a simple Canal wou'd be sufficient for such a Purpose.

And 3. because its firm and hard Substance seems unfit for discharging such an Office. ²

275. In the FACE, or part of the Head not covered with Hair, the Containing Parts are to be considered, viz.

The *Common* as 1. the *Epidermis* or Scarf-skin. 2. The Skin, from the Colour and tenderness of which a great part of Beauty proceeds. 3. Much Fat, which a species of the *Panniculus Carnosus* often covers in this Part.

The *Proper* as the *Frontal Muscles*, and those of the Nose, Lips, lower Jaw &c. For which consult the *Myology*. And the Bones which see in the *Osteology*.

And the Parts Contain'd as the Organs of the five Senses, viz. of Seeing, Tasting, Smelling, Hearing and Feeling.

¹ Brann, *de Glandula, Pituitar.* and Littre l. e. ² Drake's *Anthropolog.* p. 496

276. The ORGANS of the sense of SEE-
ING are the two EYES, in which we
observe,

The *Situation* in the upper Part of the
Face, that the Eyes may discern Objects
at a greater Distance.

Their *Figure*, which when the *Exter-
nal* Parts are taken away is Globu-
lar.

Their *Colour* in Humane Bodies is brown,
black, grey, blewish.

The PARTS serving this Sense which are
not Constituent Parts of the Eyes are

1. The EYE-BROWS, which are
two Hairy Arches placed above the
Orbits, compos'd of Hairs of a par-
ticular Magnitude and Position, bend-
ing down towards the Temples; of
a thick Skin and Fat underneath, to
the End that they might be duely
rais'd. The part next the Nose is
call'd the Head, but the opposit is
named the Tail, which serve to
prevent the Sweat dropping down the
Forehead from falling into the Eyes.
2. The *Eyelids*. In each Eye are two, the
upper and the lower, at the meeting of
which are seen the two Angles or Can-
thi, the Inner is the greater, the Exteri-
our is the less. We are also to take No-
tice of

The *Structure* which consists of the Scarf-skin a tender Skin and an arched Cartilage called *Tarsus*, which are invested within with a very slippery and sensible Membrane derived from the *Perio-steum* and the *Albuginea* of the Eye. *Vide Ruysch. Thesaur. Anat. x. p. 12.*

The *Eyelashes*. These are stiff Hairs in the edge of the Eyelids, inflected after a particular Manner to keep off extraneous Bodies and too violent Rays.

The *Muscles* for Motion for which consult the Myology.

The *sebaceous Glands* of *Meibomius* secreting an Oily Liquor. (a)

The *Lachrymal Caruncle* and *Semilunar Membrane* (b) in the greater Angle.

The *Lachrymal Gland* above the lesser Angle, with its little *Excretory Ducts* under the upper Eyelid (c)

The *two Puncta Lachrymalia* terminating in the *Lachrymal Bag*, the *Nasal Canal* and the *Nose* it self. (d)

The *Use* to cover and defend the Eye, and to absterge or wipe the *Cornea*, as also to Modify the Rays.

(a) *Epist. de vasis Pa'pebrar.* (b) *Morgagn Adversar. Anat. Tab. 1. f. 22.* (c) *Steno de Gland. Ocular.* (d) *Morgagn. ibid. Tab. 1v. f. 1.* Verheren *Tab. 28. f. 9. a.* *Bianch. Ductus Lachrymal. and our Dissertation de Nova Method. fan- andi fistul. Lachrymal.*

3. The *Muscles* of the Eyes in Men are six, among which there is much Fat, four of these are straight namely, the *Attollens*, *Deprimens*, *Adductor* and *Abductor*. Two are Oblique viz. the *Superior* and *Inferior*.

The Proper Parts constituting the Globe of the Eye are COATS, viz.

p. 119. The Coats.

The *Albuginea* or *Conjunctiva* in the fore Part only.

The *Cornea*, which may be divided into various *Lamellæ*.

The *Sclerotica* in which are conspicuous *Nuckii Aquæ Ductus* commonly so called, which in reality are the very Sanguiferous Vessels of the Eyes.

The *Choroides* whose *Interiour Lamella* is called *Ruyfchiana*, both are furnished with numerous distinct Vessels and ting'd with black.

The *Uvea*, in which are to be observ'd the *Iris*, which is entirely Vascular, the *Pupilla*, the *Sphincter Pupillæ*, *Processus Ciliares*, *Ligamentum Ciliare*, the *Circulus Arteriosus* and *Venosus*, (from which there is a wonderful Distribution² of Vessels thro the *Uvea Choroides*, *Ligamentum Ciliare* and the Humours of the Eye.) the *Ductus Ni-*

¹ Ruyfch *Epist.* xiii. *Tab.* xvi. *Thesaur. Anat.* 111. *Tab.* 1. & 6. and *H. W. de Circular. Sanguin. in Ocul.* *ibid.*

gri between the *Processus Ciliares* and *Ligamentum Ciliare*.

The *Retina*, this is a very tender Coat being a fine Expansion of the *Optic Nerve* upon the bottom of the Eye, and the Principal Part for which all the rest were form'd.

The Double C A M E R A of the Eye. The *Anterior* which is between the *Cornea* and *Uvea* is the *Greater*, but the *Posterior* between the *Uvea* and *Corpus ChrySTALLINUM* is the *Less*.

The Humours for Refracting the Rays of Light are three, viz.

The *Aqueous*, filling each *Camera* of the Eye (see Note 21.)

The *Vitreous*, which resembles melted Glass or Jelly, consists of very fine *Vesicles* containing a *limpid Humour* filling the *Posterior* Part of the Eye, and every where contiguous to the *Retina*.

The *ChrySTALLINE*, which Lens-like is convex on both sides, and more solid than the rest, is suspended loosely and moveable by the *Ligamentum Ciliare*, and like Onions consists of several *Lamellæ* or *Lays*.²

A very fine Vascular Coat call'd *Arachnoïdes* furrounds the *ChrySTALLINE* and *Vitreous Humour*³ by the Interposition of which the *ChrySTALLINE* inheres

² How pl. c. 2. *ibid* ³ *Ruysscher Thef.* Tab. 1. f. 8.

in the Concavity of the Glassy Humour: But when this by any Means is broken, the Chrystalline falls out. SANGUIFEROUS VESSELS are in a wonderful Manner distributed thro' the Internal Part of the Eye, as *Ruyfch* and *How* have demonstrated. Several *Arteries*, c spring from the Internal and External *Carotides*, these contain only *Lymph*. (see Note 22.) The Veins tend partly to the *Sinus's* of the *Dura Mater* and partly to the Jugulars.

The *Nerves* are very numerous, namely the the *Optic Pair* form the *Retina* (see Note 23.) 2. The third Pair which is bestowed upon these Muscles, viz. the *Atollens*, *Deprimens*, *Adducens* and *Obliquus Inferior*. 3. The fourth Pair call'd *Pathetici*, this is spent upon the *Trochlearis*. 4 The fifth Pair gives Branches to the *Membranes* of the Eye the *Lachrymal Gland*, the *Lachrymal Bag*, the *Eye-lids*, &c. 5. A Branch of the sixth Pair. This goes to the Muscle call'd *Abducens*.

277. The Principal ORGAN of the Sense of TASTING and SPEECH is the TONGUE, in the Examination of which several other Parts assisting its Function are to be considered also, namely the

218 Of the Organs of Taste and Speech.

Salival Glands, the *Os Hyoides*, the
Guins, Palate, Lips, *Uvula* and the Tonfils.

278. The GLANDS SECRETING
the SPITTLE are

The PAROTIDES, which are considera-
ble Glands in each side one, situated be-
tween the Ear and the Angle of the
lower Jaw, from which proceed several
small Ducts that unite and form one
Channel three Inches long, and about a
Straw thick. This was discovered by
Steno An. 1660. (a) and is call'd *Ductus*
Salivalis Superior: It passes thro the
middle of the Cheek, perforates it nigh
the second or third Grinder, and emp-
ties it self there into the Mouth.

The MAXILLARES are also very re-
markable one in each side, situated in the
inner side of the Angle of the under Jaw,
each of which has a particular Duct com-
posed of several smaller Pipes, it is a lit-
tle finer, but longer than the former, and
call'd *Ductus Wharthonianus* from its
Inventor *(b)* or *Ductus Salivalis Inferior*:
This opens into the Mouth under the
Tongue nigh its Ligament call'd *Fræn-
ulum*, with a single and sometimes a double,
and sometimes also a triple Orifice. *(c)*

The SUBLINGUALS are two, situa-
ted under the Tongue. These secrete the

(a) *Steno Observ. Anat.* *(b)* *Adenograph. Cap. xxi.* *(c)* *Ruy-
sch. Thef. Anat. . 1. p. 25.*

salival juice, and in Humane Bodies empty themselves into the *Wharthonian Ducts*. But *Ravinus An.* 1679 discovered in Calves a peculiar Duct proceeding from each ¹ and after that, *An.* 1682. *Bartholine* made the like Discovery in a Lion, ² this Duct is therefore call'd *Ravinianus* or *Bartholinus*.

SMALL GLANDS are dispersed thro the whole Membrane of the Mouth, especially in the Lips, Palate, Cheeks and Tongue, which because of their Situation may be call'd *Linguales*, *Labiales*, *Buccales*, *Palatinae*, *Uvulares*, &c.

The **GLANDULA NUCKIANA** situated in Dogs nigh the Eye, sends down a Duct into the Mouth which opens near the last Grinder but one of the upper Jaw. ³

This Gland is wanting in Humane Subjects, 279. The **OS HYOIDES** call'd also *Linguale* or *Bicorne*, which has been mentioned already among the Bones in the *Osteology* (106) because of its connexion with, and the service it imparts to the Tongue, requires a further consideration here.

IT coheres with the Basis or Root of the Tongue in such a Manner that it is situated between it and the Larynx, and is moved together with the Tongue.

¹ *Dissert. de Dypterygia* and *Welsch. Tab. Anat.* 30. ² *De Ductu Salival Novo.* ³ *Nuck. Scalograph.* p. 15. *Tab.* iii f. 1. 2. *Nuck. Scalograph.* p. 15. *Tab.* 3. f. 1. 2.

IT is connected by the assistance of Ligaments with the Tongue, Larynx, and the Styloide Process of the Head, but by the Interposition of Muscles, as well with the forementioned parts as with the Jaw, the *Scapulæ*, the *Clavicles*, and the *Sternum*.

IT has five Pair of *Muscles* by which it is variously moved together with the Tongue: These are described in the *Myology*.

ITs Use is 1. to afford a firm Basis to the Tongue, and to assist its Motion and swallowing. 2. to give a fixed Point to several Muscles.

280. The *Lips* are two, consisting chiefly of Muscles; without they are, covered with the common Teguments, within with the Membrane of the Mouth under which the *Miliary* and *Lenticular Glands* are situated. ¹ The *Prolabia* being stripp'd of their *Tegument*, and immersed for some time in Water ², expose to view very numerous Nervous *Papillæ*, hence it is that they are so very sensible. The upper Lip under the septum of the Nose, has a peculiar Ligament call'd *Frænulum*. Their use is very considerable in Speaking and Eating.

¹ Cowper. *Myotom. Reform.* Fig. 4. ² Ruysch. *Thef. Anat.* iii. p. 26. Tab. iv. f. 1. and 2. lit. E. and *Thef.* vii. Tab ii. f. 1.

281. THE G U M S consist of the com-^{The Gums.}mon *Membrane* of the Mouth, and the *Periosteum* of the Jaw Bones, to which they adhere very firmly. They are furnished with very numerous Vessels, from which they receive their deep red Colour, their Use is to cover the Jaw-bones, and fasten the Teeth.
282. The P A L A T E has the like stru-^{The Palate.}cture, but is furnish'd with a considerable Number of *Glands*, especially in the hind Part near the *Uvula*, secreting a *Mucilaginous Liquor* *Lubricating* the Jaws. This *Membrane* defends and preserves the Bones of the Palate from Corruption.
283. The T O N G U E it self, the most^{The Tongue.} considerable Organ of all, is now to be examined; whose Situation, Number, and Magnitude are known to all; but the following Particulars demand our Observation, viz.
- [The *Figure*, which is in some Measure Pyramidal, its fore and pointed Part is call'd *Apex* or the *Tip*, its hind and thicker the *Basis* or *Root*.
The *Connexion* with the *Os Hyoides*, the lower Jaw, the *Styloide Process*, the *Pharynx*, *Larynx* and the other Neighbouring Parts by *Muscles* or *Membranes*.
The *Ligaments* which are 1 the *Frænulum* under the *Tip*. 2 the *Membranous Ligament*

gament, by which two it is tied to the lower Jaw, the *Os Hyoides* and the *Larynx*.

The *Longitudinal Line* in the middle call'd *Mediana*, which equally divides the Tongue.

The *Substance* which is compos'd chiefly of *Muscles*, *Nervous Membranes*, as also of *Glands* and remarkable Vessels.

The *Muscles*, of which besides these that belong to the *Os Hyoides* there are three Pair, over which there are several other *Muscular Fibres*,¹ from which *Mechanism* wonderful motions of this *Organ* arise. These *Muscles* will be describ'd in the *Myology*.

The *Glands*, besides the *Sublinguales* already mentioned, (278.) are very numerous in the upper and *Posterior Part*, which in some Subjects I have sometimes observed to be of a considerable magnitude.²

The *Foramen Cæcum* or blind hole observable among those *Glands* in the upper and *Posterior Part* of the Tongue is of unknown Use.³

The *Arteries* are numerous, and spring from the external *Carotides*.⁴

¹ vid. Malpigh. Fracassat & Steno de Lingua. ² Morgagn. *Advers. Anat. prim.* Tab. 1. ³ see its Figure in Collins's *Anatomy* Tab. 2. Morgagn. *ibid.* our Figure Tab. 4. Fig 20. ⁴ Ruysch. *Thef. Anat.* Tab. 3. Fig. 4. p. 45.

The *Veins* are Branches of the External *Jugulars*, of which those that are seen under the *Apex* are called *Ranulares*, and sometimes, especially in disorders of the Jaws, may be opened.

The *Nerves* are very considerable, two Branches arise from the fifth Pair, which are commonly thought to assist in Tasting, and two from the Ninth which are also generally supposed to serve for Motion, but *Boerhaave* on the contrary thinks, that the latter serve the Taste but the former Motion ¹.

The *Cases Tunics* or *Membranes* are three, these surround the substance of the Tongue.

The *First* and *outermost* is a Continuation of the Common Membrane of the Mouth, this forms little *Pyramidal* and *Globular porous* sheaths, for receiving the *Nervous Papillæ* of the third Membrane ².

The *Second* or middle is called *Reticularis Malpighii*, this consists of a fine Net transmitting the *Nervous Papillæ* through its Holes, and is only conspicuous in the upper Part. See our *Fig. 20*.

The *Third* is the *Papillaris Nervosa*, containing *Nervous Papillæ*.

¹ Institut. Medicin. de Gustu. ² Ruysch. Thes. An. 1. Tab. IV. Fig. 6. Morgag. Tab. I.

These are *Fungous*, or headed with Globes resembling the horns of Snails or Mushrooms, and furnish'd with little holes — or

Pyramidal, greater and less, sometimes *Arched*,³ these different sorts of *Papillæ* rise from this inmost Coat, pass through the little holes of the *Reticular*, and terminate in the little Cases of the *Exteriour*, and *Constitute the Immediate Organs of Tasting*.

The *Use*. The Tongue is the Principal Instrument of Tasting and Speech, however 'tis also of admirable service, in *Eating, Swallowing, Spitting, &c.*

284. The *Uvula* is a round *Pendulous* Part situated between both *Tonsills*.

Its *Figure* is like the last joint of an Infants Finger.

Its *Substance* is *Muscular*, surrounded with the common *Membrane* of the Mouth.

Its *Muscles*, by which it is moved, are described in the *Myology*.

Its *Ligaments* are two, which are *Membranous*, by these it coheres with the Palate.

Its *Use* is not as yet fully known, it seems to be of some service for formation of the Voice, and in some Measure it prevents Drink from running into the Nostrils

Nostrils while we swallow. This Part is wanting in Beasts.

285. The TONSILLS or *Almonds* are two large *Glands*, often resembling *Almonds*, situated one in each side of the Jaws, these secrete a Clammy Humour for *Lubricating* the Jaws, and discharge it through several little Holes, which are *Obvious* to the sight¹.

Tonsills

The *Vessels* of the *Tonsills*, *Uvula*, *Gums*, *Lips*, *Palate* and *Salival Glands* are *Arteries* from the *Carotides*, *Veins* from the *Jugulars* and *Nerves*, chiefly from the fifth Pair.

286. The ORGAN of SMELLING is the NOSE, whose situation, Figure, Number and Magnitude are known to all, but these are to be considered, viz.

The Nose

The *Division* into Parts

External, to which are referred

The *Dorsum* or *Ridge*, the *Radix* or *Root*, the *Spine*, the *Orbiculus* or *Tip*, and the *Alæ* or *Pinnae*, which are the sides.

The *Septum* dividing the Nose into two *Cavities* call'd *Nostrills*.

The *Hairs* in the *Inferiour* Part of the *Nostrils*, by some called *Vibrissæ*, hindring the *Involuntary* efflux of the *Mucus*, and the entring of *Insects*.

The *Common Teguments*, the *Scarf-skin* the *Skin* and the *Fat*.

¹ *Wedman. de Tonsillis and Ephem. Natur. Cur. Cent. III. and IV. Obs. 190. P. 456.*

The *upper Part* is stiff and consists of Bones.

The *Lower Part* is flexible, and is compos'd of *Cartilages, Muscles* and *Membranes*; for the *Muscles* consult the *Myology*.

Internal as the

Bones many of which concur to make up the Nose, as the *Ossa Nasi, Maxillaria, Cribriforme, Spongiosa, Frontale, Lachrymalia*, the *Ossa Palati*, the *Vomer* and the *Sphenoides*.

Cartilages constituting the lower part of the Nose and tyed together by *Membranes*, that the Nose may be flexible. The first of these constitutes the fore-part of the *Septum* of the Nostrils, there are also two of considerable magnitude in each *Ala*, between which sometimes two, sometimes three lesser are interpos'd.

Structure of the *Septum* of the Nostrills in the fore and lower part is *Cartilaginous*, but in the *Posterior* and upper it is *Bony*, which Parts are joined together by *Membranes*.

Two *Orifices* into the Jaws for the Passage of the Air and *Mucus*.

Sinus's of the *Maxillary Bones*, the *Frontal*, the *Sphenoides* and the Cells of the *Os Ethmoides* encreasing the Ca-

vity of the Nose and at the same time the Expansion of the *Pituitary Membrane*.¹

Inequalities or Eminences of the *Offa Spongiosa* in the Cavity of the Nostrils, partly serving for the same use, and partly hindering Insects from falling into the Jaws.

Soft and very *Vasculous Membrane* in-
vesting the Nostrils, Sinus's and their Inequalities call'd *Mucosa* or *Pituitaria Schneideri*, which is the Organ of smelling and the *Secretion* of the *Mucus*. p. 125.

The *Orifices* of the *Excretory Ducts*, in this *Membrane* are very Conspicuous in an Oxes Head.²

Small *Glands* are observed under this *Membrane* which secrete the *Mucus*.³

Very numerous *Arteries* from the *Carotides* are dispersed thro the *Membrane*
⁴ and these also assist in *Secretion*. p. 126. The

The *Veins* Spring from the *Juglars* and
and carry back the superfluous Blood. Ears

Nerves are spread upon the *Pituitary Membrane*, these are 1. the *Olfacto-*

¹ Delineated in *Palsinus Osteolog. Tab. I. and II.* *Drakes Anat. Tab. XVIII.* ² *Ruyseh. Epist. viii. Tab. 9 7.* ³ *ibid. Fig. 6.* ⁴ *Schellwaghtius* denies it in his *Dissertation on the Mamillary Processes of the Brain.* ⁵ *Ruyseh* in the fore-mentioned place f. 8.

ry, which are very considerable however less than in Beasts, and have hitherto been accounted, the immediate *Organ* of Smelling, 2. Branches of the fifth Pair.

The thin *Membrane* under the *Pituitary* investing the Bones and Cartilages, call'd in the latter *Perichondrium*, in the former *Periosteum*.

The Holes in the Nostrils are to be observed, and

1. Those leading to the Frontal *Maxillary* and *Sphenioid*, *Sinus's* and to the Cells of the *Ethmoides* for their Communication with the Nostrils
2. The Orifices of the *Lachrymal Ducts*, opening into the Nostrills, which are very well delineated by *Bianchus*.
3. *Ducts* from the Nose to the Mouth, just behind the fore Teeth. These are open in a Skeleton, but not to be found either in living or Dead Subjects being closed with *Membranes*, therefore the Use commonly ascribed to them as if they transmitted the *Muccus* from the Nostrils to the Mouth is supposed without Reason.

The *Use of the Nose* is, to be the *Organ* of smelling, to assist *Respiration* and the *Voice*, to *Secrete* the *Mucus*, to divert the *Lachrymal Humour*, and to contribute in a very great measure to the Beauty of
of

of the Face. But whether it discharges *Pituite* from the Brain as the Ancients and *Schlevogtius* asserts, is yet doubtful.

278. The ORGAN of HEARING are the EARS, whose *Situation*, *Number* and external *Figure*, are known to all they are usually divided into three Parts viz. the *External*, *Middle* and *Internal*; The *External* is call'd *Auricula* in which the various Eminencies, Cavities, &c. are to be considered: as

The *Pinna* and little Lobe,

The *Helix* and *Anthelix*,

The *Tragus* and *Antitragus*,

The *Scapha*: This is a Cavity between the *Helix* and *Anthelix*

The *Concha*, which is a Cavity before the *Meatus Auditorius*, with the *Sebaceous Glands of Valsalva* ^{The Tympanum.}

The *Substance* consisting of the common *Teguments* and a *Cartilage*.

The *Muscles* in Men are very small and often scarcely visible, being sometimes two sometimes three in number, which from their *Situation* may be call'd *Superior*, *Posterior*, and *Anterior* whose use in moving the Ear is but very inconsiderable if any at all. However they may serve for the Tension of the Ear when we are willing to hear more accurately

¹ *Traité de l'Aure Human. Duverney de l'Organ. Audit*
Tab. III. Fig 11

The *Ligament* by which the *Posterior* Part of the *Auricle* is join'd to the *Os Petrosum*.¹

The *Meatus Auditorius*, in which we must observe.

Its winding and Oblique *Progress* towards the *Anterior* Parts.²

Its *Substance* partly *Bony*, partly *Cartilaginous* being compos'd as it were of broken *Cartilages*.

The *Membrane* investing its *Internal* part, which is a *Continuation* of the *Skin*.

The small yellow *Glands* call'd *Ceruminosæ Duvernei*³ secreting *Wax* and depositing it in the *Meatus Auditorius* for various uses.

The *Corpus Reticulare Valsalvæ* in whose holes the *Ciruminous Glands* are contain'd.⁴

The *Hairs* in the *Meatus Auditorius* and their *Use*.

The use of the *External Ear* is, for the better receiving of sounds as thro an *Ear Tube*.

The *Middle* part is call'd *TYMPANUM* in which we consider

The *Membrane* of the *Tympanum* placed in the *End* of the *Meatus Auditorius*, whose

The *Tympanum*.

¹ *Valsalva* Tab. III. f. 1 and 3. ² *l. c.* Tab. III. Fig. and 3. ³ *ibid.* Tab. III, f. 1: 3. ⁴ *Ruysh.* Epist. 8. p. 12. f. 9 ⁵ *Welsch.* Tab. 59 Anat. ⁶ *Valsalva* in the forementioned place Chap II, *Drakes* Anat. p. 597

Situation is not Perpendicular but very Oblique.

Figure is *Eliptic*, not plain but *Convex*.

Connexion in the Circumference is with the *Os Petrosum* in the middle with the little Bone call'd *Malleus*.

Substance is *Membranous* consisting of a double or triple *Lamella* and fill'd with Blood Vessels, discovered by *Ruyfch*.

Little Hole which some after *Ravinus* ¹ assert, is to be found in this *Membrane* ² thro which some transmit the Smoake of *Tobacco* from the Mouth, (see *Note 24.*)

The *Cavity* of the *Tympanum*, which is less in Humane Bodies than in Calves, where we consider

The Cavity of the Tympanum

The *Periosteum*, this is very fine, and furnished with numerous *Sanguiferous* Vessels. ³

The *Chorda Tympani*, which is a little *Nerve* made by Inosculation of a small branch of the fifth and seventh Pair, is stretch'd under the *Membrane* of the *Tympanum*.

The three *little Bones* of the *Ear* covered with a *Periosteum* ⁴ viz. the *Malleus*, *Incus*, and *Stapes* of which we have discoursed already in the *Osteology*. (see *Note 25.*)

¹ *Ruyfch*. Epist. VIII. Tab. IX. f. 10 ² *Ibid* f. 1. ³ Consult the *Myology*. ⁴ *Valsalva de Aure Human.* Tab. 3. 4. 7. 10.

The *Juncture* or *Articulation* and *Cohesion* of these little Bones. The *Handle* of the *Malleus* adheres to the *Membrane* of the *Tympanum*: But its *Head* is articulated by *Ginglymus* with the *Body* of the *Incus* and its longer *Leg* with the *Head* of the *Stapes* by *Arthrodia*, but the *Basis* of the *Stapes* stands upon the *Fenestra Ovalis*.

The *Muscles* of the *Malleus* are two, the *Internus* and *Externus*; the *Stapes* has one ¹.

The two *Fenestræ*

The *Ovalis* leads to the *Vestibulum* and is closed by the *Basis* of the *Stapes*.

The *Rotunda* leads to the *Cochlea*, and is closed by a *Transverse Membrane*.

The *Holes* besides the *Fenestræ* now mentioned are two.

The one by the *Eustachian Duct* terminates just behind the *Tonsils* in the *Mouth*. This *Duct* is partly *Bony* partly *Cartilaginous* and partly *Membranous*, thro which there is a *Communication* between the *Ear* and the *Mouth* ².

¹ *Ruyfch. Epist. 8. Tab. 9. f. 10.* ² *ibid. f. 1.* ³ Consult the *Myolog.* ⁴ *Valsalva de Human. Tab. 3. 4. 7. 10.*

The other goes to the little Cells of the *Mastoide Process.*

The Internal or *third Part of the Ear*, is call'd *Labyrinthus*, in which the following Particulars are to be observed, viz. *The Labyrinth,*

The *Vestibulum* which is a Cavity constituting the middle Part of the *Labyrinth*, of which the *Fenestra Ovalis* is the entrance,

The three *Semicircular Canals*, the greatest the middle and the least opening by five *Orifices* into the *Vestibulum* delineated by *Duverney* and *Valsalva* in the forementioned Places.

The *Cochlea* is a Cavity opposite to these Canals resembling a Snails-shell forming two spires and a half, in which there is the *Nucleus* and Canal divided into two by a thin *Spiral Lamina*.

The *Upper* opening into the *Vestibulum* is call'd *Scala Vestibuli*,

The *Lower* terminating by the *Fenestra Rotunda* in the Cavity of the *Tympanum* is call'd *Scala Tympani* ¹

The very fine *Membrane* which is distributed thro' all the Cavities of the *Labyrinth*, takes its Rise from the *Expansion* of the *Auditory Nerve*, and is the *Principal Part of the Organ of Hearing* as the *Retina* is in the Eye. The *Membranous Expansions* are call'd by *Valsalva Zona Sonora*. ²

The Canals of the *Auditory Nerves*.

¹ *Valsalva Tractat. de Aure Human.* ² *ibid.* Tab. 8. f. 8. 9
Tab. 7. f. 3. 4.

- [1 *Common* this is larger, and in it there are little holes opening towards the *Labyrinth*.
 2 *Proper*, this is narrower but longer, terminating partly in the Cavity of the Scull, and partly in the *Fallopian Aquæ-duct*.¹

The *Nerves* are, from the *Auditory Pair* which consists of two Branches, a soft and a hard one. The soft Branch is distributed thro the *Labyrinth*² but the hard Branch gives small branches to the *Dura Mater*, the *Tympanum* and the External Ear. 2 From the third Pair of the *Vertebrals* of the Neck for the External Ear The *Arteries* spring from the *External* and the *Internal Carotides*.

The *Veins* from the *Jugulars*.

288. The *Cutaneous Papillæ* are the ORGAN of the Sense of Feeling. These are the *Extremities* of the *Nerves* of the Skin, elevated and covered with the *Cuticle* every where in its surface, but mostly in the *Hollow of the Hands, and Soles of the Feet*, and especially in the *Ends of the Fingers*, where the feeling is most accurate, as has been already shewn when we discoursed of the Skin. When objects make Impression upon these, the sense of

¹ *Ibid.* VII. f. 3 4 ² *Simoncellius* and *Misichellius*, describe to us a very singular Course of this Nerve, thro *Chocklea Vestibulum* and *Semicircular Canals* but whether this be conformable to Truth or no, I refer to the Decision of those who are more quick-sighted than my self. (Consult the Note 26.)

Feeling is excited in us, and the *Tactile Qualities* such as Rough, Smooth, Moist, Dry, Hot, Cold, Hard and Soft, &c. are presented to the Mind.

289. The *Sense of Tasting* is very like this of Feeling; for the *Nervous Papillæ* in the Tongue being affected with savoury Bodies, excite various kind of Tastes. So almost after the same manner the *Nerves* dispersed in the *Pituitary Membrane* of the Nostrils perceive various smells, hence it appears that the Sense of Feeling is the most General, and that the rest are only different Species of this Sense.

Of Angiology.

290. ANGIOLOGY properly so called, is the Doctrine of the *Sanguiferous Vessels*, namely the *Arteries* and *Veins*.

291. An *Artery* is a beating *Elastick* and branched *Canal*, carrying the Blood from the Heart to all Parts of the Body; in which we consider,

The *Number*. There are *Two* in the whole Body, namely the *Pulmonary*, and the *Aorta* or *Great Artery*, from which are derived all the rest as Branches.

The *Figure* which is Conic, proceeding from a larger to a narrower Diameter. About the Extremities the small Branches at length become *Cylindrical Canals*, and are changed into *Reticular Plexus's*,
Brushes,

Brushes, Bottoms, small Spires, &c. and at last terminate into *Veins, Lymphatic Vessels* or *Excretory Ducts*.

The *Structure* which is *Membranous*, composed of three *Membranes*, the first is *Vasculous*, the second *Muscular*, (consisting of *Annular Fibres*,) the third is *Nervous*, to which we may, with *Ruysch*, add a fourth which is *Cellulous*.

292. The PULMONARY ARTERY rises from the right *Ventricle* of the Heart, and distributes its numberless Branches through the Lungs only.

The distribution of the Aorta.

293. The AORTA¹ issuing from the left *Ventricle* of the Heart, by one only Trunk, immediately above its *Semilunar Valves*, sends out to the Heart and its *Auricles* two *Arteries* called *Coronariae*, and afterwards bending down in the form of a Bow, it is divided into three

ASCENDING BRANCHES in Human Bodies, (see Note 27.) from whence proceed

Two *Carotides*, the *right* and the *left*, each of which in the Neck is wonderfully crooked about the *Larynx*,² and is divided into

The *External Carotide*, which gives Branches to the *Larynx, Pharynx*,

¹ See a very fine Draught of this in *Drake's Anatomy*, Tab. XX. ² *Drake ibid.*

Muscles of the *Os Hyoides*, Jaws, Tongue, Lips, Mouth, Nose, Eyes, Ears, Temples, and all the External parts of the Head. — and

The *Internal Carotide*, which goes to the Brain, and its *Membranes*, the Eyes, Nostrils, and the Internal *Ear*.

The *Subclavian*, from which on both sides passes

The *Vertebral* or *Cervical Artery*, ascending to the Spinal Marrow and Brain, within the holes formed in the transverse Processes of the *Vertebra*.

The *Musculares* of the Neck, which are various and of an uncertain Number; these are distributed through the *Muscles* of the Neck.

The *External Scapular*, gives Branches to the two or three upper Ribs.

The upper *Intercostals* are spent upon the two or three upper Ribs.

The *Mediastinal* is spent upon the *Mediastinum*, *Thymus* and *Pericardium*.

The upper *Diaphragmatic* descends to the *Diaphragm*, and often gives small Branches to the last mentioned parts, especially if the *Mediastinal*, as it often happens, be wanting.

The *Mammary*, descending under the *Sternum* to the *Abdomen*, makes provision for the various *Muscles* of the *Thorax* and *Abdomen*.

And the *Axillary*, from which springs,

The *Internal Scapular*, which is divided among the parts, lying under the Shoulder-Bone.

The

{ The *Thoracic* or *External Mammary* sends its Branches to the *External* parts of the *Thorax*.

{ The *Brachial* for the most part descends undivided to the Bending of the *Cubitus*, and gives small Branches to the Arm. But afterwards it is divided into the *Radial* and *Cubital*, and these are spent upon the Head and Fingers. The *Brachial* is also sometimes divided in the upper part of the Arm, and sometimes in the middle: so various is the Sport of Nature in different Subjects, in respect of this division.

And the DESCENDING TRUNK which retains the Name *Aorta*, and with this Name it descends through the *Thorax* and *Abdomen* to the *Os Sacrum*.

From this Trunk spring

{ The *Ruyschian Bronchial Artery*, which often also issues from the *Intercostals* ¹.

{ The lower *Intercostals* are given to all the Ribs except the two or three upper.

{ The *Œsophageæ* (observed by few) are distributed upon the *Œsophagus*.

{ The lower *Diaphragmatics*, which sometimes come from the *Celiac*.

{ The *Celiac* springs immediately under the *Diaphragm*, whose

{ Right Branch emits the *Gastrics* and Right *EPIPLOICS*, the *PANCREATIC Duo-*

¹ *Ruysch. dilucid. Valvul lymphat* p. 61. and *Epist. vi. denal*

denal, the *Hepatic*, and *two Cystics*.
The *Left* sends out the *Gastrics*, and
and left *Epiploics*, the *Gastro-Epi-*
ploics, the *Splenic*, and these give va-
rious *Pancreatics*.

The *upper Mesenteric* is distributed to the
Mesentery and small Guts.

The *Renal* or *Emulgents* in both sides,
are sometimes single, and sometimes
double.

The *Atrabilaria* go to the *Capsula A-*
trabilaria.

The *Adipose*, to the *Adipose Membrane*
of the Kidneys.

The *Spermaties*, in Men to the *Testes*, in
Women, to the Womb.

The *lower Mesenteric* to the great Guts,
whose Branch passing to the straight
Gut, is called the *Internal Hæmor-*
rhoidal.

The *Lumbals* to the *Muscle* of the Loins,
and neighbouring parts of the *Ab-*
domen.

The *Sacra* descends through the middle
of the *Os Sacrum* to the *Pelvis*.

The *Two Iliacs*, each of which is again
divided into two Branches.

The *Internal* or *Hypogastric*, which is
distributed to the *Bladder straight*
Gut, where it is called the *External*
Hæmorrhoidal, *Genital Parts*, *But-*
tocks

tocks and the other neighbouring *Muscles*.

The *External* emits the *Umblical*, the *Epigastric*, running up the inside of the *Musculus Rectus* to the *Mammary*, the *Pudenda* which goes to the Skin of the Privities, and lastly, the *Cru-ral*, which is divided into the *Exter-nal* which is smaller, this goes to the *Exterior* part of the Thigh, and the *Internal* which is greater, from whence arise the *Popliteæ*, the *Sural*, and the *Tibial*, and those without distinct Names, are distributed to the Foot and Toes.

p. 132. of the 294. A VEIN is a Vessel, carying back
Veins. the Blood from the Parts to the Heart.

Of these there are three, the *Pulmonary* Vein, the *Cava*, and the *Vena Portæ*.

295. The PULMONARY VEIN issues from the left *Auricle* of the Heart, and then is divided into four, but afterwards into Innumerable Branches distributed to the Lungs. 'Tis delineated in *Drak's Anatomy* Tab. XIII.

The Distribu- 296. But the VENA CAVA arises out
tion of the Veins. of the Right *Auricle* of the Heart, and there emits the *Coronary* Vein of the Heart, afterwards is divided into
The UPPER TRUNK, from which
spring

The

The *VENA AZYGOS*, and from this the *Intercostals*, and *Æsophageæ*.

The *Vena Bronchialis*, which sometimes arises from the *Azygos*, also sometimes from the *Intercostal*, and is often wanting.

The *Mediastinal* accompanies the *Mediastinal Artery*.

The upper *Diaphragmatic* attends its *Artery*.

The *Subclavian Veins*, from which in both sides proceed

The *External Jugular* for the *External* Parts of the Head, from which Parts it receives various Names, as *Frontal*, *Temporal*, &c.

The *Internal Jugular* gives Branches to the *Larynx*, *Os Hyoides*, the *Tongue* (which are call'd *Raninae*;) and the neighbouring Parts. But the Trunk terminates in the *Jugular Bag*, and brings back the Blood from the *Sinus's* of the *Dura Mater*.

The *Vertebral* ascends to the *Scull*, in the *Transverse Processes* of the Neck, and goes to the lateral *Sinus*.

The upper *Intercostals*, are bestowed upon the two or three highest *Ribs*.

The *Mammary* is an Attendant of the *Mammary Artery*.

The upper and lower *Musculars*.

The *External* and *Internal Scapulars*, and the *External Thoracics*.

Of the Veins:

The *Axillary*, whose *Exterior* Branch, call'd *Cephalica*, in the *Exterior* side of the Arm, is extended towards the Thumb; the *Interiour*, named *Basilica*, in the Right Arm is call'd *Hepatica*, in the left *Splenica*. The *Mediana*, is made of the Concourse of the foregoing, in the bending of the *Cubitus*. That is call'd *Salvatella*, which runs along the Back of the Hand, towards the little Finger.

The LOWER TRUNK, from which arise,

The *Diaphragmatics* or lower *Phrenics*.
The *Hepatics*, these are great and numerous Branches.

The *Emulgents*, from the left of which proceeds the left *Spermatiks*.

The *ATRA BILARIÆ*, often rise from the *Emulgents* also.

The *Adiposa*, Right *Spermatic*, and the *Lumbals*.

The *Sacra* which sometimes is found double.

The *Iliacs* from which on both sides arise

The *Hypogastric*, from which some go to the straight Gut, and *Anus* call'd the *External Hemorrhoidal*, others to the Bladder, Genital Parts, Buttocks, and Neighbouring *Muscles*.

The *Epigastrics*, *Pudenda*, and *Musculars*, accompanying the *Arteries* of the same Name.

The

The *Crural*, running along the Foot, whose Internal Branch, nigh the Internal Ankle, is named *Saphena*; the *External*, about the Knee, *Poplitæa*, in the Calves *Suralis*, and about the big Toes *Cephalica*.

297. The *VENA PORTÆ*, is like a Tree ; whose

Roots (or lower Branches) are divided into

The Right, from which proceed all the *Mesaraic* Veins of the Intestines, the *Internal Hæmorrhoidal*, and the *Right Epiploics*.

The Left which is call'd the *Splenic* Vein, from which arise

The *Various Gastrics*, constituting the *Coronary* Vein of the Stomach.

The *Vasa Brevia*, the *Epiploics*, and *Gastro-epiploics*.

The *Pancreatics*, and sometimes the *Internal Hæmorrhoidal* Vein.

Trunk, going to the Liver gives *Cystics*, the *Right Gastric*, and the *Duodenal*, and this often the *Pancreatic*.

Branches. As soon as the Trunk begins to be unfolded, it forms in the Liver the *Sinus Portæ*, and afterwards distributes Innumerable Branches thro the Liver only.

* Mr. Cheselden has given a very fine Figure of this in his *Anatomy*. Tab. xvi.

298. The *Structure*. The Greatest Veins consist of a *Membranous Vascular*, and *Muscular Coat*, but far thinner than the *Tunics* of an *Artery*. In some Branches of the *Vena Cava*, there are *Valves* that assist the Circulation of the Blood, but none in the *Vena Portæ* or Pulmonary Vein.

of the Nerve, 299. The NERVES are round whitish Parts, for the most part *Fibrous*, or compos'd of hollow *Fibres*, taking their Rise from the Brain, or rather from the *Medulla Oblongata* in the Scull, or from the *Spinal Marrow*, and extended from these to all the Parts of the Body.

They are usually divided into *Nerves* of the Brain, and *Nerves* of the Spinal Marrow. Of the *Nerves* of the Brain, there are in my opinion nine Pair only.

I. The first is, the *Par Olfactorium*, passing thro the *Os Cribrosum* to the *Membrane* of the Nostrils. (See Sect. 286.)

II. The Second is, the *Par Opticum*, forming the *Retina* of the Eye.

III. The Third Pair is, the *Oculorum Motores*, this is divided into six Branches near the *Orbit*, the 1: of which in Humane Bodies goes to the *Elevator Palpebræ*, the 2 to the *Elevator Oculi*, the 3 to the *Depressor*, the 4. to the *Adducens*, the 5. to *Obliquus Inferior*, the 6. to the *Coats* of the

the Eye. But in Beasts this Pair is distributed after another manner.

IV. The fourth is, the *Par Patheticum*, this is very small, and enters the *Musculus Trochlearis* of the Eye.

V. The fifth is the *Par Gustatorium*, this is divided in the Scull, immediately under the *Dura Mater*, into three considerable Branches, of the which,

The 1. and upper is call'd *Ophthalmicus*, this is dispers'd upon various Parts of the Eye, the Eyelids, Muscles of the Forehead and Nose, and the *Teguments* of the Face.

The 2. may be call'd *Maxillaris Superior*, because after it has gone out of the Scull, thro the *Foramen rotundum*, it gives Branches to all the Parts of the upper Jaw, to the Lips, Nose, Palate, Uvula, Gums and Teeth. It also sends out a small Branch to the Ear, which Inosculating with a small branch of the seventh Pair, forms the *Chorda Tympani*. Besides these it also emits a small Twig or two in the Scull, which with a small Branch of the sixth Pair make the beginning of the *Intercostal Nerve*.

The 3. may be call'd *Maxillaris Inferior*, because passing thro the *Foramen Ovale* of the Scull, it makes provision for the parts of the lower Jaw,

and especially for the Tongue, on which Account the whole Pair is called *Gustatorium*.

VI. The *Sixth* is the *PAR ABDUCENS*, this sends out a small Branch for constituting the *Intercostal Nerve*, (v. 3.) but all the rest of this Pair, is spent upon the *Musculus Abducens* of the Eye.

The *Intercostal*, being formed of the small Branches of the two Precedent Pair, passes out of the Scull through the Canal of the *Internal Carotide*, and nigh the Eighth Pair through the Neck, from hence it descends through the *Thorax* and *Abdomen* to the *Pelvis*, and forming various *Plexus's*, it gives Branches to almost all the Parts contained in the *Thorax* and *Abdomen*.

VII. The *Seventh* is the *PAR AUDITORIUM*, it arises from the hind part of the *Processus Annularis*, and divides into two Branches, one of which is called *Portio Dura*, the other *Portio Mollis*. The latter first enters a Hole in the *Os Petrosum*, afterwards goes to the *Labyrinth* through various little Holes, (69) is spread upon all its parts, and constitutes the *Principal Part of the Organ of Hearing*. The former namely the *Portio Dura*, passing over the *Fallopian Aqueduct*, sends back a small Branch through a particular Hole of the *Os Petrosum*
to

to the *Dura Mater*, and another which with a Branch of the fifth Pair constitute the *Chorda Tympani*, as also several smaller Branches to the *Muscles*, and the other parts of the *Tympanum*. The rest of this is spent upon the *External Ear*, the *Pericranium*, the *Muscles* of the *Os Hyoides*, the *Lips*, *Eyelids* and *Parotides*.

VIII. The *Eighth* is the P A R V A G U M, together with *Willis's Accessorius Spinalis*, this goes out nigh the lateral *Sinus's*; and in its descent through the *Neck* and *Thorax* to the *Abdomen*, it gives Branches to the *Larynx*, *Pharynx*, *Heart*, *Lungs*, and chiefly to the *Stomach*. It also sends back Nerves from the upper Part of the *Thorax*, to the *Larynx*, which are therefore called *Recurrentes*. Moreover in the *Neck*, *Thorax* and *Abdomen*, it makes various *Plexus's* with the *Intercostal*.

IX. The *Ninth* which is the P A R L I N G U A L E, takes its course to the *Tongue*, and is generally accounted the *Lingua Motorium*, but by some the *Par Gustatorium*.

But that *Pair*, which with *Willis* is usually taken for the Tenth of the Brain, is for several reasons rather to be esteemed the first of the Neck.

300. Those are called N E R V E S of the S P I N A L M A R R O W , which come out between the *Vertebrae*: of these we reckon *Thirty two Pair*, namely

Eight *Pair* of the N E C K , from which innumerable Branches are distributed to the *Muscles* of the Head, Neck, *Scapulae* and Shoulders. But in particular a certain Branch ascends to the Ear from the third Pair, and moreover from the third, fourth and fifth Pair, the *Nervus Diaphragmaticus* takes its rise and descends through the Neck and *Thorax*, to the *Diaphragm*.

The *Sixth*, *Seventh* and *Eighth* Pair, and the *First* Pair of the *Dorsals* being join'd by *Inosculation*s, compose the six strong *Brachial Nerves*, which spread themselves upon the *Scapulae*, *Arms*, *Hands*, and *Fingers*.

To these must be referred the *Spinalis Accessorius Willisii*, as the *Ninth*, which arising about the third Pair of the Neck from the *Spinal Marrow* ascends into the *Scull*, through the great Hole of the *Occiput* then joining the *Par Vagum*, and passing out of the *Scull* through the same Hole, forsakes the *Par Vagum*, and turns to the *Musculus Cucullaris* or *Trapezius* of the *Scapula*.

Twelve *Pair* of the B A C K : These besides the Branch which they give to the

the *Brachial Nerves*, run along the tract of the Ribs in their *Furrow*, and distribute Branches to the *Pleura*, the *Intercostal*, *Pectoral* and *Abdominal Muscles*, to the Breasts and other Parts surrounding the *Thorax*.

Five Pair of the *LOINS*, these send Branches not only to the *Loins*, *Peritonæum*, *Teguments* and *Muscles* of the *Abdomen*, but their

First Pair on both sides, often bestows a Twig to the *Diaphragm*.

Second Pair, *Inosculating* with the Branches of the *First*, *Third* and *Fourth Pair*, constitutes the *Nervus Cruralis*, which is spread upon the *Anterior* part of the *Thigh*, and in like manner a Branch is composed of the *Second*, *Third* and *Fourth*, which passes through the great Hole of the *Os Pubis*, to the *Scrotum*, *Testicles*, and *neighbouring Parts*.

Fourth and *fifth Pair*, with the *First*, *Second*, *Third* and *Fourth* of the *Os Sacrum*, compose the *Nervus Ischiaticus*, or *Cruralis Posterior*, which is the greatest Nerve of the whole Body. This passes out of the *Pelvis* between the *Musculi Glutæi*, and descending in the hind part of the *Thigh*, it is dispersed through the *Tibia* and whole foot, to the very *Toes*. But
before

before it leaves the *Pelvis*, it communicates small Branches to the *Bladder*, *Straight Gut*, *Privities* and *Neighbouring Parts*.

Five Pair of the Os SACRUM. These pass out thro the *Anterior Holes* of this Bone: The upper four, as has been already mentioned, constitute the *Nervus Ischiaticus*: The fifth divides it self among the Parts situated in the *Pelvis*, the *straight Gut*, *Bladder*, *Privities*, and the other *Neighbouring Parts*.

Whoever is desirous of seeing a nicer Distribution of the *Nerves*, may consult *Willis de Cerebro & Nervis*, and *Vieussen's Neurographia*.

p. 138. The
Structure of the
Nerves.

301. THE STRUCTURE or MAKE of the NERVES, in the greater and many smaller *Nerves*, appears to be *Fibrous* composed of numerous *Fibres*, or a bundle of *Cylindric*, *Whitish Filaments*, which indeed seem solid without any Cavity, either visible or discoverable by any Experiment, and much less can any fluid be observed in them. However that the *Filaments* of the *Nerves* are hollow, and that they contain the fluid commonly call'd *Spirits*, and therefore are not entirely solid *Fibres* but real *Vessels*, to me appears undeniable; for Confirmation of which, a few of the several Reasons that might be produced are as follows.

1. Because

1. Because they spring from the Brain, and Spinal Marrow, namely at the Extremities of the *Capillary Arteries* of the *Cortical Substance* of the Brain; as other *Excretory Ducts* from other *Viscera* and *Glands*.
2. Because so great a Quantity of Blood incessantly conveyed to the Brain by four considerable *Arteries*, in comparison of that which is sent to the Liver by one small *Artery*, cannot be required for the sole *Nutrition* of the Brain, unless a *Secretion*, and that a large one, be made from the Blood in this Place.
3. Because, when a *Ligature* is made upon a *Nerve*, the *Sense*, *Motion*, and *Nutrition* of that Part in which it was inserted cease, which amounts to a Demonstration that the Influx of some Fluid, which at other times flowed to effect these, is now cut off.
4. Because, they encrease, are lengthened out and nourished to the last Hour of Life, from the first Rise in the Womb, to the perfect Magnitude of the Body; which to me appears inexplicable, unless some very fine *Fluid* be admitted into the *Nerves*.¹

¹ It will be very proper to consult upon this Head the whole Chapter of the Brain in Dr. *Boerhaave's* Institutions, because so many at this time deny these things, only because they are incapable of discerning the Force of the Reasons that are advanced to prove them.

302. The Use of the *Nerves* is, to convey in their minute *Fibrillæ* for *Sense*, *Motion* and *Nutrition*, the *Spirits* or a very fine *Fluid* to all the Parts of the *Body*, and every Point of those Parts.

Of Myology:

303. MYOLOGY is that Part of Anatomy which Treats of the *Muscles*, demonstrating their *Structure*, *Rise*, *Insertion*, *Situation* and *Use*.

Muscles defined

304. A MUSCLE is the Instrument of Motion, or a part of the Body appointed for Motion, consisting chiefly of *Fleshy* and *Tendinous Fibres*, to which are added, Vessels of all kinds, such as *Arteries*, *Veins*, *Nerves*, and *Lymphatics*, all which are enclosed in a common *Membrane*.

Its Division.

305. It is divided into the *Body*, and the two *Extremities*.

The *Body* is also call'd the *Belly*, and the two *Extremities* the *Tendons*. The *Extremity* where it takes its Rise, is named the *Head*, *Beginning*, *Original*, and also the *fix'd Point*; but the *End* is call'd the *Tail* *moveable Point*, and very often the *Tendon*, which, if it be *Membranous*, *Anatomists* call'd *Aponeruosis*.

306. The Action of a *Muscle* consists in *Its Action.*
 the Contraction of its Belly, by which
 the Extremities approach to each other,
 and so move the Part in which the *Mus-*
cle is inserted as if it was drawn by a
 Cord.¹ In many *Muscles*, both Extre-
 mities are moveable, and such properly
 speaking have no fix'd Point: But in this
 Case that Part which is more immovable
 than the other is for the most part, to be
 accounted the fix'd Point or Origin, and
 that which is more susceptible of Motion
 the End or moveable Point; for it hap-
 pens in several such *Muscles*, that, that
Point which was moveable becomes fix'd,
 and on the contrary, that which was
 fix'd becomes movable; Instances of
 which may be observed in the *Scaleni,*
Serrati, Antici, and others.

307 Some *Muscles* conspire together for, or *Fellows and*
 are *Partners of one and the same Action,* *Antagonists.*
 as the Benders, or Extenders, of the Arm,
 &c. And hence the *Muscles* which
 concur in the performance of one Acti-
 on, may be call'd Partners or Fellow-
 actors. But when the contrary Action
 of the *Muscles* is considered, namely
 while the Extenders of any Part per-
 form an Action contrary to the Benders;

¹ Upon the Action of the *Muscles*, consult above all
 others Borelli de Motu Animalium: Bernoullius de Motu
 Musculorum. Bergerus Physiolog: Cap. xxii. And Dr. Boer-
 haave's Institution upon this Head.

Tonic Motion.

then such *Muscles* are named *Antagonists*. But these acting together render the Part stiff and keep it unmoved, which Action of the *Muscles* is call'd their *Tonic Motion*.

Diversities of Fibres.

308. The *Muscular Fibres*, according to the diversity of the Action for which they are designed, are either *Straight* or *Oblique, Transverse, Annular or Spiral, &c.*

Simple and Compound Muscles.

309. Some *Muscles* consist of a single or uniform Order of the *Fibres*, and these are call'd simple. But others are compos'd of various and often contrary Directions of the *Fibres*, and even of different small *Muscles*, and may therefore be termed *Compound Muscles*. all which STENO, BORELLI and LOWER, have sufficiently demonstrated. And it is also observable, that the thickness and strength of the *Muscles*, encrease in Proportion to the Number of the *Fibres*, Directions, or *Muscles* that enter the Composition.

Animal, Natural, and mix'd Motion.

310. The Motion of most of the *Muscles*, is *Voluntary* or *Animal*. That of the rest is call'd *Involuntary* or *Natural*: The Motion of some is *composed* consisting of the *Animal* and *Natural*, or *Voluntary* and *Involuntary*, and hence it is call'd a mix'd Motion. Those *Muscles* which have a Voluntary Motion, receive their *Nerves* from the Brain; they which have the *Involuntary* from the *Cerebellum*, and they

they which have both, from the Brain and *Cerebellum* also. But as a *Muscle* can act no longer when its *Nerve* is either cut or ty'd, in like Manner it cannot act if its *Artery* suffers the same Experiments, as has been discovered by *Steno* and others.

311. They receive their Names for the most part, either from the fix'd and movable Point of the *Muscle* together, The Origin of their Names. or from the fix'd Point, or moveable Point alone: Or from their Use, their Figure or Likeness, or their Place or Situation, their Magnitude, or from their other Qualities.

312. We will now begin to deliver the History of the *Muscles* in particular, proceeding in Order from the Head to the Heel, by which it may appear, that their *Number*, in which Authors and different Subjects vary so much, and which very easily surmounts five hundred, cannot be certainly fix'd, or determined.

Of the Muscles in Particular.

313. The MUSCLES of the SKIN of the SKULL, are four viz. Muscles of the Skin of the Skull.

Two

Two call'd *FRONTALES*, which arise in the Skin of the Forehead, and have both Extremities movable. They are extended on both sides, from the Eyebrows obliquely outwards above the *Os Frontis*, then they spread their *Tendons* upon the upper part of the Skull, and join them with the *Aponeurosis* of the *Occipitales*, which are fix'd: So by them the Skin of the Skull, especially of the Forehead may be mov'd, and the Eyebrows lifted up. The *Orbiculares Palpebrarum* are their Antagonists.

Two call'd *Occipitales*, these are very thin, and arise from the *Os Occipitis*, where it adheres in both sides to the *Ossa Temporum*, they ascend upwards, join their *Aponeurosis* with the *Frontals*, whose fix'd points they are, and assist their Action.

Of the Eyebrows.

314. The Eyebrows have one Muscle call'd *Corrugator* or *Depressor*, this arises on both sides from the Root of the Nose, and is inserted in both Eyebrows which it draws together and also moves downwards: The *Frontals* on the contrary lift them up. This *Muscle* seems to be a part of the *Frontales*.

315. The Eyelids have three,
The first is call'd *Orbicularis*, or *Constrictor*,

strictor. This takes its rise from the upper Process of the Os Maxillaris, nigh the greater Canthus of the Eye, it surrounds both Eyelids with Orbicular Fibres and shuts them. Of the Eyelids.

The Second is, the *Elevator Proprius Palpebræ Superioris*; this arises in the bottom of the Orbit, and is inserted in the Margin of the upper Eyelid nigh the Cartilage call'd *Tarsus*.

The third is, the *Depressor Palpebræ Inferioris*; this is a series of fleshy Fibres, which is sometimes thinner, and sometimes thicker, arising from the Skin of the Cheeks, and sometimes from the Os Zygale, and inserting it self in the lower Margin of the Orbicularis, by which the lower Eyelid, if duely observed, is manifestly drawn downwards when we open our Eye.

3. 6. The MUSCLES of the EYE, in of the Eyes-Beasts are seven, but in humane Bodies only six, namely,

Four straight Muscles rising from the Circumference of the Hole of the Optic Nerve, in the bottom of the Orbit, and terminating in the Sclerotica, not far from the Circumference of the Cornea.

Comper has given a very fine Figure of these in his *Myotom. Reform.* f. 11.

S

The

The upper is call'd <i>At-</i>	<i>tollens</i> or <i>Superbus</i> .	{ when any
The lower <i>Deprimens</i> or	<i>Humilis</i> .	{ two of these
The <i>Exterior Abducens</i>	or <i>Indignatorius</i> .	{ Act together
The <i>Exterior Adducens</i>	or <i>Bibitorius</i> .	{ they per-
		{ form the <i>Ob-</i>
		{ lique <i>Moti-</i>
		{ ons.

Two *Oblique* call'd also *Rotatores* : as
 The *Obliquus Major, Superior* or *Troch-*
learis ; this rises nigh the prece-
 dent *Muscles*, but passes thro a
 particular Cartilaginous *Trochlea* or
Pully, near the greater *Cantbus* of
 the *Eye*, from thence it turns back
 again, and is inserted in the *Exter-*
nal side of the *Globe*. When this
 acts, it pulls the *Eye* *Obliquely*
 downwards, and in some Measure
 draws it forwards.

The *Obliquus Minor, or Inferior*, rises
 from the fore and inner Part of the
Orbit, almost near the *Nasal Canal*,
 it *Obliquely* surrounds the lower
 part of the *Globe*, and is inserted
 in its *Exterior* or hind part. When
 this Acts, it pulls the *Pupill* *Ob-*
liquely upwards, which Action is
 different from what was commonly
 attributed to it.

The seventh *Muscle* which is found in
Brutes, rises every where from the *Cir-*
cumference

cumference of the *Optic Nerve*, furrounds the Posterior part of the *Sclerotica*, and seems to serve for thrusting the Eye outwards.

317. The MUSCLES of the External *Of the Ear.* Ear demonstrated, (287) namely the *Anterior, Superior and Posterior*, in Humane Bodies are very small, and for the most part nothing but the *Expansion* of the Frontal and Occipital Muscles, or if they be Distinct from these, they vary according to the diversity of Subjects; as may be seen in *Lasseri*,¹ *Duverney*,² *Cowper*,³ and *Valsalva*⁴. The *Anterior*, if it be observable, springs from a *Membrane* of the Temporal Muscle, and is inserted in the fore and upper part of the Ear. The *Posterior*, which is sometimes single, and sometimes double, and sometimes triple, if it be not a Continuation of the *Occipitales*, arises from the *Mammiform Process*, and terminates in the *Posterior* part of the *Concha*.

The Muscles which *Valsalva*⁵ ascribes to the *Tragus* and *Antitragus*, in my mind are not to be accounted such.

318. The MUSCLES of the INTERNAL *Of the Malleus.* EAR, are either those belonging to the *Malleus* or to the *Stapes*.

¹ *Traſſat. de Auditu.* ² *Traſſat. de Audit.* ³ *Mytom.*
⁴ *de Aure Human.* ⁵ *Ibidem.*

The MUSCLES of the MALLEUS according the Generality are only two, but according to others three.

The *Externus* arises from the External side of the *Bony Eustachian Tube* proceeding upwards, and in some measure backwards, it enters the *Tympanum*, is inserted in the *Apophysis Raviana*, and relaxes the Membrane of the *Tympanum*.

The *Internus*, which is closed in a Canal of the *Extremity* of the *Eustachian Duct*, rises Tendinous near the *Fenestra Ovalis*, and is inserted into the *Posterior* part of the *Malleus*. When this acts by pulling the Hammer inwards it distends the *Membrane* of the Drum.

The third mentioned by some, seems to be rather a *Fibre* than a *Muscle*.

The *Muscle* of the *Stapes* or *Stirrop*, arises with a thick Belly out of a small Canal in the *Os Petrosum*, immediately it grows slender, and is inserted in the Head of the *Stapes*, and distends its annexed *Membrane*.

of the Lips. 319. The MUSCLES OF THE LIPS are twelve.

Constrictors one Pair viz. the *Orbicularis*, this constitutes the Lips.

Abductors
two Pair,

The *Zygomaticus*, which comes from the *Os Zygoma*, and terminates in the *Angle* of the *Orbicularis*.

The *Buccinator*, whose Origin is partly from the *Processus Coronoides* of the lower Jaw, and partly where the Gums of the Grinders of both Jaws terminate. It ends as the former. This thrusts the Meat between the Teeth.

Elevators
two Pair,

The *Incisorius*, rises from the *Os Maxillare* immediately under the Orbit, and terminates near the fore teeth in the *Orbicularis*.

The *Caninus* has its Origin in the Cavity, under the *Os jugale* in the *Os Maxillare*, and its end in the *Angle* of the Lips.

The *Depressors* are three,

Two called *Triangulares*, they derive their Head from the *Lateral* part of the lower Jaw, and their end is fixed in the *Angle* of the Lips.

One only called *Quadratus*, which arises from the *Anterior* part of the same Jaw, and has its termination in

S 3 the

Of the Nose.

the whole lower part of the *Orbicularis*.

320. The MUSCLES of the NOSE are
 { The *Dilatatorii*, (which also lift the Nose upwards,) are two on both sides *viz.*
 { The *Pyramidalis*, which arise from the Root of the Nose, and is a continuation of the *Corrugator Superciliorum*, and terminates in the *Superiour Cartilages* of the Nose.

{ The *Myrtiformis*: this takes its beginning near the *Incisorius* of which it seems to be a part, and ends in the *Inferiour Cartilages* of the Nose.

{ The *Constrictor* or *Depressor*, is not *Orbicular* as in *Brutes* but small, and often not visible. This arises from the Roots of the fore Teeth immediately under the Nose, and terminates in the *Alæ* or sides of the Nostrils. The *Orbicularis* of the Lips assists this Muscle very much in its Action.

Of the under Jaw.

321. The MUSCLES of the under Jaw, are six Pair.

{ The *Depressors* two Pair, *viz.*

{ The *Platysma Myoides*, which arises about the *Clavicle*, from the *Pectoral* and *Deltoid* Muscle, and is inserted in the lower Jaw, yet in such a manner that it very often emits a *Muscular Membrane* over the whole Face.

{ The *Biventer* or *Digastricus*, has its
 Origin

Origin in the Incisure under the *Processus Mastoideus*, and becoming *Tendinous* passes through the *Stylo-Hyoideus*, and often a *Membranous Ring* join'd to the *Os Hyoides* as a Pulley,¹ and is inserted in the *Internal Synchondrosis* of the Chin.

The *Elevators* six Pair, viz.

The *Crotaphites* or *Temporalis*, which has the whole Region of the *Temples* for its Origin, and fixes its Tail in the sharp *Process* of the lower Jaw.

The *Masseter* arises from the lower part of the *Os Jugale*, and terminates in the *External Superficies* of the *Angle* of the Jaw.

The *Pterigoidæus Internus*, springs from the Cavity of the *Processus Pterigoidæus*, and ends in the *Interior Superficies* of the *Angle* of the Jaw.

The *Pterigoidæus Externus*, derives its Origin from the *Exteriour lamina* of the fore mentioned *Process*, and has its end just above the *Insertion* of the former.

322. The *Os HYOIDES* has five pair ^{of the *Os Hyoides*.} of Muscles.

The *Mylo-Hyoides*, arises from the Basis of the lower Jaw near the Chin, and ends in the *Basis* of the *Os Hyoides*.

¹ vide our Dissertation on Mastication.

The *Coraco-Hyoides*, has its beginning nigh the *Processus Coracoideus*, from the upper Edge of the *Scapula*, and makes its Insertion into the *Basis* of the forementioned Bone.

The *Genio-Hyoides*, begins in the middle of the Chin, under the former, in the inside from the *Synchondrosis* of the Jaw, and terminates in the *Basis* of the *Hyoides*.

The *Sterno-Hyoides*, takes its beginning from the *Sternum* and *Clavicle*, makes its Insertion into the *Basis* of the *Hyoides*, and is the *Antagonist* of the former.

The *Stylo-Hyoides* rises from the *Processus Styloides*, and ends in the *Horn* and *Basis* of the *Hyoides*. This Muscle is often perforated by the *Digastricus*.

The Use of these Muscles is evident by their Situation.

Of the Tongue

323. The TONGUE, has three pair of Muscles, 'viz.

1. The *Genio-Glossus*, this takes its rise under the *Genio-Hyoides*, and pulls the Tongue out of the Mouth.
2. The *Cerato-Glossus*, has its Origin from the *Basis* and *Horn* of the *Os Hyoides*, and is the *Antagonist* of the former.
3. The *Stylo-Glossus*, rises from the *Pro-*

' You may see very fine Figures of these, in *Comper's Myotomia Reformata. f. V.*

cessus

cessus Styloides. This moves the Tongue sideways and pulls it upwards.

The *Basio-Glossus*, which some add here, is only a part of the *Cerato-Glossus*.

And the *Mylo-Glossus* is a part of the *Mylo-Hyoïdes*, hence it appears that there is no need of forming peculiar *Muscles* of these.

324. The *MUSCLES* of the *Larynx* are Of the *Larynx*. seven Pair, which receive their Names from their *Origination* and *Insertion*.

The *Common* are two, which take their Rise without the *Larynx*.

{ The *Sterno-Thyroides*,¹ draws the *Larynx* downwards, and dilates the *Glottis*.

{ The *Hyo-Thyroides* pulls up the *Larynx*, and contracts the *Glottis*.

The *Proper* are *Five*, having both their *Origination* and *Insertion* in the *Larynx*, viz.

{ The *Crico-Thyroides*,
 { The *Crico-Arytænoides Posticum*.
 { The *Crico-Arytænoides Laterale*.
 { The *Thyro-Arytænoides*, together with the following constricts.

{ The *Ary-Arytænoides*, arises from one *Arytænoid Cartilage*, and is inserted in the other, and mutually intersect each other,².

¹ But this rises rather from the *Clavicle*, than from the *Sternum*. ² You may see them delineated in *Morgagn. Adversar. Anat. Prim. Tab. II. f. 1. k.*

Of the
Pharynx.

325. Five Pair of Muscles were formerly ascribed to the *Pharynx*, but *Valsalva*¹ as has been already mentioned, enlarges the Number very much in reckoning six Pair, to which he gives new Names. Whoever is willing to know more of this matter, may consult the Author himself. I am of opinion that they may be commodiously referred to three Pair, of which

Two dilate, as

{ The *Stylo-Pharyngæus*, which has its beginning in the *processus styloides*, and is inserted into the side of the *pharynx*.

{ The *Cephalo-Pharyngæus*, under which I comprehend that part of the *Pharynx*, which begins from the lower part of the Bones of the Scull, which part some divide according to its different Origination, and call those *Fibres* which proceed from the *Os Sphenoides*, the *Sphenopharyngæus*, and these from the *Pterygoide-Processes*, the *Pterygo-Pharyngæus*².

One constricts which is commonly called *Oesophagæus*, or *Sphincter Gula*: this rises on both sides from the *Os Hyoides*, the *Scutiform* and *Annular Cartilages* of the *Larynx*, and surrounds the *Gullet*. But because of this different Origination, *Valsalva* divides it into three Pair, the first of which he names *Hyo-Pharyngæus*,

¹ *Traité de l'Anat. de l'Homme*. Tab. V. VI. Cap. II. ² *Morgagni Advers. Anat.* II. S. S. and *Advers.* II. p. 43. and 44.

the second *Thyro-Pharyngæus*, and the third *Crico-Pharyngæus*, and delineates some *Tendinous Lines* lying among those Pairs, which however do not always plainly appear, for which reason I had rather comprehend those Parts under the Name of one Pair.

326. The *U V U L A* which is a part of the *of the Pharynx*, has four very small pair of *Uvula Muscles*.

The *Glossio-Staphylinus Valsalva*,¹ rises in both sides from the Root of the Tongue, and ends in the sides of the *Uvula*.

The *Pharingo-Staphylinus* begins in both sides, from the sides of the *Pharynx*, and terminates as the former.

The *Pterigo Staphylinus Internus*, or *Spleno Staphylinus* receives its Origination near the uppermost part of the *Processus Pterygoïdes*, from the *Os Sphenoides*, and has its *Insertion* in the *Posterious* and upper part of the *Uvula*. *Valsalva* calls this *Salpingo-Staphylinus*,² because it proceeds from a Part of the *Tuba Eustachiana*.

The *Pterygo-Staphylinus Externus*, has its beginning nigh the *External* side of the precedent, descends between both *Lamellæ* of the *Processus Pterygoïdes*, and reflects its Tendon to the forepart of the *Uvula*, over the thin *Apophysis*

¹ de *Aure Human.* Cap. II. ² *ibid.*

of the inner *Lamella* or Plate as through a Pulley. From which situation it seems to be mov'd upwards and forwards by this Pair, but backwards and sideways by the Rest. This *Muscle* is called by *Valsalva*, *Musculus novus Tubæ*, because as he thinks the *Tuba Eustachii*, as also the Nostrils, are dilated by it ¹, *Morgagnius* ² makes mention of the *Musculus Azygos Uvulae*, which he affirms he has described in a peculiar Epistle, but because I have not as yet seen that Description, I have not as yet been able to make a discovery of the *Muscle* ³.

There are some also who reckon the very Body of the *Uvula*, for a Pair of *Muscles*, which being *Triangular* downwards, might be produced under the Coat that encompasses it; which they may for me.

Of the Head. 327. The *Muscles* of the H E A D, are ten Pair.

B E N D E R S three Pair, on each side one.

The *Mastoideus* takes its rise from the *Sternum* and *Clavicle*, and is inserted in the back part of the *Processus Mastoides*.

¹ Drake's *Anatomy* P. 590. ² *Advers. Anat.* I. S. 8. and *Advers.* II. p. 35. ³ he tells us in the Preface, that he found this *Muscle* in the last Mans Body, which he dissected

The *Rectus Anticus Major*, springs from the transverse *Processes* of the five lower *Vertebrae* of the Neck, and has its Insertion in the *Os Occipitis*, before its *Condylode Processes*, see Note (28.)

The *Rectus Anticus minor*, or *Annuens Cowperi*,¹ has its Origination in the *Anterior* part of the *Atlas*, lies hid under the precedent, and just behind it is inserted in the *Os Occipitis*.

EXTENDERS besides the common *Muscles* of the Neck, five Pair.

The *Splenius* arises from the three lower *Vertebrae* of the Neck, and the five upper of the Back, and terminates above the *Processus Mastoideus*.

The *Complexus* has its rise from the three upper *Vertebrae* of the Back, and the six lower of the Neck, and lying under the former, it ends in the *Os Occipitis* nigh the *Splenius*.

The *Rectus major Posticus*, takes its Origin from the Spine of the second *Vertebra* of the Neck, and is inserted in the *Occiput*.

The *Rectus Minor Posticus*, rises from the spine of the *Atlas*, and terminates under the Precedent.

The *Obliquus minor*, comes from the transverse *Apophysis* of the *Epistro-*

¹ *Cowper Myotom. f. III, l. I.*

phæus, and ends above the *Rectus major*.

Rotatores or *Rollers* one Pair.

The *Obliquus major*, springs from the spine of the *Axis*, and ascending *Obliquely* is inserted in the transverse *Process* of the *Atlas*.

Benders to the sides one Pair,

The *Rectus Lateralis*, has its origination in the upper part of the transverse *Apophysis* of the *Atlas*, ascends straight with a short but thick Body, and ends in the *Occiput*, near the *Incisure* of the *Processus Mamillaris*.

328. Four Pair of MUSCLES are commonly ascribed to the Neck, of which two are

BENDERS as

The *Scalenus* which arises from the first, second, and sometimes the third Rib, and has its Insertion in the Transverse Processes of the *Vertebræ* of the Neck. By *Fallopius* and others, this is referred to the *Elevators* of the *Thorax*, and not without Reason, for it may be serviceable for both Uses. The *English Anatomists* make three different *Scaleni* of this, and

ibid. k.

call

call them the first, second and third *Scalenus* because it may very often be divided into three Parts.

The *Longus* takes its origin from the Body of the five upper *Vertebrae* of Back, and is inserted in all the *Vertebrae* of the Neck.

Extenders two viz.

The *Transversalis* and *Spinalis*, but these are, without sufficient grounds, distinguish'd from the common Extender of the Back and Loins call'd *Longissimus Dorsi*, of which in its proper Place.

Cowper hath added to these 1. five Pair more of Extenders call'd *Interspinales Colli*, which arise from the upper Part of the *Spinal Process* of the five lower *Vertebrae* of the Neck, and each of them is inserted in the lower part of the *Spinous Apophysis* of the Neighbouring upper *Vertebra*. 2. Among the Transverse Processes of the Neck, he hath discovered *Muscles* almost like the former which move the Neck to the side, and these he calls *Intertransversales*.^{*} But these seem to be only parts of the *Scalenus*, or at least not very distinct from it.

^{*} Cowper *Myotom.* f. viii: i and k. ² *ibid.* LL. ³ *Trans.*
actions of the Royal Society Vol. 21. p. 132.

of the Scapula. 329. The Muscles of the SCAPULA in my opinion, are five Pair.

The *Elevator* or *Musculus Patientia*, springs from the Transverse Process of the first, second, third and fourth *Vertebra* of the Neck, and terminates in the upper Angle of the *Scapula*.

The *Trapezius* or *Cucullaris*, comes from the *Os Occipitis*, the *Spinous Processes* of the Neck, and the seventh or eighth of the Back, and ends in the spine of the *Scapula*, the *Acromion* and *Clavicle*; because of the different direction of its *Fibres*, according to their different Actions it is able to raise, depress and move the *Scapula* backwards.

The *Rhomboides*, rises from the five lower Spines of the Neck, and the three upper of the Back under the *Cucullaris*. In this Situation it marches obliquely, and inserts it self into the whole Basis of the *Scapula*. When this acts it draws the *Scapula* backwards.

The *Serratus* or *Dentatus minor Anticus*, or *Pectoralis minor*, springs out with heads like the Teeth of a Saw, from the second, third, fourth and fifth True Rib under

Mr. Cheselden denies these different Actions, and contends that no Muscle can act in one Part and not in another at the same time, without dividing the Part acting, from the Part not in Action, and is of Opinion that it only draws back the *Scapulae* or pulls them to each other.

the

the great *Pectoral*, and terminates in the *Processus Coracoides* of the *Scapula*.

The *Serratus* or *Dentatus major Anticus*, rises like the former, from all the true and the two upper false Ribs, and is inserted in the Basis of the *Scapula*. These draw the *Scapula* forwards and downwards, and by several are referred to the *Elevators* of the Ribs ; But they can be serviceable for this purpose, when the *Scapula* by the Contraction of the *Elevator Trapezius* and *Rhomboides* is fix'd and kept immoveable.

330. The MUSCLES of RESPIRATION ^{Of the Respiration.} either dilate or contract, the Cavity of the *Thorax*.

The Muscles which dilate act conjointly, and are,

The *Diaphragma* which we have described already, (see 257.)

The *Intercostales Externi* and *Interni*. These are forty four, one of each sort between every two Ribs, they arise from the lower edges of the upper Ribs, and terminate in the upper edges of the following. The *Fibres* of the External run forwards, but those of the Internal obliquely backwards ; when these act, they Elevate the Ribs.

The *Supercostales Verheyeni*,[†] are

[†] *Anatom. Tab. xxxv. f. 1. ee, ff,*

The *Breves*, twelve on each side, these spring from the Transverse Processes of the eleven *Vertebrae* of the Back, and one, namely the lower, of the Neck, and end obliquely in the Posterior Part of the Ribs.

The *Longi*, are three or four, their Origin is the same from the seventh, eighth, ninth and tenth *Vertebra*; and is inserted in the ninth, tenth, eleventh and twelfth Rib.¹

The *Subclavius* comes from the lower part of the *Clavicle*, nigh the *Acromion*, and terminates in the fore part of the upper Rib, and in the Sternum.

The *Serratus Posticus Superior*, arises with a thin, but broad Tendon from the lower *Vertebrae* of the Neck, and the two upper of the Back, and is inserted in the second, third and fourth Rib.²

The *Serratus major anticus*, which has been already described (*f.* 329.) is by some referr'd to these, but since the Scapula is more moveable than the Ribs, it more properly belongs to the Scapula: However I do not deny that it can contribute its Service to *Respiration* also.

¹ *Ibid.* *f.* 2, a b c d e. ² Perhaps this *Muscle* extends the Neck also.

The *Scalenus* of the Neck has been describ'd, Sect. 328.

The *Muscles* which contract or depress the *Thorax*, besides those of the *Abdomen* which are serviceable for this end, are

The *Serratus Posticus Inferior* : This rises with a broad Tendon from the three lower *Vertebrae* of the Back, and the two upper of the Loins, and terminates in the four lower false Ribs of the Back, like a sheath, lest their Fibres should in violent motions start from one another.

The *Triangularis sterni*, comes from the lower and inner part of the sternum, and is inserted on each side into the Cartilages of the fourth, fifth, sixth and seventh true Rib, *Verheyen* divides this into several, and calls them *Sterno-costales*.

The *Infracostales Verheyeni* become visible when the *Pleura* is drawn off, and are six, seven, eight or nine on each side, they arise not far from the little Heads of the Ribs, ascend obliquely and end in an upper Rib, sometimes in one and sometimes in another, ² *Morgagnius* informs us that these *Muscles* were delineated before by *Eustachius*. ³

¹ *Ibid.* ² *ibid.* f. 3. d d, e e. ³ *Advers. Anat.* ii. p. 36. *vid. Manget. Theatrum Anatom.* Tab. *Eustach.* xvi.

The *Sacro-lumbaris* or part of the common Extensor of the Back, *see* 331. concurs also in contracting the Thorax, because it is inserted in the Posterious part of the Ribs.

Of the Back
and Loins.

331. The MUSCLES of the BACK and LOINS are common.

The *Extensors* are commonly reckon'd three in Number on each side, as,

The *Sacrolumbaris*, whose rise is in the *Os sacrum* and Posterious Spine of the Ileum, and end in the Ribs.

The *Longissimus Dorsi* which has its beginning in the same place, and insertion in all the *Vertebrae* of the Spine of the Back.

The *Semispinosus* springs from the *Os sacrum* and *Vertebrae* of the Loins, and terminates in the upper *Vertebrae* of the *Thorax*, but because these cohere so closely to one another, that they cannot be entirely separated without tearing, and concur in the performances of the same Action, 'tis reasonable to esteem them *one common Extensor* of the Loins Back and Neck ¹:

¹ Mr. Cheselden says that these Muscles also act Alternately in raising the *Ossa Innominata* in progression, as may easily be observed by laying our Hands one the Back in that Action. p. 73

The *Benders*. Besides the *Muscles* of the *Abdomen*, which assist in bending, there is a proper Bender on each side which is

The *Quadratus Lumborum*. This takes its rise from the Posteriour and upper Process of the *Ileum*, and makes its insertion into the Transverse Processes of the *Vertebrae* of the Loins, and the last false Rib. Another Bender is also added by these *English Anatomists* ¹ which they call

The *Psoas Parvus*. This rises with a thin Tendon from the *Os ileum*, and is inserted in the side of the first *Vertebra* of the Loins. But this Muscle is very often wanting. The *Quadratus* gives also its Assistance for Elevating the *Ossa Innominata* in Walking.

332. The MUSCLES of the ARM or *Of the Arm.*
Shoulder-Bone are nine.

Elevators three.

The *Deltoides* arises from the *Clavicle*, the *Acromion* and *Spine* of the *Scapula*, and terminates four Fingers breadth under the neck of the *Os humeri*.

The *Supra spinatus*, springs from the Cavity above the spine of the *Scapula*, and is inserted in the Neck of the *Humerus*.

¹ Cowper. Myotom. Keil's Anatomy. Drake Antuom.
and Cheseldens Anatomy p. 73.

The *Coraco-brachialis* has its Origination in the *Processus Coracoïdes* of the *Scapula*, and its Insertion in the middle part of the Arm.

Depressors three

The *Infrascapularis*, has the whole inside of the *Scapula* for its Origin, and the Interior part of the Head of the *Os Humeri* for its End.

The *Rotundus* or *Teres major*, rises from the Inferiour Angle of the *Scapula*, and ends three Inches below the Head of the *Humerus*.

The *Latissimus Dorsi*, call'd also *Aniscalptor*, comes from the *Vertebræ* of the Loins, the three lower of the back, joins its Tendon with the former, and inserts it self in the same place.

Adductor one

The *Pectoralis major* proceeds from the *Clavicle*, *Sternum* and all the true Ribs, and terminates four Inches breadth below the Head of the *Humerus*. We are of opinion that the Action of this *Muscle* is assisted by the *Coraco-brachialis*, and that of the *Deltoides* by the uppermost part of the *Pectoralis*, which part generally appears to be a distinct *Muscle*.

Abductors two

The *Infra spinatus*, has its rise in the Cavity below the *Spine* of the *scapula*.

The

The *Rotundus* or *Teres minor*, derives its Origin from the lower *Costa of the Scapula*, these two properly constitute only one *Muscle*, and also make only one *Tendon* which is inserted in the Back part of the Neck of the *Humerus*.

333. The *Muscles* of the C U B I T U S are *of the Cubitus* fix.

Flexors two, viz.

The *Biceps*, one of whose heads springs from the *Processus Coracoides*, the other from the head of the *Scapula*. This descends in the furrow of the *Humerus*, becomes fleshy, is join'd with the former, and terminates in the *Tubercle* of the *Radius*, just below its upper little Head.

The *Brachialis Internus*, springs just below the end of the *Deltoides*, and is inserted in the *Tubercle* of the *Ulna*, just below its upper little Head.

Extensors four

The *Longus*, rises from the lower *Costa* or *Brim* of the *Scapula*.

The *Brevis*, proceeds from the external *Spine* of the *Humerus*.

The *Brachialis Externus*, takes its rise nigh the precedent from the *Interiour Spine* of the *Humerus*. These three *Muscles* unite their *Tendons* and make a kind of *Triceps*, which is inserted in the *Posteriour* part of the *Olecranon*.

num, and may very well be called the *Triceps Brachialis*.

The *Anconæus*, has the *Exterieur Condyle* of the *Humerus* for its *Origin*, and ends just below the precedent *Muscles*.

334. The *Muscles* of the *Radius*, are four, *Pronators* two.

The *Rotundus*, takes its rise from the *Internal Condyle* of the *Humerus*, and fixes its end almost in the middle part of the *Radius*.

The *Quadratus*, comes from the *Inferiour* part of the *Ulna*, and has an opposite *Termination* in the *Inferiour* part of the *Radius*.

Supinators two,

The *Longus*, derives its head from the *Exterieur Spine* of the *Humerus*, and inserts it self in the lower little Head of the *Radius*.

The *Brevis* arises from the upper part of the *Ulna*, and is inserted in the *Superiour* part of the *Radius*, all which part it encompasses.

335. The *Muscles* of the *CARPUS*, are four. *Flexors* or *Benders* two, rising from the *Internal Condyle* of the *Humerus*.

The *Radius Internus* terminates in the little Bone of the *Carpus*, near the Thumb.

[This *Muscle* may also serve to bend the *Cubitus*.

The

The *Ulnaris Internus*, ends in the *Internal* little Bone of the *Carpus*.

Extensors two, which come from the *External Condyle* of the *Humerus*, as

The *Radius Externus* or *Bicornis*, which is inserted in the first and second Bone of the *Metacarpus*.

The *Ulnaris Externus*, has its insertion in the Bone of the *Metacarpus*, which sustains the little Finger.

If the two *Radii* act together, while the two *Ulnares* are at rest, they move the *Hand* outwards, and on the contrary if the two *Ulnares* act together, the *Radii* being at rest, they draw the *Hand* inwards. These *Muscles* are held together by the *Ligamentum Annulare* commonly so called, that their Action may be the better performed. But this *Ligament* is rather to be accounted a certain common *Membrane*, encompassing all the *Muscles* placed in the *Cubitus*, than *Annular*. Of the Palm
of the Hand.

336. The *Muscles* of the *PALM* of the *Hand* are two, which are commonly thought to be its *Constrictors*, as

The *Palmaris Longus*, which derives its beginning from the *Interiour Condyle* of the *Humerus*, and ends with a *Tendinous Expansion* in the *Palm*,

The *Caro Quadrata* or *Palmaris Brevis*, is fixed in the *Aponeurosis* of the *Palmaris Longus*, above the *Musculus Abductor* of

of the little Finger, these *Muscles* seem to assist the Benders of the *Carpus* ¹.

Of the Fingers. 337. The *MUSCLES* of the *FINGERS* are either *Common* or *Proper*.

The *Common* are

The *Flexors* of

The first *Phalange*, and these are the four *Lumbricales* which rise from the *Tendons* of the *Profundus*, and are inserted in the sides of the first *Phalange* next the Thumb.

The *Second*, viz. the *Sublimis* or *Perforatus*, this comes from the Internal Protuberance of the *Humerus*, and from the *Radius*, and is divided into four *Tendons*, which are inserted in the second *Phalange* of the four Fingers.

The *Third* viz. the *Profundus* or *Perforans*, this has its Origin from the upper and middle part of the *ulna*, and being divided into four *Tendons*, it perforates the *Tendons* of the Precedent, and terminates in the beginning of the third *Phalange* of the four Fingers. ²

¹ Ann. 1717. In the Publick Dissection of a Mans Body, I observed that both these *Muscles* were wanting in both hands, which other *Anatomists* also have observed especially of the former.

² These two *Muscles* pass under the Transverse *Ligament* of the *Carpus*, and their *Tendons*, being enclosed in a strong *Membraneous* sheath, are join'd to the Bones of the Fingers.

The *Extensor* of all the three *Phalanges* is call'd

Extensor Communis, which begins in the External Protuberance of the *Humerus* and Posterious Part of the *Radius* and *Ulna*, tis divided into four *Tendons* passing under the *Ligament* of the *Carpus*, and these are inserted in the Posterious or gibbous part of all the *Phalanges* of the Fingers.

The *Adductors*, (namely towards the Thumb) are three, call'd *Interossei Interni*. These spring from the Bones of the *Metacarpus* and end in the External side of the first *Phalange*.

The *Abductors* are three, nam'd

Interossei externi, which also proceed from the Bones of the *Metacarpus*, and have their Insertion in the internal side of the first *Phalange*.

338. The Proper *Muscles* of the Thumb ^{Of the Thumb} are five, viz.

The *Flexor*. This is derived from the middle part of the *Radius*, and is fix'd in the third *Phalange*.

The *Extensor* call'd also *Bicornis* or *Tricornis*, takes also its rise from the Posterious and middle Part of the *Radius* and *Ulna*, and has its Insertion in the first, second, and third *Phalange*.

The *Thenar* or *Abductor*, derives its Origination from the Transverse *Ligament* conjoining the Bones of the *Carpus*, and

and fixes its End in the first and second *Phalange*. The *Ossa Sesamoidea* of the Thumb commonly stick in this *Muscle*.

The *Hypothenar* rises near the Precedent from the same Ligament more towards the hollow of the Hand than the former, and ends in the lower little Head of the first *Phalange*. This *Muscle* is omitted by many, because it may be accounted part of the former.

The *Antithenar* or *Abductor*, comes from the Bone of the *Metacarpus* of the middle Finger, and makes its Insertion into the first and second *Phalange*.

Of the Index. 339. The Proper MUSCLES of the INDEX or Forefinger are two,

The *Extensor* or *Indicator*, takes its Origin from the middle of the *Ulna*, and terminates in the same place with the *Extensor Communis*.

The *Abductor* has the first *Phalange* of the Thumb, and the first Bone of the *Metacarpus* for its beginning, and the first *Phalange* of the Index for its End.²

¹ It is to be observed that in the *Muscles* of the Thumb, as well as in those of the other Fingers, Variations often occur; so that no Description can be given of them, that can agree with all Subjects; for the *Extensor* of the Thumb has sometimes two *Tendons*; and sometimes three, from which it derive its Names. Two *Flexors* are sometimes found as *Comper* has observed, and such like Variations are found in the other Fingers. ² I have sometimes observed an *Ossiculum Sesamoideum* in the *Tendon* of this *Muscle* where it passes the little Head of the Bone of the *Metacarpus* which sustains this Finger.

340. The proper *Muscles* of the little Finger are two, viz.

1. The *Extensor Proprius* which seems to be a part of the *Extensor Communis*. and
2. The *Abductor* whose Origin is in the inner Bone of the *Metacarpus*, and ends in the internal side of the first *Phalange*.¹

Many add an *Abductor Proprius*, but this seems to be a part of the former.

341. We now turn from the Arms to the *Abdomen*, in order to describe the *Muscles* belonging to it, and afterwards we will proceed from these to the Feet.

342. We have already demonstrated the *MUSCLES* of the *ABDOMEN* s. 205. and those of the *CLITORIS* s. 234. The *Muscles* of the *Testicles*, *Penis*, *Urethra*, *Anus*, *Bladder* and *Vagina* of the *Womb*, are yet to be describ'd.

343. The *MUSCLES* of the *TESTICLE* of the *Testicle*, call'd *Cremaster* or *Elevator*, is a thin series of the *Muscular Fibres*, which spring from the *Obliquus Ascendens* of the *Abdomen*, nigh that Place where it is perforated by the spermatic Vessels. From thence they descend into the *Scrotum* with a Production of the *Peritoneum*, to which they are firmly join'd and are expanded upon the surface of the *Tunica Vagina-*

¹ An *Officulum Sesamoideum* is frequently found in this Muscle. See it delineated Tab. 1. f. 5. l. c.

The *Sphincter Ani* is a *Muscle* consisting of Annular *Fibres* about two Fingers breadth, surrounding the *Anus* which prevents the Involuntary Evacuation of the Excrements.

The *Levatores*. These two *Muscles* are very large, they spring on each side from the *os Pubis*, the *Ischium*, *sacrum* and the *os Coccygis* and are inserted in the former.

The *Os Coccygis*, according to the Observations of Mr. *Cheselden* ¹ and *Morgagnius*, ² has also a proper Pair of *Muscles*, which springs on each side from the *Posteriour acute Process* of the *Ischium*, and is inserted in the *Coccyx*. These *Muscles* draw this Bone forwards, so they assist the *Levatores Ani* and reduce the *Coccyx* to its Natural Station.

347. The *MUSCLES* of the *BLADDER* are two, viz.

- 1 The *Sphincter Vesicæ*. This has been already describ'd. *f.* 222.
- 2 The *Detrusor Urinæ* so call'd by some, which is no other than the *Muscular Coat* of the Bladder, the *Sphincters* Antagonist, by which the *Urine* is expell'd out of the Bladder. ³

¹ *Anat.* p. 35. ² *Advers. Anat.* iii. p. 94. ³ *Bianchus* in *Mangetus's Theatrum Anatomicum* describes new *Muscles* of the Bladder p. 414 and the following, and takes care to Delineate them in two Tables, but *Morgagnius* refutes him in *Advers. Anat.* iii. p. 35 to the end.

348. The *Sphincter* of the *Vagina* of the *Womb*, is a *Series* of Muscular Fibres encompassing the Orifices of the *Vagina*, and loosely cohering with the *Clitoris*, and *Os Pubis*, by which the Orifice of the *Vagina* in Coition is contracted and the *Penis* softly embrac'd. This I suppose is also the cause why this Orifice is always more straight than any other part of the *Vagina*. Of the Vagina:

349. The *Muscles* of the *FEMUR* or *Thigh Bone* are fourteen. Three of which Of the Femur:
are

Flexors viz.

The *Psoas*: This springs from the first, second, third and fourth *Vertebra* of the *Loins*.

The *Iliacus*, has its beginning in the *Internal Cavity* of the *Ileum*, and both have their Infertion in the *Trochanter minor*.

The *Pectinaeus* or *Lividus*, takes its rise from the upper part of the *Os Pubis*, and terminates four Inches below the former.

Extensors three viz. the *Glutæus, Maximus, Medius* and *Minimus*. All these begin in the *External* surface of the *Ileum* and *Os Sacrum*, but the *Glutæus Maximus* ends four Fingers breadth below the *Trochanter Major*, and the *Glutæus*

lis which encloses the *Testicle*. When these Fibres act they raise the *Testicle*. In Emaciated Subjects, this Muscle is so very thin that it scarcely is apparent to the sight.

Of the Yard.

344. The MUSCLES of the PENIS are properly only two, namely, The *Erectores*, which on each side receive their Origin from the *Ossa Ischii*, and each has its Insertion in the Cavernous Body of the *Penis*, of its own side. When these act together they compress the Vein of the *Dorsum Penis* against the *Ossa Pubis*, prevent the Reflux of the Blood from the Yard, and so cause its erection. But the Muscles call'd *Acceleratores* and *Transversales*, which we describ'd as belonging to the *Penis* §. 229. because they properly pertain to the *Urethra*, shall now be examined with the Muscles of this Part.

345. The MUSCLES of the URETHRA are either *Dilators* or *Contractors*.

The *Dilators* are

The *Transversales*,¹ these arise on each side from the *Tubercle* of the *Ossa Ischii*, and are inserted in the Back part of the *Bulb* of the *Urethra* which they distend when they are in Action.

¹ Bidlow *Anat.* Tab 47. f. 5. 1. Cowper *Myotom. Reform.* f. 10 and 12. L. E D. Drakes *Anatom.* Tab. vi and vii. E E.

The *Dilatator Posticus*, is derived from the forepart of the *Sphincter* of the *Anus*, and has its Insertion in the back part of the *Bulb* of the *Urethra*. This *Muscle* was formerly taken for a part of the *Sphincter Ani*, but *Littrius* first discovered and describ'd it for a Distinct *Muscle*.¹ This *Muscle* appears to be the Antagonist of the *Erectores Penis*; for after the Ejection of the Seed it draws back the *Penis* from the *Os Pubis*, and so restores the free Reflux of the Blood.

The *Constrictors* are

The *ACCELERATORES Urinæ*. These receive their Source partly from the Precedent *Muscle*, and partly from the upper end of the *Bulb* of the *Urethra*; then encompass the whole *Bulb* and lower Part of the *Urethra*; and in the *Interiour* part, recede from each other and make their Insertion into that strong *Membrane* that surrounds the *Corpora Cavernosa*. Hence when they act they constrict the *Posterior* part of the *Urethra*, by which they discharge the *Urine* and expel the *Seed* with great force, especially in the act of *Copulation*, out of the *Urethra*.

346. The *MUSCLES* of the *ANUS* are of the *Anus*.
three

¹ *Histor. Acad. Reg. An. 1700.*

Glutæus Medius and *Minimus*, in this same *Trochanter*.

Abductors five,

The *Fascia Lata* called also *Membranous*, arises Flethy in the fore and upper *Spine* of the *Ileum*, but immediately becomes *Membranous*, and is inserted in the upper part of the *Tibia* ¹.

The *Quadratus*, obtains the *Tubercle* of the *Ischium* for its Origin, and terminates between both *Trochanters*.

The *Pyramidalis*, proceeds from the *Internal* part of the *Os Sacrum*, where it is join'd to the *Ileum*.

The two *Gemini*

The *Superior*, is deriv'd from the posteriour and lower *Spine* of the *Ileum*.

The *Inferior*, springs from the *Tubercle* of the *Ischium* ².

These three have their Insertion in the *Cavity* or *Sinus*, within the *Trochanter Major*.

¹ This *Muscle* in respect of its situation, should be referr'd to the *Tibia*, and called *Abductor Tibiæ*, but because it encompasses the *Femur* with its *Aponeurosis*, when it Acts it must of necessity draw back the *Femur*, and therefore I doubt not but that it may be very properly referr'd to the *Muscles* of this Bone. ² The two *Gemini* are for the most part found closely united with the *Obturator Internus*, hence by some they are described not as *Distinct Muscles*, but referr'd to this *Obturator*.

Adductor

Adductor one viz. the *Triceps*, whose first and second Head rises nigh the *Symphondrosis* of the *Pubes*; The third comes from the *Tubercle* of the *Ischium*, and has the whole *Spine* of the *Femur*, for the Place of its Insertion.¹

Rotators, which are also called *Obturator*s, two.

The *Internus*, takes its rise from the *Internal* Circumference of the great Hole of the *Os Pubis*, passes the *Incisure* of the *Ischium*, and is inserted in the Dimple, nigh the *Trochanter major*.

The *Externus*, proceeds from the *External* Circumference of the fore mentioned Hole, and is inserted in the same place as the former. These *Muscles* can also assist the *Abductors*.

350. The *Muscles* of the *TIBIA* are Ten, ^{of the} four of which are *Extensors*, situated ^{Tibia.} in the fore Part of the *Femur*.

The *Rectus*, springs from the fore and lower *Spine* of the *Ileum*.

The *Cruralis*, is situated under the former, and has the whole *Anterior* Part of the *Femur* for its Origin.

The *Vastus Internus*, obtains the whole *Internal* side of the *Femur* for its source, and

¹ This also assists the *Flexors*.

The *Vastus Externus*, the whole *Exterior* side of the same Bone.

These *Four* make a strong common *Tendon*, in which the *Patella* inheres, and this *Tendon* is inserted in the *Tubercle* of the *Tibia*.

Flexors six,

The *Sartorius*, arises from the fore and upper *Spine* of the *Ileum*.

The *Gracilis*, derives its beginning from the *Symphysis* of the *Pubes*.

The *Semimembranosus*, comes from the *Tubercle* of the *Ischium*. All these four have their Insertion in the *Interior*, and upper part of the *Tibia*.

The *Biceps*, the first of whose *Heads* proceeds from the *Tubercle* of the *Ischium*, and the second from the lower part of the *Femur*, terminates in the upper part of the *Fibula*.

The *Popliteus* is a small *Muscle*, and rises with a round *Tendon* from the *Exterior Protuberance* of the *Femur*, and passes *Tendinous*, obliquely under the *Poples* in the inside, where it becomes fleshy, and so is inserted in the *Superiour* and inner part of the *Tibia*. This *Antagonizes*, both the *Sartorius* and *Gracilis*.

Of the *Tarsus*

351. The *Muscles* of the *TARSUS* or *Instip* are Eight, two of which are

Flexors,

Flexors, as

The *Tibialis Anticus*, whose beginning is in the upper, and *Exteriour* part of the *Tibia*, and end in the *Internal Os Cuneiforme*, and the *Internal Bone* of the *Metatarsus*.

The *Peronæus Anticus*, begins in the middle and forepart of the *Fibula*, and terminates in the *Exteriour Bone* of the *Metatarsus*.

Extensors four,

The two *Gastrocnemii*, derive their beginning from the two *Condyles* of the *Femur*¹.

The *Plantaris* takes it rise from the inner part of the *External Condyle*².

The *Solaris*, begins from the upper and *Posteriour* part of the *Tibia* and *Fibula*.

The *Bodies* of those four *Muscles* constitute the *Calf* of the *Leg*, and their *Tendons* being joined form that very strong *Tendon* called *Chorda Achillis*, which is inserted in the *Posteriour* part of the *Calcaneum*.

Adductor one viz.

¹ In those two beginnings, I with *Vesalius*, *Riolanus* and *Drake*, have observed the two *Ossa Sesamoidea*, which I have delineated *Tab. 1 f. O E.* and sometimes as well as *Fallopianus* and *Cowper*, only one in the *External* of these *Muscles*, ² *Mr. Cheselden*, affirms that he found an *Os Sesamoideum* in the *Head* of this *Muscle*, *Anat. p. 34.*

The *Tibialis Posticus*, which derives its Head from the upper part of the *Ligamentum Interosseum*, and is fixed in the *Os Naviculare* ¹.

Abductor one viz.

The *Peronæus Posticus*: This arises from the upper part of the *Fibula*, but its *Tendon* turns below the *Tarsus*, and is inserted in the Bone of the *Metatarsus*, that sustains the big Toe. In those who are aged, one of the *Ossa Sesamoidea* is found in this *Tendon*, where it passes under the *Os Cuboides*.

Of the Toes. 352. The *Muscles* of the T O E S, are either Common or Proper. The Common are fourteen.

Extensors two

The *Longus*, derives its head from the upper part of the *Tibia*, and the fore part of the *Ligament* between the *Tibia* and *Fibula*; it is divided into five *Tendons*, the upper four of which are inserted into the third Bones of the lesser Toes, the fifth into the utmost Bone of the *Metatarsus*, which sustains the little Toe ².

¹ This *Muscle* often has a double *Tendon* or is *Bicornis*, and sometimes it may be divided into two distinct *Muscles*, for which reason some reckon two *Tibiales Postici*. ² This fifth part, constitutes the *Flexor* of the *Tarsus*, and often makes a distinct *Muscle*. It sometimes also runs down to the little Toe.

The *Brevis*, derives its self from the upper and forepart of the *Calcaneum*, and is divided into three *Tendons*, which have their insertion in the second *Phalanx* of the three Toes, next the great Toe.

Flexors of the

First Phalange are the four *Lumbricales*, whose Origin is from the *Tendon* of the *Perforans*, and inner part of the *Calcaneum* and Extremity, in the first *Phalange*.

Second, the *Perforatus* takes its Head from the lower and fore part of the *Calcaneum*, is divided into four *Perforated Tendons*, and terminates in the Bones of the second *Phalange*.

Third is the *Perforans*, whose head comes from the *Posteriour*, upper and middle part of the *Tibia*, and is divided into four *Tendons* perforating the former, which end in the third *Phalange*.

Adductors, are the four } these have
Interossei Interni, } the like situ-
Abductors, are the four *In-* } ation, as those
terossei Externi. } in the Hands.

353 The Proper *Muscles* of the BIG TOE. are seven, viz.

Of the Big
Toe.

The *Extensor Longus*. This receives its Head from the fore and middle part of the *Ligamentum Interosseum* and *Fibula*

bula, and is fix'd in the first and second *Phalange*.

The *Extensor Brevis*, springs from the upper and fore part of the *Calcaneum*, and ends in the same place with the former ¹

The *Flexor Longus* derives its beginning from the back Part of the *Fibula*, and is inserted in the lower part of the last *Phalange*.

The *Flexor Brevis* comes from the middle of the *Os Cuneiforme*, and has its Insertion in the two *Ossa Sesamoidea* of the great Toe, which are joined to its first *Phalange* by *Ligaments*.

The *Abductor* or *Thenar*, has its Origin from the internal side of the *Calcaneum* and *Os Naviculare*, and inserts it self in the internal side of the big Toe in the *Internal Os Sesamoideum* ².

The *Adductors* namely to the other Toes, are

The *Antithenar* which rises from the third *Os Cuneiforme*, and makes its Insertion into the *External Os Sesamoideum* ².

The *Transversalis*; this proceeds from

¹ These two *Muscles* are often one which is call'd *Bicornis* or terminating in two Tendons. ² We call that the *External* side which is next the other Toes, hence its easy to comprehend what we mean by the *internal* side: for other Authors intend the *Contrary* by the same Terms.

the fourth Bone of the *Metatarsus*, and fixes it self nigh the former.

354. The Proper *Muscle* of the LITTLE TOE, is

Of the Little Toe

The *Abductor Proprius*. This begins from the *Exteriour* part of the *Calcaneum*, and fifth Bone of the *Metatarsus*, which sustains the little Toe, and inserts its *Tendon* in the *Exteriour* part of the first *Phalange*. But because this Toe cannot be drawn from the rest, it rather performs the Office of a *Flexor*.

Adenology.

355. A D E N O L O G Y is the Doctrine of the Glands which the Grecians call *αδένες*, *Adenology ac-*
fin'd. but the Latins *Glandulae*, which Term signifies *Acorns*, because some Glands bear a resemblance of those Nuts.

356. The Parts to which the Antients gave this Name, altho' so very various in *The Definition of Glands difficult.*
 Figure, Magnitude and Colour, are yet easily known by the Commonality: But to give a Definition, or Description of them Analogous to a Definition, which may comprehend all true Glands, and be common to no other Parts which the Antients wou'd have to be Distinct from Glands both in Name and in Nature, and

and to which they have given other Names, is a matter so very difficult that the most Judicious and Accurate Authors have hitherto attempted it in vain.

By many therefore omitted.

357. For very many learned Anatomists, and among those of this Class, some who have professedly as they say, writ on this Subject, and have attempted to illustrate and make a more accurate Discovery of their Nature; have given no Definition or clear Description of them, which very Omission has been the Cause of much Obscurity and Confusion in the History of *Glands*.

The Definition given by others imperfect.

358. But others that have been more bold, and made attempts to give some Definition, differ so much from one another, and have advanced Definitions so imperfect and inadequate, that they either do not agree with those which all acknowledge for *Glands*, or else confound other Parts with *Glands*, which in reality are not, as has been shewn more at large in the Oration made here last Year on the true Appellation of a *Gland*.

The I. Proof

359. For they who Define a *Gland* by a *Globular part*, exclude the *Pancreas*, which is the chief and greatest *Gland*, which altho' it agrees less with no other Figure than the *Globular*, yet has always been accounted a *Gland*: In like manner the *Capsula*, *Atrabilaria* *Parotides* and

and others wou'd by general Terms be excluded from the Number of *Glands*, which however always were, and still are called *Glands*.

360 Others have said that a *Gland* is a soft ^{The II.}
lax and spongy Part &c. But

We have in the first Place **GLANDS** which are not soft lax and spongy, but which are observed to be somewhat hard firm, lax and compact. In the next Place there are other **Parts** which are soft, lax, and spongy, as the Lungs Fat, and others, and therefore they might be confounded with the *Glands*.

361. Some have call'd a *Gland* *Parenchyma* or soft, lax and fungous Flesh, but whether these have defin'd a *Gland* better than the precedent, may be easily determined by what has been already said, for it labours under the same disadvantage with the former. ^{The III}

362. Not a few who have said, *that a Gland* ^{The IV.}
is a Congeries of Vessels of all kinds or a part composed of a Congeries of Vessels, thought they had admirably well exhausted the Nature and Definition of a *Gland*: But are not all the Parts of the Humane, if an accurate and nice Examination be made, a *Congeries of Vessels of all kinds*? Therefore this Definition can no way agree with, or express the Nature of the *Glands*.

The V.

363. Others have attempted to Distinguish *Glands* from the other Parts, by this Circumstance, namely, that they are a *Congeries of Vessels enclosed in one proper Membrane*. But I demand is not the the same observable in the *Lungs, Heart, Muscles, Membranes and other Parts*, which all allow to be of a Nature very different from that of the *Glands*. Since then this is plain, 'tis also evident that this Definition will not answer the Purpose for which it was design'd.

The VI.

364. Some, and those not a few, have said, *wherever there is Secretion, there is a Gland*. These therefore are willing to assume their Definition of a *Gland* not from the particular Structure of the Part, or a *Priori* as they say, but from the Use or Function and (to use the Philosophical Phrase) a *Posteriori*. But we see, first, that *Secretions* are made and those very considerable without the least assistance of *Glands*. For who knows not that the *Chyle* is secreted in the *Intestines* from the *Excrements* without the aid of *Glands*, by the absorbing Orifices of the *Lacteal Vessels* alone? So also the Fat is secreted in the little Cells or Vesicles of the *Membrana Adiposa*, where no *Glands* can be either discovered or demonstrated. On the contrary, there are *Glands* which by all are received as such,
concerning

concerning which however it is uncertain whether they secrete or no. For who can prove to a Demonstration that the *Glandula Pinealis*, the *Glandula Pituitaria*, the *Capsula Atrabillares*, the *Thymus Glandula Thyroides*, *Glandulae Bronchiales* &c. secrete any thing, yet these are by every one accounted real *Glands*, moreover because the Antients call'd some Parts *Glands*, altho' they were ignorant that they secreted any thing, (as even the Moderns were entirely unacquainted with this use of those Parts before the discoveries of the Precedent Age,) hence it follows that the Antients gave them this Name, not on account of their Use, but for other Reasons and Qualities. We may also add that the Common People, even at this Time, know the *Glands* by their Habit or external appearance alone, altho they be ignorant of their Use. Therefore they may be known by other Marks.

365. Others, because in a preternatural The VIII.
State of the Bodies of those who have died of the Dropsie and other violent Diseases, they have found Globular Bodies or rather morbose Tumours, such as the *Atheroma*, *Steatoma*, and such like, as also *Terrestrial* and *Tartarious Congestions* in the *Liver*, *Spleen*, *Brain*, *Peritonæum*, *Pericardium*, &c. have immediately

diately concluded from thence that those *Tubercles* or *little Bodies* which appeared Spherical were true *Glands*, and therefore that these *Viscera* in a Natural State were composed of such *Corpuscles*, or of meer and innumerable *Glands*.

366. To which I return this Answer, first that these Spheric *Corpuscles* are not to be found in sound Bodies, or at least are generally wanting, and therefore that they rather are the effects of the *Morbose* Cause, being *Stagnations of Terrestrial or thick and viscid Particles in the Capillary Vessels*, which afterwards assume the resemblance of these little Spheres; for that which is allowed to be Natural and ordinary ought to be apparent in the Ordinary and Natural, and not in the Preternatural State alone; otherwise it must readily be granted by all, that our Senses and Reason are impos'd upon. For how often have *Cartilaginous* and even *Bony* Parts been found in the Body of the *Arteries* and *Membranes*? And is it therefore reasonable to conclude from thence that the Natural Constitution of the *Arteries* and *Membranes* is *Cartilaginous* or *Bony*? Certainly it is not. Neither have, they ever sufficiently proved that such Spherical *Corpuscles* are rather *Glands* than *morbid Tubercles*, produced by some Preternatural Cause.

367. Again, others in the *Liver* and *Kid-* The VIII.
neys have found *Præternatural Vesicle*,
and hence they attempt to prove that those
parts are really *Glandulous*: But first these
Cases also were altogether *Præternatural*,
and extraordinary, which therefore, because
not to be found the same in sound Bodies,
cannot be sufficient to prove the State
Natural or ordinary, in which those very
Parts appear far otherwise. Secondly, the
Antients never called the *Vesicles Glands*;
therefore confusion of Names and contentions
about Words would arise, should we now
pretend to alter the Names of things, the
proper signification of which has been long
since fixed. Lastly I demand why should
they not rather conclude from those Ob-
servations, that the *Liver* and *Kidneys* are
Vesicular, than *Glandulous* Parts? For no
one hitherto hath attempted to call the
Lungs, although consisting of *Vesicles* in
its natural State therefore *Glandulous*, but
all as was most proper called a Spade a Spade,
that is, named that *Vesicular* which is *Vesicu-*
lar. Neither has the *Ovarium* hitherto been
reckoned in the number of the *Glands*,
although *Vesicles* are manifestly observa-
ble in it. I am therefore surpriz'd that
some have valued such Observations at so
great a rate, that they should think that
by them, it is proved to a Demonstration
that the substance of the *Kidneys* is meerly
Glandu-

Glandulous, which however (as has been already mentioned p. 219.) is demonstrated by *Ruyfch* to be entirely *Vascular*, and appeareth such to the Naked Sight, which to me for the forementioned Reasons, seem to be altogether inconclusive, when advanced to prove that their substance is *Glandulous*, see *Note 29*.

An Object-
ion.

368. It is objected here by some Patrons of the *Spurious Glands*, in the first Place, that there is no difference between what is *Vascular* and that which is *Glandular*, for every thing *that is Glandular is Vascular*, and so on the contrary every thing *that is Vascular is also to be accounted Glandular*. To which I answer that by such the Parts are confounded, which ought to be Distinguish'd, since by this way of Reasoning, it should also be allowed that the whole Body is composed of meer *Glands*, than which nothing is more remote from Truth, therefore this Position cannot be approved by those who desire either to speak accurately, or judge of the Parts distinctly, because it would unavoidably introduce the greatest Confusion in the *Anatomical Art*.

The II.

369. In the next Place some, with *Malpighi*, affirm that in every *Gland* there is a little *Cell* or *Vesicle*, lying among the Extremities of the *Arteries*, *Veins* and *Excretory Ducts*, which when they are dilated

lated by some *Præternatural* Cause, render the *Vesicles* apparent. But to take no notice of the Opposition made by many of the most Celebrated Anatomists against this Notion, as being without proof, (since for instance in a Natural state, no Discovery can be made even of *Glands*, and much less of their *Folliculi* or *Vesicles*, in the *Cortical* substance of the Brain,) I affirm that the *Capillary Vessels* can as easily be changed into *Vesicles*, since such are often observed in the *Placenta*, which is altogether *Vasculous*, in the *Lungs*, surface of the *Skin*, *Eyes* and other *Parts*, in which *Glands* neither are nor can be demonstrated. Therefore the same may also happen in the *Kidneys*, *Liver*, *Brain*, &c. But seeing it is not the Business of an Anatomist to Talk, but to Demonstrate, it is therefore plain that those things are not to be receiv'd as matters of Fact, which are never apparent in sound Subjects. For in a *Præternatural* state there are so many Monstrous Productions and Deviations of Nature, that they, who from such a Constitution of the Humane frame, are willing to deduce its Natural State, cannot possibly avoid the *Maze* of Errors.

370. Moreover we are abundantly convinced, that *Secretions* can be, and in reality are made in most parts without the Interposition of such *Folliculi*. For though

Secretions may be made without Follicles.

we pass over in silence the Secretion of the *Chyle* and *Fat*, and suppose a *Follicle* in some simple *Gland*, through which *Gland* the *Extreme Arteries* and *Veins*, are disseminated, and in which *Follicle* according to their Notion, the *Excretory Duct* takes its rise, yet then this *Follicle* would contribute nothing to the Business of secretion, but perform only the office of a *Receptacle*. For when we consider that fluid, which is conceived to exist in the *Follicle* or *Excretory Duct*, we are also apprised that it is already secreted before it enters either one or the other, and that the Secretion of it is not to be made afterwards in that Place. It is certain that from the *Veins*, (unless it be in the *Liver*, where the *Vena Portæ* supplies the Place of an *Artery*,) there is no Secretion, because they carry back the Blood, from which Secretions have been already made: 'Tis therefore necessary that this be accomplished in the *Arteries*, and especially in the little *Lateral Canals* which spring out from the sides of the *Capillary Arteries*, perhaps after the very same manner as we see the *Lacteal Vessels* arising from the sides of the *Intestines*. And in this manner we conceive the *Secretions* are made in the *Brain*, *Kidneys*, *Liver*, *Testicles*, *Skin*, and other *Membranes*, and even in the *Glands* themselves. For since Nature is wont to use the most simple Method

thod in all her Actions, and since these *Follicles* are either not discoverable, or if they be, they perform the Office rather of a Receptacle than of an Excretory Organ; I think that this more certain Method of Secretion taken from the manifest Secretion of the Chyle, is deservedly to be preferred before one that is only Doubtful.

371. Therefore they, who are desirous of avoiding and removing as far as may be, all Equivocations with the Errors arising from them, will take due care *not to account a Vascular and Glandulous Substance one and the same thing*; but, as the Parts themselves are different from one another in Figure, Habit, and Aspect, be sedulous in distinguishing them by Name. For as it is altogether unallowable to give Forreign and Incongruous Names to those *Viscera* which by sight, Injections and Microscopes are found *Vascular*, and in which no distinct *Spheric Corpuscles*, inclosed in a proper *Membrane*, are beheld, so 'tis entirely reasonable that what is *Vascular* should retain its own Name, and what is *Glandulous* be called so; for by this means that Equivocation and Confusion of those Parts will be admirably well avoided which is too too Predominant in the Writings of many of the Moderns.

372. But if it be now demanded, *what ought to be called Glandulous, or what a Gland?* *What the Antients call'd Glands.*

I answer, because the Moderns as may appear by what has been already said, do not agree about the matter; I therefore think it necessary to consider in the first Place, *What the Antients called Glands*, and then why they gave this Name. First by Examination we find that they distinguished by this Appellation, the *Pineal, Thyroide*, and *Pituitary Glands*, the *Parotides, Maxillares* and *Jugulares*, the *Thymus* and *Pancreas*, and the *Mesenteric Axillary* and *Inguinal Glands* &c. And therefore these and other Parts resembling these, which perhaps were not known to them, are also for the future to be call'd Glands: For so we proceed, from things known and granted, to the knowledge of things unknown and doubtful.

*Why they call'd
certain Parts
Glands.*

373. But as to the latter Question viz. *Why they call those Parts Glands?* It is certain that the Antients gave them this Name, *Not because of their Globular or Spheric Figure*, otherwise they had not reckoned the *Pancreas, Thymus*, and others in this Class, *nor because of their soft lax and spongy Substance*, for then they had excluded from their Number the more hard and compact Glands, and introduced the Fat and Lungs which consist of a soft lax and spongy Substance. *Nor, thirdly, did they call the Parts Glands on account of their Use or Secretion*: Because they were ignorant that
the

the Glands did secrete any thing, until the Anatomists of the last Age made a Discovery of this in some of them. And 2. because they never gave this Appellation to the very *Viscera* in which they certainly knew a Secretion was made, such as the Liver, Kidneys and Testicles; nor to the Spleen, altho they thought that it Secreted the Atrabiliarious Juice. Therefore they seem to be guilty of a Mistake who think that the parts are called *Glandulous* from the Office of Secretion, since contrary to the Intention and Custom of the Antients, those parts should not be call'd Glands which from them have already received other Names, and on the contrary some parts which they call'd Glands wou'd in these Days be no longer Glands, because we are not as yet apprised whether they Secrete any thing or no as the *Glandula Thyroidea* the *Bronchials* and others.

374. Hence it is evident that the Antients call'd some Parts of our Body, Glands, *because of their peculiar Habit, or particular External appearance*, without any regard had either to their Internal Structure, Spheric Figure or Use.

Therefore, since 'tis neither allowable for us, nor proper for fear of confusion to change the old Terms, or Impose the Name of Glands upon those Parts that are too different from them which they call'd so, this Name can properly agree

with no part, altho it has the like internal Structure, and the like Use as is observable in some Glands, but such as have also the like *External Appearance* or *that peculiar Habit*, for which they formerly were so called, and are still so named among the Vulgar.

Glands Defined

375. What therefore a Gland is or how it may be best defined shall not be here repeated because we have already §. 33. from this Method of reasoning given a Definition of them: So that they may for the future, if the matter be duely considered without Prejudice be better distinguished from other Parts than formerly.

The reason of the Definition.

376 But perhaps not a few will wonder *why I fly to the peculiar Habit of the Glands* in order to distinguish them from the other Parts. But I suppose their Admiration will cease, if they will but consider that no other certain Mark or specific difference has hitherto been given or can be proposed by Authors, and therefore it is absolutely necessary that I should call this in as an Assistance. For since the Botanists, as is evident in a variety of Instances in RAY and TOURNEFORT, have been every now and then obliged to fly to the proper habit of certain Plants, when they could not any otherwise either define or describe their Genius; and this is readily granted as allowable in them: Why may not Anatomists also be permitted

permitted to use the same Liberty in the like case, where a perfect Definition or Description cannot be given? We impose this our Opinion upon none; but as soon as any will produce such a Definition as will duly distinguish the *Glands* from the other Parts, and which at the same time will agree with all the *Glands*, we will then with all readiness embrace that better Description.

377. But if it be enquired, what that *The Habit De-*
peculiar Habit in the *Glands* is. We an-*fined.*
swer, 'tis that particular Complication of the Vessels from whence proceeds the singular form, by which at first sight it is easily distinguished from the *Muscles, Membranes, Vessels and other Viscera of the Animal Body*, which habit or form cannot indeed be described by Words, in the like manner as the Botanists cannot possibly express the peculiar Habit of *Moss*, tho' one of the most common Herbs, which the celebrated RAY testifies in p. 6. of his *Method of Plants*; and nevertheless both the learned and the Illiterate easily know and distinguish it by its peculiar Habit from other Plants.

378. Therefore whatever Part has by the Antients been call'd a *Gland*, or possess'd that Habit or External Form which those parts have, to which the Antients gave this Name: This very same we acknowledge
What is to be accounted a Gland.

ledge for a true *Gland*, and think that it ought to be esteemed such. But whatever is destitute of that Habit, the same according to our Judgement ought to be banish'd from the Number of the *Glands*. But we must observe here that the Antients not only acknowledged the great Glands for such, but also these of a lesser size, particularly those of the Mesentery, among which there are some that are very small, which also almost every one of the Vulgar to this very Day distinguishes by this Name. Wherever therefore either smaller or greater Parts occur furnished with that Form or Habit, which the Parts, called Glands by the Antients and Vulgar, possess, these are to be acknowledged for Glands.

What is to be excluded.

379. For the same reason we must Exclude from the Number of Glands, *the Cortical Substance of the Brain*: Because nothing is observable in it, either by the naked sight, or by the Assistance of the best Microscopes that has the least resemblance of the Figure of the lesser Glands, and much less of their Habit: And especially since Injections have furnish'd us with a Demonstration that it consists entirely of small Vessels. The same Judgment is to be made of the *Liver, Spleen, Kidneys and Testicles*, in which neither I, nor several other very eminent Anatomists, cou'd ever find by the most accurate Examination a-

ny

ny thing that possesses the Habit of Glands. Hence therefore these *Viscera* are more properly call'd *Vascular* than *Glandulous*, because they really are *Vascular*, and so they obtain a name conformable to, or expressive of their Nature. But above all I most wonder that some should represent the Spleen also *Glandulous*, because of the *Tubercles* which sometimes have been found in it upon the Dissection of diseased Subjects, when nevertheless the Spleen secretes nothing, and therefore has not any the least occasion for Glands. Had the Antients who attributed a Secretion to it tho' falsely been guilty of such a Blunder, the fault in them wou'd be more excusable. But when this is committed at this Time, when all in general agree that in this Part there is no Secretion made, because it is entirely destitute of an *Excretory Duct*, the mistake is unpardonable; for who can possibly conceive for what use it ought to be stored with Glands, since there is no Secretion, and especially since all that which they attribute to the function of these Glands can be more easily and better explained by the Action of the small Vessels only. If the *Kidneys* of a Man, Hog, Ox, Calf, Dog, are to be examined either raw or boiled, their whole Cortical as well as interior Substance appears *Vascular* or *Tubular*, but I never yet could find those round Corpuscles
of

of which they say it consists. And in like manner the *Testicles* are altogether *Vasculous*. Neither are there any *Glands* to be found in the *Pleura*, *Pericardium*, *Peritonæum*, nor in the *Tunica Vaginalis*, but only now and then some small *Præternatural Tumours*.

The difference of Glands.

380. Authors have devis'd numerous DIFFERENCES of the *Glands*, but of these a few only shall be propos'd in this place, which we take to be sufficient for our present purpose. And 1. They may be divided into *Simple*, which others call *Conglobate*, consisting of one single *Spheric Corpuscle*, distinct and inclosed in its one little *Membrane*; and into *Compound* or *Conglomerate Glands*, which are composed of many lesser, inclosed in one common *Tunic*. 2. They differ in *Consistence*, for some are hardish, some very soft, especially those which are situated in the *Juncture* of the *Bones*. 3. In *Colour* most indeed are of a fleshy *Colour*, others far more red, some yellowish and some altogether black. 4. In *Figure* most are *Spheric*, and some resemble *Acorns*, but many are very different from these *Figures*, as the *Pancreas*, *Thymus*, *Thyroide Gland* &c. Some also have received their Name from their *Figures*, as the *Pineal* and *Miliary Glands*, and the *Tonsills* called barbarously *Amygdalæ* or *Almonds*. 5. They differ in Use,

Use, from whence some are usually called *Salival, Mucous* or *Lymphatic Glands*, and others *Mucilaginous, Sebaceous, Ceramious, Lachrymal* and *Pituitary Glands* &c. 6. In their situation; according to the diversity of which they are called *Parotide, Maxillary, Thyroide, Lingual, Palatine, Labial, Jugular, Cervical, Axillary, Lumbal, Inguinal, Intestinal, Mesenteric* and *Renal Glands*. So also from their situation they are usually called *Solitary* or *Congregate*, especially in the *Intestines*. 7. Tis so well known to all, that the *Glands* differ also from one another in Magnitude, that I suppose there is not any occasion to use any words about this matter.

Of the Glands in Particular.

381. But let us now see in particular, what parts may deservedly be retain'd in the Number of the *Glands*: and first IN THE HEAD. In this Part if any thinks fit to take the whole Brain for one great *Gland*, because HIPPOCRATES, on account of the faint resemblance that it bears of such parts, called it a *Gland-like Body*,¹ I shall not be very opposite to this manner of speaking, altho the following Antients entirely abstained from the use of this Phrase.

¹ Lib. de G'andulis.

But that the *Cortical* substance of the Brain does consist of innumerable little *Glands* or *Globular Corpuscles*, as B I D L O W¹ has delineated them, is both very different from the Opinion of H I P P O C R A T E S, and the nature of the Thing, as it appears to the very sight. However some *Glands* are found in the *Sinus's* of the *Dura Mater*, and nigh them, which P A C C H I O N U S² has taken care to describe. Moreover in the Brain the *Glandula Pinealis* which has been mentioned f. 270. is also one of this Number: and under the Brain lies the *Glandula Pituitaria*, in the *Sella Turcica*, for which see f. 274. The use of all which *Glands* is as yet very uncertain. The Injections of Mr. R U Y S C H and ocular Demonstration have fully inform'd us that there are not any *Glands* in the *Plexus Choroides*.

The Glands
in the outside of
the Head.

382. In the outside of the Head we have the *Parotides*, the *Maxillary*, *Sublingual*, *Lingual*, *Labial*, *Palatine* and *Buccal Glands*, dispersed over the whole *Membrane* of the Mouth, these have been described f. 278. As also the *Lachrymal Gland* in the *Orbit*, which was formerly called *Glandula Innominata*, f. 276. Under the *Eyelids* are the *Ceraceous* or Se-

¹ *Anatom. Tab. X. f. 2.* ² *de Glandul. Conglobat. duræ Matris.*

baceous Glands of *Meibomius* demonstrated in the same Place. But none are to be found within in the *Uvea* of the Eye, where some affirm there are *Glands*. Nor are the *Tonsills* of the Jaws to be omitted of which f. 285. Nor the *Mucous Glands*, in the *Pituitary Membrane* of the *Nostrils* f. 286. Nor the *Ceruminous Glands*, in the *Meatus Auditorious*.

383. In the NECK the principal that occurs is the *Glandula Thyroidea* being the The Thyro-
ide Gland. greatest of the Neck, which because it has been as ill describ'd as figured by VERHEYEN; in what will be shortly published in the *Ephemerides Cent. vii* and *viii*, I have more accurately described it, and have taken care that it, together with the *Bronchial Glands*, should be delineated in their natural magnitude as they were taken from a Humane Body, to which I have also added the Figure of the *Thyroide Gland* from an Infant. This Gland is in Humane Bodies single and not double, bearing the resemblance of the horned Moon; its Horns are extended from each side upwards, and with these it adheres on both sides as well to the *Thyroide* and *Cricoide Cartilage*, as to the *Oesophagus*, but its middle is join'd to the lower part of the *Larynx*, and the upper of the *Aspera Arteria*.

384. I have also discoursed at large in the forementioned Transactions of the new Use The Opinions
of Verce'lonius. which

The Opinion of which V E R C E L L O N I U S ¹ ascribes to Vercellonius this Gland, who constitutes it a *Nidus of little Verminous Eggs*; which being generated here, are transmitted thro' very subtil *Ducts* (whose Cavities however he could not discover) into the *Œsophagus*, and from thence into the Stomach; in order to Impart a Vital Character to the Chyle in the Stomach, and promote Digestion, which Eggs in a preternatural State often become real Worms.

What I observed.

385. I have often enquired into this matter in Humane Bodies, and have found *Fibres* manifest enough, by which it adheres to the *Œsophagus*, and the Gland itself always hardish and firm, but could neither observe in it any little Eggs nor find hollow *Ducts*. But this last Winter I found in a Womans Body which I publicly dissected, this Gland very turgid with Liquor; I therefore hoped that I might here make some advances in the Discovery of its Use. Wherefore I opened both the the *Aspera Arteria* and the *Œsophagus* in the back part, that hereby I might have the greater freedom of looking into the Cavity. After that I squeezed the Gland with my Hand, first slightly, and after-

¹ *Dissect. de Glandul. Conglomer. Œsophagi.*

wards with greater force, in hopes that I should observe some fluid entering into either the *Trachea* or the *Œsophagus*, or into both together, but not the least drop could be forced into either the one or the other, so that I am still unable to determine for what real Use this remarkable Gland was form'd, or into what part it discharges its fluid. But when I open'd this turgid Gland in order to view its Internal parts, a copious limpid Liquor flow'd out, which appeared very full of little yellow Spheres, which like very small drops of Oyl swam upon the surface of the Water. But whether these *Corpuscles* were the little Eggs of VERCELLONIUS, or some other kind of Matter I dare not determine. However I thought it proper to insert this Observation here, for perhaps it may afford some light to those who hereafter may have an opportunity of forming Experiments.

386. Besides this Gland, several others of various *Magnitude* and Figure, and of ^{The Jugular} ~~of~~ ^{Glands.} uncertain situation and Number, are found here and there in the Neck, in the *Interstices* of the *Muscles* and in the Fat. Those in the forepart are called *Jugular*, but they which are in the *Posterior* part are named *Occipital* or *Cervical Glands*, whose use also is not as yet certainly determined. They are commonly supposed to be assistant

to the *Lymphatic Vessels* but for what End I cannot conceive. R U Y S C H and M O R G A G N I U S have discovered Glands in the *Epiglottis*, and have given Figures of them in their Dissertations as we have already shewn S. 259. In the other Parts of the *Larynx*, and especially nigh the *Arytænoide Cartilages*, as also in the *Aspera Arteria*, Glands are delineated by M O R G A G N I U S¹ which are not commonly so large as in that Subject from which he delineated his: Nevertheless I always found them aparent enough. In the *Oesophagus*, especially in its upper part, many Glands are often found which are figured by V A L S A L V A². But I have sometimes seen them somewhat more large, and in the middle of particular little holes a kind of Excretory Duct was observed, the Figures of which I have as yet by me.

of the Thy-
mus.

387. In the T H O R A X the Gland T H Y M U S first occurs: The description of which we gave f. 256 and have added two different Figures of it, which may be seen Tab. iv. f. 14 and 15. An. 1706. Great debates arise about this Gland between B I D L O W and V E R H E Y E N, for B I D L O W in a certain Dissertation on the *Thymus*, vigorously attacks the Description and

¹ *Advers. Anat.* I. Tab. II. *De Aure Human.* Tab. v. Fig. 2.

Figure which VERHEYEN gave of this Gland; to which VERHEYEN gave as sharp a return. To this BIDLLOW again made a Rejoinder which the latter refuted with another Answer. But because BIDLLOW, instead of taking due care to state the Controversy aright, endeavoured chiefly to expose the Style, but very small Advantage arose from the management of this Controversy.

388. In the *Thorax* the BRONCHIAL ^{The Bronchial} GLANDS ^{al Glands.} also, offer them selves to our Consideration: These are very remarkable and situated in the greater Division of the *Bronchia* of the *Aspera Arteria*,¹ are of a blackish Colour, but their Use is also as yet doubtful. It was hitherto commonly believed that these Glands secreted a certain Liquor which they discharged into the *Bronchia* for moistening and lubricating these parts: But VERCELLONIUS² contends that they rather transmit a Fluid serviceable for Digestion thro very fine Ducts into the *Œsophagus* and Stomach. I have often enquired into those Ducts also, and have found Fibres observably stretched out from these Glands to the *Œsophagus*, which however, were ne-

¹ The Figure of these in their Situation and natural Magnitude may be seen in *Cens. vii* and *viii* of the *Ephemerid.* ² In the Dissertation already quoted.

ver so great as to present any Cavity to view, or admit a Bristle; this matter therefore demands a further enquiry, somewhat more than two Years ago, in a Mans Body I found in the greatest of these Glands a Stone as big as the last joint of the little Finger' and this Year in a Woman I dissected I saw one a little less in the same Gland.

*The Glandula
Dorsalis.*

389. Near the fifth Vertebra of the Back, or thereabouts, a notable Gland is now and then found, adhering to the back part of the *Œsophagus*, which has been delineated and described by *VESALIUS* and others among the Antients, and by them called *Glandula Dorsalis*. This Gland is observed to be various in magnitude, however it often equals a Kidney-bean or an Almond, and sometimes found greater, and sometimes less. Very often it is altogether wanting, or at least so very small that I have not been able to make a discovery tho' I used my utmost diligence in examining the parts adjacent. Sometimes also two Glands are found here, but according to some this is more frequently single. Some few Years ago I opened a Man who could no longer swallow either any Meat or Drink, because of some opposition which he perceived not in his Jaws but in his

Chest.

Chest. In him I found this Gland enlarged to the bigness of a Hens Egg by which the *Oesophagus* was so compress'd, that nothing could any longer have a passage that way. ¹ VERHEYEN found the *Oesophagus* entirely closed by the same Cause ¹.

390. VERCELLONIUS ² contends that ^{Its Use} this Gland also is appointed for the Secretion of some Juice assisting Digestion, which he affirms is convey'd into the Gullet by slender Ducts, of which hitherto I have not been able to make any discovery. FANTON ³ and others sometime before *Vercellonius* suspected that these Glands secreted a *Mucilage* which they discharged into the Cavity of the Gullet; and says that he not only saw their Ducts in a Dog in which these Glands were overgrown, but also found Worms in them. In like manner the Celebrated *Morgagnius* also relates that these Glands often grow turgid in Dogs, and that they contain little red and Oblong Worms, ⁴ which very thing is confirmed by *Red* ⁵ and *Clerck* ⁶. And in such cases *Morgagnius* says that little Canals are found opening into the *Oesophagus*; but when these are in a natural

¹ *Anat. Cap. de Oesophag.* ² In the same Dissertation. ³ *Anat. Corporis Human. Dissert. III. p. 55.* ⁴ *Advers. Anat. III. p. 5.* ⁵ *De Animal. vivent. in viventib. repertis.* ⁶ *De Lumbrico lato Cad. 13.*

State, that no apparent Ducts can be discovered in Dogs and much less in Humane Bodies. But why little Worms are so frequently in those Glands, and whether perhaps this be such another *Nidus* or *Ovary* of little Worms, as that which VERCELLONIUS places in the *Thyroide Gland* is a matter deserving a further Enquiry.

*The Glands in
the Abdomen.*

391. In the ABDOMEN are found many Glands, the greatest of them is the *Pancreas* f. 216. next the *Renal Glands* or *Capsulae Arabilaria* f. 220. As also the *Mesaraics* f. 212. The *Intestinals* both of BRUNNERUS and PEYERUS mentioned f. 210 and f. 211. The Glands of the Stomach are easily discovered in Dogs and Swine; but in Humane Bodies with the greatest Difficulty, and therefore I should have very much doubted their Existence in Humane Bodies, had not the Judicious MORGAGNIUS given me an undeniable Proof by his observations. Besides about the *Vertebrae of the Loins*, where the *Receptacle of the Chyle* is situated near the *os Sacrum*, and the *Division of the Iliac Vessels* various Glands, but of different Figure and Magnitude are found, which receiving their Names from their Situation are commonly called *Lumbares*, *Sacrae*, and *Iliacae*. Into these Numerous Lymphatic Vessels make their Entrance, which from thence discharge

charge themselves into the *Receptacle* of the *Chyle*. I have seen the *Lumbal Glands* in a Woman so far overgrown, that they exceeded the Magnitude of the *Fist*. *Conglobate Glands* about the bigness of a Kidney-bean are often found in the *Concave part of the Liver*, about the *Entrance of the Vena Portæ*, and neck of the *Gall-bladder* as also near the *Spleen*, nigh the *Entrance* of its *Vessels*, which Glands are by some call'd *Glandulæ Hepaticæ*, *Cysticæ Vena Portæ*, *Lienares* or *Splenicæ*, and seem to be serviceable to the *Lymphatic Vessels*. These in the *Concave part* now mentioned, are commonly observed to be more numerous in an *Ox's Liver*, than in that of *Humane Bodies*, some of which often equal an *Almond*, others a *Nut*, and others a *small Egg*, in magnitude.

VERCELLONIUS affirms that about the left *Orifice* of the *Stomach* on the outside, there adheres Glands about the bigness of a *Kidney-bean*, whose *Excretory Duct* he describes as opening into the *Stomach*¹. Such a Gland I have indeed often observed in *Swine*, but could never find the *Excretory Duct*. But in *Humane Bodies* for what Cause I know not, I cou'd not even find the *Gland* tho' I made diligent search for it in various *Subjects*. Some affirm that there

¹ In the forementioned Place.

are Glands which secrete Fat every where in the *Omentum* where Fat is contained, But

Very few only are to be found, and these chiefly where 'tis join'd to the *Pylorus* which are call'd *Omentales*, and this Fat is secreted from the small *Arteries* as in other parts. In the *Gall-bladder* of *Oxen* I have very often observed small yellow Glands not unlike the *Ceruminous* in the *Meatus Auditorius*. But in *Humane Bodies* I seldom cou'd observe them¹. The *Bladder* and *Ureters* sometimes present small Glands to our View, and in these they appear here and there, and in no certain Place. But in the former especially near its Neck they are conspicuous, however this happens but seldom.

In the parts
for Generation
proper to Men.

392. Those which occur in the parts of Generation proper to Men are, 1. Cowpers Glands, of which *s.* 230. and below (*Note* 15.) 2. *Lilbrinus's Gland* describ'd in the same page. 3. *Tyson's Odoriferous Glands* in the *Prepuce* and *Corona Penis* *s.* 229. of which, however those which are in the *Interiour part of the Prepuce* have presented themselves to my view more frequently than these in the *Corona*, where it is very difficult to distinguish them from the *Nervous Papillæ* which are very numerous. 4. The *Prostatæ* which are describ-

¹ Vid. *Ephemer. Nat. Curios. Cent. v. and vi. p. 243. Tab vi. Fig. 1 and 11.*

ed *sect.* 228. 5. The Glands of the *Seminal Vesicles* seldom occur, but I have sometimes seen them about the bigness of Mustard Seed. *Harvey*¹ has observed them together with an *Excretory little Duct* so large that he could thrust a Bristle into them, these therefore equalled the greatest of those in the *Thick Intestines*. 6. *TERRANEUS*² describes small Glands in the *Urethra* which he represents as inhering here and there in the very *Cavernous Part* of the *Urethra*, perforating the *Urethra* with many small holes, and discharging a *Mucilaginous Liquor* into it.

But I cou'd never as yet discover any one of these. This indeed I have seen which *MORGAGNIUS* has mentioned, namely that the little holes now mentioned, being often somewhat turgid with the Liquor retained within, impose upon the sight, under the appearance of Globular and whitish Corpuscles. But because the Antients have distinguished the *Testicles* with the *Epididymides* from Glands, I therefore think it proper to follow their Example.

393. In the parts of Generation Proper to Women, the following may be referred to the Number of Glands, namely 1, those which *MORGAGNIUS* has discovered in the *Nymphæ*, and described in his *Anato-*

In the parts of Generation proper to Women.

¹ In *Prodrom. Physiologico.* ² In *tract. de Glandulis* p. 32. ³ *Adversar.* 1. S. 10.

my, which in a great measure resemble the *Odoriferous Glands* in the *Prepuce* of the *Penis*. They are not equally big and conspicuous in all Women, as they are delineated by him, which I suppose happens because the *Nymphæ* themselves in different Subjects are of different Magnitude, and where the *Nymphæ* are very small, there they are scarcely perceivable: But on the contrary where they are great, these *Glands* generally offer themselves to the Observators view, and so much the more the greater the *Nymphæ* are. For in Women whose *Nymphæ* were very large and thick, I found some of the same bigness with those which were delineated by MORGAGNIUS. But in others I observed that they were scarcely visible, or not at all to be found. 2 Authors affirm that there are *Glands* in the *Urethra* of Women, as well as in that of Men ², But upon the most accurate Observations that I could Use, I found some little *Ducts* in the *Urethra*, but could not make a discovery of any *Glands*. 3 But about the *Orifice of the Urethra in the Vagina of the Womb*, where the *Lacunæ* (f. 234.) discover themselves so far as to admit of Bristles: I have sometimes found subjacent *Glands*, a very remarkable one of which MORGAGNIUS has delineated, ³.

¹ *Advers. Anat.* I. Tab. iii. ee. *Bidlow. Anat.* Tab. 1. f. 3. *Ternaux de Gland.* p. 44. ² In the place already quoted.

I have very often observed, when I attended Women in a difficult and Præternatural Labour in order to Extract the *Fætus*; that these and the *Glands* of the *Nymphæ*, swell very much in the time of delivery, for then because of the *Turgescenty* of these Parts, occasioned by the *Copious Influx* of the Blood, all things are abundantly more visible than in dead Bodies, in which very often there is not any appearance either of the *Ducts*, or of the *Glands*. 4. The *Vesicles* appearing the upper Orifice of the Womb, which by some are esteemed *Glands*, in my mind cannot be accounted such, because then there would not be any distinction between what's *Vesicular*, and that which is *Glandulous*, from which, as has been already shewn at large, the greatest Confusion would arise; for the parts which by the Antients were always esteemed distinct, should therefore at this time also be accounted different, otherwise the *Ovary* also and other *Vesicular* parts should be reckoned in the number of *Glands*. 5. It has been already affirmed f. 242. that there are not any *Glands* in the *Placenta*.

394. The *Glands* pertaining to the *Limbs* or *Extremities* are, 1. The *Axillary* which are enclosed in Fat, and situated in the Arm-pits; and 2. The *Inguinals* placed in each side in the Groins, which in various Diseases

The *Glands*
of the *Limbs*.

Diseases often swell are inflamed and turn to Suppuration. But their use is not apparent. 3. *Havers's* *Glands* also called from their use *Mucilaginosæ*, present themselves to our view in the Examination of the Limbs; These are observed in the *Articulations* of the Bones, especially of the *Os Femoris*, as well where it is join'd with the Cavity of the *Os Innominatum*, as where it is connected with the *Tibia*. In other Junctures also such *Glands* as these may be discovered, but they are less than the former. These *Glands* are the softest of all, and secrete a *Mucilaginous Liquor*, which is found in the *Articulations* of the Bones, for lubricating their Extremities, that motion may be performed with the greater Freedom and Ease, and to prevent their growing together. This sort approaches very near to a certain subtle *Species* of Fat, such as is observable in the *Interstices* of some *Muscles*, as also in the *Vertebral Canal* about the *Spinal Marrow*, so that it is often doubtful whether the substance under Examination be a true *Gland*, or only a more lax kind of Fat. Moreover there are also various *Glands* observable about the *Scapulæ*, and the bending of the *Cubitus*, Hand, Knee and Foot, all which to mention in parti-

These are described in *Havers's Osteology*.

cular

cular, would surpass the intended Brevity of this Compendium.

395. It now remains that we proceed upon the Examination of the *Cutaneous Glands*. VERHEYEN¹ says, STENO has observed that every part of the Skin, has its subjacent Gland from which a small Sudoriferous Vessel arises, which terminates in the Exterior surface of the Skin, upon which VERHEYEN, although he affirms he has never seen any such, calls them *Glandulæ Subcutaneæ*. But how many, I entreat you, such Glands would there be, if all the Pores (the Number of which is Infinite) had their subjacent Glands? certainly so great a Number could not possibly escape the sight. Nevertheless if the Skin be separated with the greatest care from the Fat beneath, no Glands are seen either in the surface of the Fat, or in the Interior surface of the Skin. It must be allowed that some small particles of the Fat, adhere here and there to the little Holes of the Skin, but these with all the ease imaginable are distinguished from Glands. From this I think it may be readily allowed as certain, that there are not any *Subcutaneous Glands*, that is such as are supposed to lye under every Pore in the Skin. It seems abundantly more

The Cutaneous Glands,

¹ Anat. Cap. de Cate. p. 35.

reasonable that this *Hypothesis* has taken its rise from this false *Axiom*, viz. *Wherever there is a Secretion, there also there is a Gland*: For *Steno*, knowing that from every Pore there is a Discharge made, he therefore supposed from that *Axiom*, that under each Pore there lay a *Gland*, which opinion we have already proved to be false. f. 364. But in the Skin it self or in its *Exteriour* surface under the Scarf Skin, we often observe in various parts of the Body, little *Globular* Bodies together with an *Excretory* Duct, which frequently occur, particularly in the *Eye-lids*, *Nose*, *Ears*, *Areolæ of the Nipples*, *Arm-pits*, in the *Skin of the Penis and Scrotum*, and about the *Anus* and the *Privities of Women*.

Observations.

396. Concerning which we remark 1. That they are not equally numerous nor of the same *Magnitude* in all: for in some the *Nose*, and *Eyelids*, are furnished with a vast number of such *Corpuscles* of a military *Magnitude*, and with these the parts seem entirely rough, so that they often occasion a considerable Deformity in the Face: But in some the number of them is but very inconsiderable, and in others there are not any to be observed. In like manner the *Skin of the Penis and Scrotum*, in some abounds with these *Globular* Bodies, and on the contrary in others we may find scarcely any or none at all. In the *Are-*
ola.

olæ of the Breasts they are seldom found so large as MORGAGNIUS¹ has delineated them: *From whence it appears that they vary very considerably both in number, place and Magnitude, in different Subjects.*

2. That it yet remains a doubt with me and several others, *whether these Tubercles are true Glands, and whether they are not rather little Excretory Ducts, springing from the Skin, which either by the Thickness of the Cuticle, or by the Viscidity of the matter contained within them, are obstructed and afterwards expanded into those Tubercles.* RUYSCH and BOERHAVE² are of this Opinion, who therefore call them *Follicles* or *Cutaneous Receptacles*. Such also are the thoughts of VERCELLONIUS about this Matter: When he affirms³ that the *Sebaceous Glands*, (for so the Moderns call these *Tubercles*,) *are only the Extremities of the small Arteries expanded into Follicles*, as also BIANCHUS when he Judges that these are neither *Cutaneous Glands*, nor necessary for Secretion in the Skin, ¹ Reason also seems to Convince us, that these Globular Particles are not true Glands. 1. Because they are entirely wanting in such a vast number of Human Bodies, or at least cannot be dis-

¹ *Advers. Anat.*, Tab IV. f. 2. ² *Ruyseh Advers. Anat.* Dec. I. P. 9. ³ *Dissert. de Glandulis conglomerat.* OEsophag. 150. ⁴ *In Hepatis Historia.*

covered in a variety of places. 2. Because after the *Viscid* or *Sebaceous* Matter which is contained within them, is press'd out by the Fingers, the whole *Tubercle* disappears and the part falls, which could not happen if the *Tubercle* was a true *Gland*, that is, a certain peculiar *Corpuscle*, consisting of a *Congeries* of small *Vessels* inclosed in a proper *Membrane*, although something had been express'd from thence. I therefore commit this and several other matters relating to the *Glands*, to the further Disquisition of the Learned, before any certain Judgment be made concerning them, that so Truth may be promoted and daily make additional Advances.

Scholium.

That HIPPOCRATES in his description of the *Glands*, principally considered their Habit may, I think, be easily understood in that he expresses himself in the following manner. ¹ *Their Nature is Spungy, for they are rare and Fat, neither have they Flesh like that of the other parts, nor any other thing resembling the Body, but it is brittle and furnished with numerous Veins, that is Vessels.*

¹ Lib. de Glandulis.

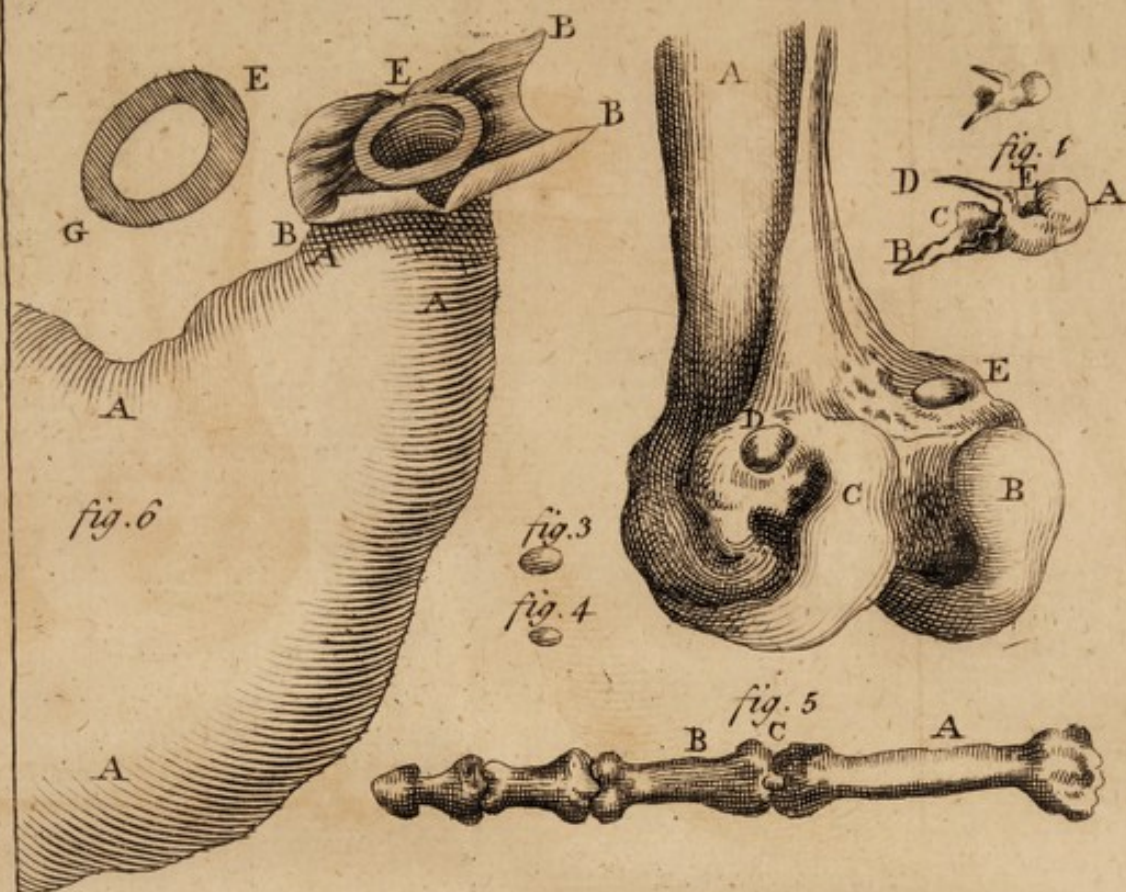
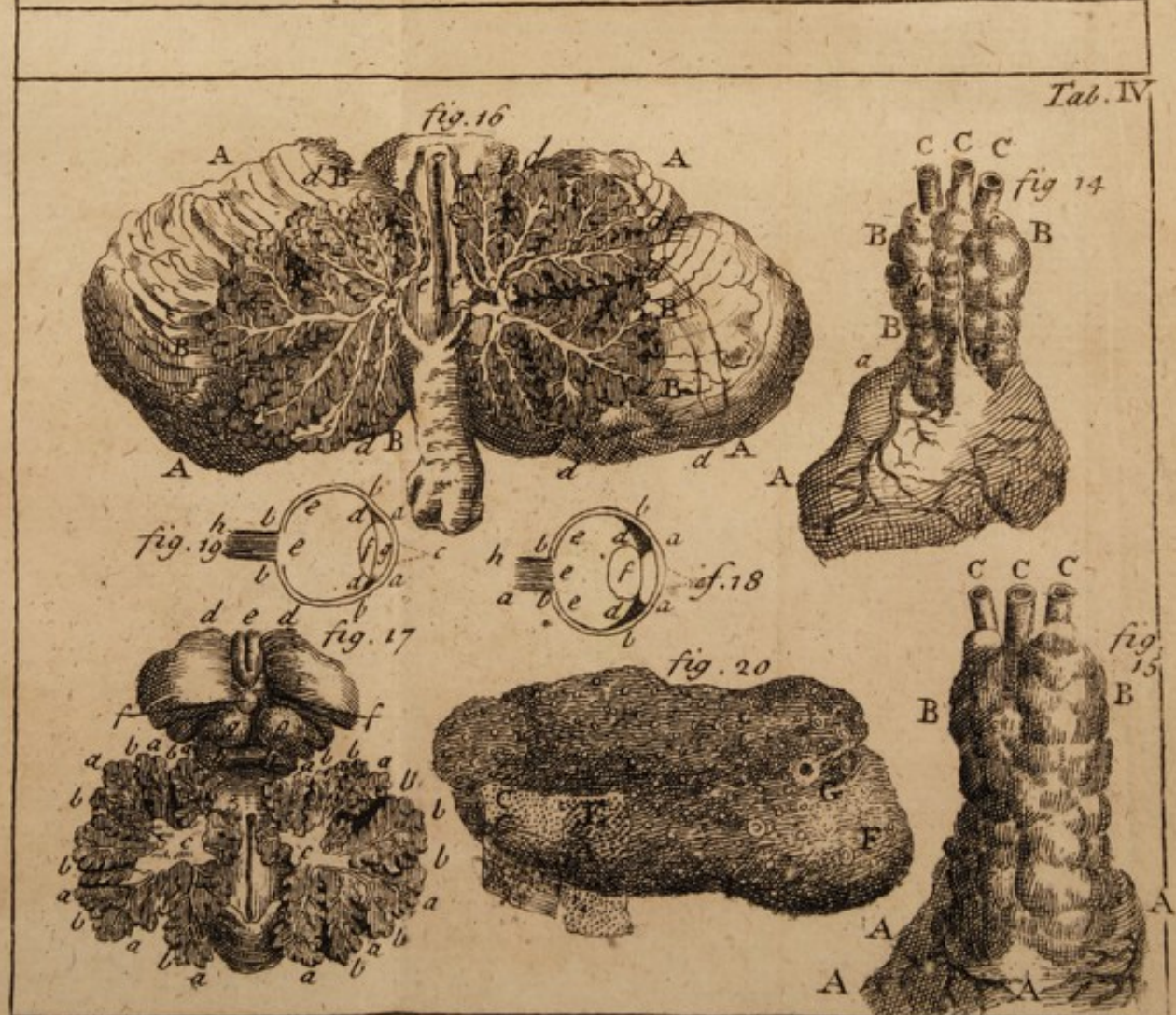
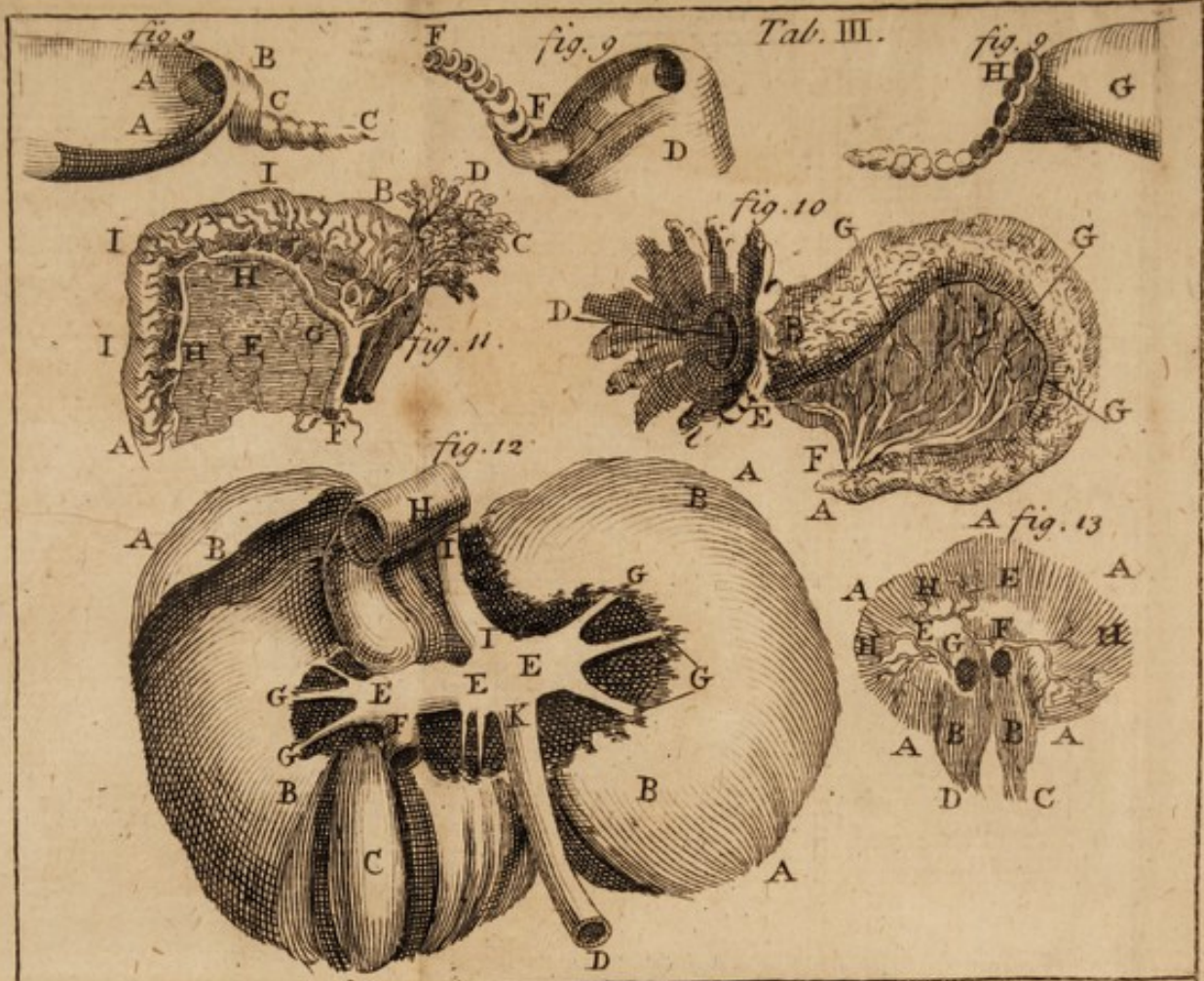


PLATE I



PLATE II









NOTES

OR

ILLUSTRATIONS

*Which could not be conveniently inserted
in the Body of the Book.*

NOTE* Belonging to SECTION ^{Of the Offa}
180. The Industrious Mr. Christo- ^{Sesamoidea.}
pher James Trew now Doctor of Physick
who formerly for the space of four Years
was attendant upon our *Anatomical Lectu-*
res, by my Advice took care to insert in
the *Ephemerides Cent. vi. An. 1717.* the
Anatomical Observation which is found p.
248. concerning some little *Sesamoide Bones*
which he discovered by his own Researches
in several Bodies which I have dissected in
the *Theatre of Altorfe*, and in this Obser-
vation describ'd and delineated as new.
But altho' this Discovery was transmit-
ted by me in TREW'S Name, yet for
certain Reasons, some few particulars being
altered

altered, it was printed by the Illustrious Directors of these *Ephemerides*, under my Name, yet without my knowledge; which therefore I thought fit to mention here, lest T R E W himself or others who may happen to know this, should think that I intended either to detract something from his Honour, or was willing to ascribe to my self what was not my own: on which account I here make a publick Declaration, that that entire observation belongs to the Ingenious T R E W. And I also ingenuously confess that those little Bones described by him, especially these which are situated in the *Ossa Femorum*, were, before T R E W demonstrated them, entirely unknown to me and then first considered as New: particularly because the Celebrated R A V I U S, under whom I formerly studied *Anatomy* and especially *Osteology*, (upon whose Judgment I for weighty reasons entirely depended,) not only omitted them in his *Anatomical Demonstrations*, but expressly denied them in his *Osteological Writings*, which at that time he communicated to his Pupills, and gave to be transcribed. His Words are these, *you are to observe*, says he, *that I ascribe no more than ten Ossa Sesamoidea to the Number of the Bones, namely two situated in the second joint of each Thumb, and big Toe, and one in each*
Tendon

Tendon of the Tibialis Posticus, ¹ for they are never to be found in the other Joints of the Fingers, or Toes, and very seldom in the forementioned Tendon, &c. By this it appears that RAVIUS is not only silent in relation to those which are situated in the Femur and little Finger, but also denies all the other *Ossa Sesamoidea*, excepting these ten which he has mentioned. Afterwards when I found that HORNE in his *Microcosm*, and his Commentators, (although very Learned Men) and many other Anatomists took no notice of these Bones; and that VERHEYEN ² mentioned their situation in the Femur, not upon his own Observation but BARTHO-LIN's assertion, and that even MARCHETT a famous Anatomist, also asserted ³ that he could never find those Bones in the Femur, which were describ'd by some, although he had made diligent search for them in several Subjects: I the more closely adhered to the Opinion of RAVIUS, whom I knew to be very much conversant among the Bones, especially when I myself also had made several attempts this way but to no purpose. But at last I was

¹ Perhaps *Ravius* here instead of the *Tibialis Posticus*, meant the *Peroneus Posticus*, for I *Vesalius* and others have found a little *Sesamoide* Bone in the latter, but never in the former.

² *Anat. Cap. de Ossibus Sesamoideis.* ³ *Anat. Cap. XIX.* where he treats of the *Gastrocnemii*.

really convinced by TREW's observations, that there were more *Sesamoide* Bones than RAVIUS had shewn me. Afterwards when I consulted other Anatomical Writers upon this Head, and found in several, and particularly in VESALIUS¹, RIO-
LANUS², (who ascribes the first discovery of them to VESALIUS,) BARTHO-
LINE³, MUNNICKIUS⁴ and DRAKE⁵, &c. That not one but two little *Sesamoide* Bones were often discovered in old People, in that part of the *Femur* where the two *Gastrocnemii* have their Original. And in FALLOPIUS⁶, and COW-
PER⁷, that only one was mentioned which perhaps was the same that TREW described. I therefore with his Approbation and Consent, determin'd to advertise here, that these little Bones were not a new Discovery as they at first appeared to him and me with many others. Notwithstanding since at this time they were almost entirely forgotten, and never before demonstrated nor shewn to me by any, and either denyed or not mentioned, because they could not be found, by several very considerable *Anatomists*, and lastly, since they were never before delineated, I am apt to believe that

¹ *Anat. Corp. Human. Lib. I. Cap. 28.* ² *Anthropograph. Lib. V. Cap. 43.* ³ *Anat. Cap. de Ossibus Sesamoideis.* ⁴ *de re Anatomica. f. 65.* where he treats of these Bones. ⁵ *Drakes Anatomy p. 729.* ⁶ *Observat. Anat. p. 441.* ⁷ *Myotom. Reform. Cap. 34. p. 206.*

it will not be unacceptable to the curious, that T R E W has revived the discovery of one, and after him, I of another in the *Femur*, and that we have both proved them by new Experiments, and also given Figures of them, which are conformable to their Natural Magnitude, (*see* Tab. 1. f. 2. 3. 4.) for Figures of Parts which are not as yet sufficiently known, contribute very much both to advance and adorn *Anatomy*.

(1) S. 196. The Generation, and Rege-^{Of the Generation of the Cuticles}neration of the Scarf-skin is explain'd by the celebrated M O R G A G N I U S after another Manner in his *Adversar. Anatom.* p. 13. for the *Cuticle*, according to him, seems to be nothing else but the upper Surface of the Skin hardened by the External pressure and Heat whence it becomes insensible and in appearance Dead. But this ingenious Conjecture is in my Opinion absurd; because the *Fætus* is furnished with a Scarf-skin even while it is enclosed in the Womb, where the *Mucilage* of the Liquor contain'd in the *Amnion*, which surrounds the *Fætus*, seems to be a sufficient Defence against such a pressure of the Skin, as is necessary for the Production, hardening and drying of the *Cuticle*.

(2) S. 198. Some Moderns describe Glands in different parts of the Skin, which^{Of the Sebaceous Glands} they

which they call *Sebaceous*, especially in the *Ears*, *Eyelids*, *Nose*, *Areolæ of the Nipples*, *Scrotum and Skin of the Penis*, in the *Prepuce*, *Nymphæ*, and *Privities of Women*, and about the *Anus*, *Armpits*, &c. from which a thick *Sebaceous* matter often may be expressed, but BERGER, and VERCCELLONIUS² contend that these are not hingbut the *Extremities of the Arteries* expanded into *FOLLICLES*. Again, BOERHAVE informs us that these Bodies are rather *Receptacles of an Oily Unctuous Humour than true Glands*, which perforate the *Cuticle* with a fine *Hole*, which is their *Excretory Duct*, and convey this *Humour* from the *Capillary Arteries* terminating in these *Cutaneous Receptacles*, which when tis secreted is thin; but when it has by any means been detain'd too long in these *Receptacles*, the more subtil particles being evaporated, the remaining part becomes thick, and assuming the appearance of *Wax* or *Suet*, forms *Tubercles* which in some measure bear the resemblance of *Glands*, and are *Numerous* in the *Face*, especially in the *Nose*. These being squeezed with some force emit a tough white ceraceous Matter, which often very much resembles a little *Worm*, as many who being deceived with this appearance, think, affirming that they had seen cutaneous *Worms*. From these he afterwards

¹ In Physiologia. ² In Dissert de Gland. OEsophagi. p. 150. ³ Ruysch Advers. Anat. De, I. p. 1

very learnedly deduces the Original of *Pimples*, as also of the *Atheroma*, *Meliceris*, and several other Cutaneous disorders. This Opinion of the *Cutaneous Glands* I have always embraced, and since I first began to teach *Anatomy* to this day I communicated the same to those who attended my Lectures. But of these I have already discoursed at large in the *Adenology* §. 395. By which I believe that it is at least undeniably prov'd, that there is not such a Number of true Glands as that every Pore shou'd have one beneath it, as *Steno* and many others after him believed and taught.

(3.) S. 205. The *Ligamentum Poupartii*, is said to be a strong Ligament ^{Of the Ligamentum Poupartii.} extended from the *Anterior Spine* of the *Os Ilium*, to the uppermost part of the *Os Pubis*, by which as is said the *Muscles* of the *Abdomen*, where the Production of the *Peritonæum* and the *Spermatic Vessels* in Men pass thro, are strengthen'd, that the *Intestines* may not easily slip down, or Ruptures be caused. But *Morgagnius Advers. Anat.* II. p. 24. with *Cowper* justly denies these Ligaments, and demonstrates, that they are only the lowest Margin of the *Tendon* of the *Obliquus Descendens*, which also was always my Judgment of this matter, and therefore that there might be no unnecessary Multiplicati-

on of Beings, I made not any mention of these *Ligaments* in the former Edition of this Compendium, because they are not parts really existent.

Of the Glands
of the Perito-
neum Pleura
and Pericar-
dium.

(4.) S. 206. Several Authors affirm that they have observed *Spherical Corpuscles* or *Glands* in the *Peritonæum*, *Pleura* and *Pericardium*. But because all these Observations have been taken from Diseased Subjects, or from a preternatural State, but never yet as far as I know discovered in sound Bodies; I therefore am more inclinable to think that these *Corpuscles* resembling *Glands* are only preternatural *Tubercles* arising from the stagnation of Terrestrial viscid matter in the *Capillary Arteries* of these *Membranes*, which consideration being neglected, a croud of *Glands* have been produced in the Mind which never had a being in the Animal Body, and therefore are not to be found in a Natural State. Mr. Cheselden a modern English Author says in his *Anatomy* p. 96. that he found in a Dropsical Woman, the *Peritonæum* three Inches thick, and that in this he could discover *Glands* with his naked Eye. But who will not suspect from this great and preternatural change of the *Peritonæum*; that those *Corpuscles* which he takes for *Glands* were not true *Glands*, but rather new Preternatural Productions? For as Stones, Cartilages,
little

little Bones, different sorts of Tumours and other Preternatural Bodies are often generated in several parts of the Humane Frame, which Changes no one will readily allow for the Natural State: So I am convinced that this Alteration of the part which he mentions, cannot with any shew of reason be admitted as proper for discovering its Natural Constitution. Nor do I conceive how they can certainly prove that such *Corpuscles* in a preternatural State, which only sometimes become apparent, are real *Glands*. The same Judgment is to be made of other Observations of the like nature, as may appear by what has been proposed on this Head in the *Adenology*.

(5.) S. 208. MALPIGHI himself ^{of the Lacteal Vessels.} in his Posthumous Works doubts the Existence of the *Ductus Adiposi* as distinct Vessels. And MORGAGNIUS rightly intimates that they are not Necessary¹, because he thinks, here as well as elsewhere, the Secretion of the Fat may be made from the *Arteries* into the little *Adipose Cells*, and that from these it may be afterwards absorb'd by the Veins, without the Intervention of a third kind of Vessels such as MALPIGHI formerly suspected to be necessary.

¹ *Advers. Anat.* iii. p. 3.

Of the *Lacteal*
Vessels.

(6.) S. 213. An. 1717. A young Man of a sound Robust Constitution, having given too great a loose to his Appetite in Eating and Drinking at a Fair in a Neighbouring Town, and being in all probability Drunk, in his return Home in the Evening fell into a deep hole full of Water, wherein, having no assistance near, he was suffocated. His Body was by the illustrious Directors of our Academy delivered to me for Publick Dissection, the second Day after I was wholly employed in demonstrating the common *Teguments* and *Muscles* of the *Abdomen*. The Day following, which was the third after his Death, when I proceeded upon the Examination of the Interiour parts, I discovered in the presence of a vast croud of Students, in the *Intestines* and *Mesentery*, so great a Number of *Lacteal Veins* distended with a very white Liquor, and creeping just under the *Membrane* of the *Mesentery* above its Fat, that the *Intestines* and *Mesentery* seemed very much crouded with these Vessels, which by far exceeded the Number of the *Lacteals* at any time observable in Dogs, altho duely prepared and fed for this Purpose. For in these Creatures they accompany only the course of the Vessels of the *Mesentery*:

But

But in this Man they extended themselves with very frequent *Inosculation*s thro the whole *Mesentery* promiscuously, and some enter'd immediately the next *Glands* in the *Intestines*; but others partly sunk into the Fat of the *Mesentery*, so that their course could not be discerned, and partly went to the more distant *Glands* as I have taken care to have them delineated Tab. ii. f. 8. which however neither Painter nor Ingraver could represent numerous or small enough. Afterwards An. 1718 on the eighteenth of *April*, while several Students were present with me; I observed again in the Body of a young Man who died Consumptive, about twenty four Hours after his Death the *Lacteal Vessels* very numerous, and creeping in the same manner; we also distinctly saw them in this Subject springing out of the very *Duodenum*. Since these Vessels very seldom present themselves to view in Humane Bodies especially in such Numbers, and since those which have hitherto been represented by Authors seem to be taken from Beasts only, we were willing to delineate them as they appear in Humane Bodies, and thereby shew in what circumstances they are different from those of Brutes. NUC K indeed in his *Adenographia* fig. ix. has exhibited the *Lacteal Vessels* as they appeared to him in a Humane Body, but they

they are so few in so great a piece of the *Intestines*, that they rather resemble the *Lacteals* of a Dog than those of a Humane Body, for in both these Subjects which I dissected they were at least ten times more. The *Valves* which he represents visible and great in his, did not at all appear, but were just as they are figured by us. In the former Subject because that young Man was suddenly suffocated in the middle of Digestion while his Stomach was full, the motion of the Chyle was at the same time stopped in the *Lacteals* while they were entirely full; from whence I suppose it happened that they were so very obvious to the sight. And the other being Consumptive, was almost to the last moment of his Life plentifully fed with Gellies, Broths, Emulsions, and such other strengthening things, and therefore it is no wonder that his Vessels also should appear so very full. Such opportunities occurring but seldom, it cannot be a matter of much surprize, that Numerous *Lacteal Vessels* are very rarely observed in Humane Bodies. However the celebrated MORGAGNIUS informs us, ¹ that he has seen them much after the same manner. While this Page was fitting for the Press, I found again these Vessels numerous enough, but not so turgid as in the former Subjects, in

¹ *Advers. Anat.* 11. p. 92.

the Body of a Criminal which I dissected on the fourth Day after his Execution, in the Publick Theatre. But what we observed in particular here, was that a large *Lacteal Vessel*, about the thickness of small Packthread, was seen to run very much distended with *Chyle* thro the *Duodenum*, which was not, as is usual elsewhere, composed of several Roots, nor ran into the *Mesentery* from the opposite part of the *Intestine*, but took its course along the *Duodenum* about four or five Fingers length, and at last enter'd the *Mesentery*. That this was a *Lacteal Vessel* and not a *Nerve*, as some of the Spectators suspected, was manifest; for as soon as it was cut, a considerable quantity of *Chyle* issued out. I had this also immediately delineated.

(7.) S. 215. We have few *Lymphatick Vessels* delineated from Humane Bodies, and even those which NUCK represents in his *Adenographia*, which by many are taken for true Humane *Lymphatics*, are in reality if not all, yet mostly, taken from Brutes which may evidently appear by his Figures of the Kidneys, Heart &c. as judicious *Anatomists* may easily observe. Those which he has represented as belonging to the Humane Womb, certainly never appeared such, but were so Figured only according to the *Analogy* which he supposed there should be between the *Lymphatics* of Beasts and those of Humane Bodies.

Of the Lymphatics.

(8.)

Of the Ductus
Bilarius Cy-
sticus.

(8.) S. 217. I have already described in Cent. v and vi. of the *Ephemerides*, two Humane Gall-bladders in whose Cystic Ducts I observed Beautiful and admirable Spiral Valves, which I have represented here Tab. iii. f. 9. also, because as far as I know they have not been either described or delineated by others, together with a new and third Scheme of the same Duct taken from a Womans Body which I dissected this Year; in which also there were several Valves or Transverse and oblique Membranes dividing this Duct into little Cells the which did not at all close up the Duct, but very much resembled the Connivent Valves in the Colon as will be more readily comprehended by the Figures. GLISSON indeed says, ' That some Anatomists have feigned Valves in the Cystic Duct, but he believes that the Fibrous Ring of the Cystics has imposed upon them for he never observed any Valves. BRANCHUS ² also says, that the Valves of this Part are Imaginary. But I refer it to be determined by others, whether or no those parts are to be called Valves. which have been found not once only but after some time in most Subjects. I also recommend this matter to the Enquiries of the Learned that we may be apprised how far these Valves are useful here.

¹ Traſſat. de Hepate Cap. 24 ² Hiſt. Hepar. 14. S. 2

(9.) §. 217. They who have said that *the Substance of the Liver is Glandulous* Of the Glandulous Substance of the Liver. asserted this for that reason chiefly, viz. because several have in diseased Subjects particularly in such as died of the Dropsy or Atrophy often found very many *Spherical Corpuscles* in this *Viscus*. But because these are not to be found in sound Bodies, they are rather to be accounted *Morbid Tubercles* as we have already proved §. 366. For altho we take under our Examination the Liver of the largest Ox, or Horse, in which all the parts of the Liver are very great, yet in these there is not any possibility of discovering any peculiar distinct *Corpuscles* inclosed in a proper *Membrane*. But if in diseased Subjects those *Tubercles* be duely examined, it will appear with little or no difficulty that they really are *Morbose* productions, and altogether preternatural. For proof of this, tho' a Variety of Observations might be produced which I have made upon several Subjects; I will propose only one which lately occur'd, when, in the presence of my intimate Friend and *Colleague* Dr. BAIER. I opened the Body of a Woman who dy'd *Hydropical*, whose Liver presented to our view, innumerable whitish and *Spherical Corpuscles* in its Surface, of various Magnitude, which by others prepossessed with prejudice wou'd have been accounted Glands.

Glands. But when we opened and examin'd those *Tubercles* more narrowly, we found they contain'd a matter very different from the Substance of the Liver, but like Fat, or Suet, or that matter which is often contain'd in hard *Cystic Tumours*: Afterwards when I cut up the Liver (the bulk of which was twice as big as what is natural) we found within a considerable number of those *Tubercles* dispersed thro' the whole Substance, many of which equall'd a *Filbert*, others a *Hazel-nut*, and some were as big and even bigger than an Egg. Their Colour also and whole habit was very different from the Natural Substance of the Liver; by which it might very easily be discovered that these *Tubercles* or *Globular Bodies* were not *Glands*, but *morbose Tumours*, altho they were possessed of a *Spherical Figure*, and in some measure assum'd the appearance of *Glands*. In like manner wherever I examined such *Tubercles* either in Humane Bodies or in Beasts, I always found that they were of the nature of *Cystic Tumours*, which often arise as well in the Internal as external parts, and as often impose upon the sight by their faint resemblance of *Glands*. Others have observed *Morbid Vesicles* in the Liver which some represent as *Glands*, but the same answer will refute this which we propos'd in the last Note, where we discours'd on the Kidneys thus affected.

(10.) S. 70. *Anatomists have sometimes observed little Spherical Bodies in the Spleens as well as in the Livers of diseased Subjects*, and these also they have industriously published for *Glands*. But the same Objections which were made against those *Tubercles* in the Liver, will be of equal force to destroy the *Hypothesis* raised upon this. And if I am not mistaken they must be allowed to be of greater force here; because since there is no secretion made in the Spleen, there is therefore less occasion for *Glands*, for of what use can they be to any part which secretes no Humour. Since therefore *Ruyfch* has in several parts of his Works proved to a Demonstration that these *Viscera* are *Vasculous*, and that no true *Glands* can be discovered in them, it is incumbent upon a reasonable Mind, to prefer Certainty before that which is doubtful.

(11.) The Use of no *Viscus* has been more of the Use of obscure than that of the *Spleen*, and therefore none has occasioned a greater variety of different Opinions. Some particularly because it might be cut out of Animals without endangering their Life, accounted it an useless and superfluous part or a Blunder of Nature. Others were of opinion that it was formed to keep up the *Æquilibrium* of the Body: Most of the Antients made it the Sink of the *Atrabilarious Juice*. Some supposed

supposed that the *Ferment* or *Menstruum* of the Stomach was secreted in and conveyed from thence by some unknown Ducts into the Stomach.

Others affirm that it thickens the Blood. H A V E R S ¹ conjectured that it prepared that *Mucilage* which is secreted by the *Mucilaginous Glands* of the Joints. The Modern *English* Authors as L I S T E R ² and P U R C E L L ³, will have it to be a *Diverticulum* for the Blood in violent Motions, and the latter of these two contends, that it thickens the Blood, and by the help of some *Acid* produces a precipitation of the *Fluids*, for the better Secretion of the *Bile*. Others have invented other Uses, but to mention them all will be very tedious. *My opinion is, that it furnishes the Liver with thin Blood, that the remaining thick Mass from which the Bile is to be secreted, flowing from the other Parts into this gross Viscus, may be rendered more fluid, and hereby the Secretion of the Bile more advantageously performed.* For I have often observed that *fine thin and florid Blood* flow'd out, when the Spheric Vein was cut in a Dog or any other Animal, but never saw it thicker than the other Venous Blood.

¹ In his *Osteology*. ² *Traët. de Humoribus*. ³ In his *Treatise on the Colic*.

(12.) §. 219. Because *Tubercles* are some-^{Of the Glands}
times in the Kidneys, many have attempted ^{in the Kidneys.}
to prove that their *Substance was therefore*
Glandulous, but the same Judgment is to be
made of these, as we have already proposed in
the *Adenology* §. 366. and in the ninth *Note*,
where we examined the *Tubercles* of the
Liver. But it will be shewn below in
Note 29. how we are to determine con-
cerning the Kidneys, which appear *Vesi-*
cular.

(13.) p. 73. It is the common Opini-^{Of the Cellulous}
on of Anatomists that there are but three ^{Coat of the}
Coats in the Urinary Bladder, which have ^{Bladder.}
been mentioned in §. 222. But because
WHARTON takes notice of a *Cell-*
ulous Coat in the *Mesentery* in which Fat
is contained, and RUYSCH and others de-
monstrate a *Cellulous Tunic* in the *Intestines*
as has been said §. 211. Therefore by the
same Right, and for the same or perhaps
more weighty Reasons, I believe that a
Cellulous Coat may be added to the Num-
ber in a Humane Bladder, viz. Because Fat
and that often in no small quantity, is
for the most part if not always manifestly
found between the outermost and *Mus-*
cular Coat, where it is secreted, collected
and contained, in little *Adipose Cells*; for
which Reason it may justly be affirmed,
that the *Urinary Bladder* consists of four
distinct *Coats*. In Dogs this *Cellulous Tunic*

is scarcely observable. This *Cellulous Membrane* seems to be serviceable in allaying the *Acrimony* of the *Humours*.

Of the Excretory Ducts of the Seminal Vesicles.

(14.) §. 227. LEAL LEALIS has delineated the *Seminal Vesicles* terminating with one common Duct into the *Urethra*, whose Description the celebrated BOERHAVE¹ follows, as also some (as I hear) in *France*, maintaining that they terminate oftner with one than with a double Duct. But in all that I ever dissected I found it double, and I not only keep such *Vesicles* dried as also in *Balsamic Spirits*, in which I can shew a double Duct, but in this very Month in which I write this, I dissected a Mans Body publickly, in which I demonstrated a double Duct, and a double *Excretory Orifice*. Besides I have all other *Anatomical Authors* agreeing with me in this matter excepting those now mentioned: Wherefore altho now and then perhaps a single *Orifice*, and one Duct only can be discovered, nevertheless I cannot be persuaded to believe that such observations are very common, because all other *Anatomists* as well as I have observed the contrary. For this reason I am more apt to think that their Assertion is founded upon a Mistake, than that their Observations are just; for it may very easily happen that they who are not much conversant in such Exercises cannot discover any more than one.

¹ In *Instit. Med. edit. alter. S. 648.*

(15.) f. 230. Mr. CHESelden, an *English* Author, much doubts the Existence of these Glands, which COWPER says he discovered, and affirms that he never could find them¹, and adds further unless these *Glands* had been Mr. COWPER'S Discovery we should suspect them either some of the small *Glands* in a diseased State, or a *Lusus Naturæ* in that Subject from which he delineated them, which is very often observable among the Glands.

(16.) p. 81. The *Membrane* in Virgins called *Hymen* has always been a matter of great dispute among Physicians, some of these strenuously maintaining, and others as vigorously denying its Existence, or representing it as some preternatural Introduction. But these seem, never to have inspected into the *Vagina* of young Girls and real Virgins, but of such only as have been deflowered. In all the Bodies which fell under my Examination, the Number of which is not small, some being new born, others some months old, some one Year, two Years, six Years, and one fourteen Years old, (the Description and Figure of whose *Hymen* may be seen in the *Ephemerides* Cent. vii and viii.) I always found something *Membranous*, sometimes *Annular*, and sometimes *Semilunar*, straitening the *Orifice* of the *Vagina*: That there-

Of the Hymen.

¹ *Anat.* p. 164. 6

fore cannot reasonably be accounted preternatural which is to be met with in most Subjects. Many causes may be assigned why it is not to be found in *Adults*, but tis no way necessary to discourse of these here.

Of the Fallo-
pian Tub.

(17.) p. 153. I thought fit to insert here Tab. iii. f. 10. the *Figure* which DRAKE gives of the *Tuba Fallopiana*, since the Book is rarely to be met with out of *Britain*. But because lately in a Public Dissection of a Womans Body *January An. 1719.* when I injected *Mercury* into the right *Spermatic Vein*, having first ty'd the lower part of the *Tuba Fallopiana*, together with the broad *Ligament* lest the *Mercury* should descend to the other Vessels of the Womb, I observed the course of very numerous and subtil Vessels in those parts in a manner far different from, and abundantly more Beautiful than in his *Figure*. I took care that the whole Part should be exactly delineated, because the like *Figure* is no way extant as it is represented Tab. iii. f. 11. After the *Mercury* had in an agreeable manner filled the numerous Vessels of the *Tuba Fallopiana* which surrounds its whole Body with a prodigious croud of Branches, it at last fell into the very Cavity of the *Tube*, which is a certain proof that these Vessels have a communication with the Cavity

ty and depofite fome Liquor in it, for moistening and lubricating the Tube.

(18.) f. 258. Lately in January 1719. I clearly and diftinctly obferved the *Bronchial Veins* in a Female fubject, which I often fearch'd for in vain in Humane Bodies. They fprung from *Intercostal Veins* and terminated in the *Bronchia* by fome Branches, three of which were remarkable enough being about the thicknefs of a fmall Straw.

(19.) p. 90. An. 1711. VERCELLONIUS's new Ducts.
LONIUS published a Treatife with this Title — *Differtatio Anatomico-Medica de Glandulis Œſophagi conglomeratis*, in which he describes feveral new Excretory Ducts terminating in the Œſophagus, and contends that digeftion has not as yet been duely accounted for, becaufe Phyſicians were ignorant of the proper Menſtrum or true digeftive Liquor. He alfo informs us that this Humour is convey'd thro' very fubtile Ducts into the Œſophagus and Stomach; 1. from the Conglomerate Glands, fituated in the left part of the Stomach, 2. from the Dorsals, and 3. from the Bronchials and Tracheals. But that little Verminous Eggs are tranſmitted from the Thyroide Gland which is their proper Nidus or Neſt into the Œſophagus and Stomach, where they impart a vital Character to the Chyle, as has been already mention'd in the *Adenology* p. 181. in which place I have candidly communicated the obſerva-

tions and experiments that I made in relation to this matter.

(20.) S. 245 A particular Case which I observed twice here in *Altorfe*, a great number of Students in Physic being present, seems to be an undeniable and certain Proof that the *Fœtus* receives its Nourishment by the Mouth also, which is as follows. Four years ago in the cold Winter season, I extracted from a Cow a perfect *Fœtus* together with the Womb and Membranes in which it lay inclosed: After I had opened the several parts, I found that not only the Liquor of the *Amnion* which surrounds the *Fœtus* was frozen, but that the same Liquor being frozen in the Mouth *Œsophagus* and Stomach, like one continued Body was almost an Inch thick in the *Œsophagus*. This last Winter also I made the same Observation, from which tis evident that there is a Communication of the Liquor surrounding the *Fœtus* with that which is found in its Stomach. Nor is it probable that so great a quantity of Liquor as is found in the Stomach of the *Fœtus*, is wholly secreted in it as some think, but 'tis absolutely necessary that it should spring from some other Source; especially since 'tis furnished with all the qualities which are observable in the other without the *Fœtus*. We have shewn above p. 175. BELLINGERS sentiments

sentiments of the Nutrition of the *Fœtus* by the Mouth *from the Gland Thymus*. Compare with this the *Lipsick Transactions An.* 1718. p. 6.

(21.) p. 216. Sometime ago the opponent of my *Hypothesis* of the *Cataract* and *Glaucoma* led me into a Controversy about the situation of the *Aqueous Humour* namely, WHETHER THERE IS A GREATER QUANTITY OF THE AQUEOUS HUMOUR IN THE FORE OR IN THE BACK PART OF THE GLOBE, That is *whether there is a greater quantity of the Aqueous Humour between the Cornea and Uvea or between the Uvea or* CRYSTALLINE Lens. My Adversary maintained the latter part of the Question, and I espoused the former. He, receiving his Instructions rather from the Figures he found in Books than from his own Inspection and Observations of the Eye it self, was obliged to entertain such thoughts of the matter in order to make a more plausible Defence for his *Hypothesis*, and especially because most of the *Anatomical* and *Optical Authors* represent in their Figures the space between the *Uvea* and *Chrystalline* either far greater ¹ or at

Of the true situation of the Aqueous Humour.

¹ *Vid. Vesal. Cap. de Oculo. Cassirii Tab. Anat. lib. x. Tab. xii. f. 1. Vidii Anat. Tab. 78 f. 20 Valveid Anat. Tab. iii. lib. v. f. 1. Kepler Paralipom p. 177 Horstium de Nat. Human. Tab. xxix. Bartisch Ophthalmoid fol. 8. Plater; Tab. Anat. Tab. 49. f. 1. Highmor. Anat. p. 218. Bauchin. Theatr. Anat lib. iii. Tab. xxii. f. 1. Bar-*

least equal ¹ to that which is between the *Uvea* and *Cornea*. Altho I was fully convinced by a variety of Experiments which I had formerly made in *Holland*, that there is a greater portion of the *Aqueous Humour* contained in the fore, than in the back Part of the Eye: Yet this Controversy offering it self I determined to enquire again with all possible accuracy into the truth of the matter, that I might exhibit a true Figure, because the Situation of the Humours of the Eye is duely represented by very few ². But because in Eyes that are not frozen, the Efflux of the *Aqueous Humour*, and the consequent Coalition of the Coats hinder us from discerning rightly the Situation of the Humours, and consequently from making a proper Judgment, it was therefore necessary that the Experiment should be made upon Eyes that were frozen, in which all things retain their true and natural Situation. But seeing the last part of this Winter, and the greatest part of the precedent was too mild

tholin. Anot. Reform. Cap. de oculo Taurvry. Anat. Tab. 14. f. 1 & 2. Briggs Ophthalmographia. f. 1. and others.

¹ *Stephan. dissect. part. Corp. Human. p. 303. Cartes in Dioptr. Schciner. in fund. Optic. Newton Optic. Hartsacker's Dioptri Verheyen. Tab. xxviii. f. 5, Rahault. in Physic. and others.* ² Among those who have represented this best, are *Fabric. ab Aquapend. de visus Organ. Cap. viii. Mariott. de visu f. 3. Bidlow de Oculis & Visu. p. 3.*

and

and at the time of the great Frost I could not procure Humane Bodies, I and others at my Request as well here as at *Noremberg* began our Experiments first upon the fresh Eyes of various Animals, and in all these Eyes which we took care to Dissect thro the Axis or middle, *We found between the Chry-stalline and the Uvea a little but scarcely perceptible quantity of the Aqueous Humour; but between the Uvea and Cornea, we always observed its quantity four times greater, as may be seen Tab. iv. f. 8.* And none perceived an equal much less a greater portion behind the *Uvea*; but all the Experiments and Figures agreed exactly with my Opinion. Nevertheless that I might give a true Draught taken from a Humane Body, lest perhaps this Winter also I should not be able to procure Subjects in the frosty Season, I requested of the celebrated MORGAGNIUS, because I knew that he very often had Bodies at Command, that he wou'd not only send me his Opinion of this Matter in writing, but also transmute me a Figure of the Eye prepared in the forementioned Manner.

To which my courteous and learned Friend was pleased to return the following Answer the 26th of this last *June, 1719. viz.* *That he always saw a greater quantity of the Aqueous Humour between the Cornea*
and

and Iris, than between this and the Chryſtal-line: And alſo willingly tranſmitted the Draught which is exhibited Tab. iv fig. 19. But about the latter End of this laſt *March Ann.* 1719. The Weather proving ſo favourable that I alſo had an opportunity of making a new Experiment upon a Humane Body, at which time I clearly demonſtrated in an Eye well frozen, to a great croud of Spectators aſſembled in the *Anatomical Theatre*, that the quantity of the *Aqueous Humour* lying between the *Iris* and *Chryſtalline* was ſcarcely perceptible, whereas that between the *Iris* and *Cornea* was far greater: So that this Eye agreed exactly with the Figure of MORGAGNIUS. From hence we might indeed exhibit our own Draught but thought it proper to retain the Figure that was tranſmitted by one diſinter-eſted in the Affair, and free from all manner of partiality, that equal Judges may be more able to determine whether my Adverſary or I, has written the Truth. See the Obſervation which by my Directions was inſerted laſt Year in *Cent.* vii and viii. of the *Ephemerides*.

of the Eye

(22.) p. 217. How in his Treatiſe of the *Circular Motion of the Humours in the Eyes*, hath given a new Name to the *Sanguiferous Veſſels* long ſince deſcribed and delineated by RUYSCH¹, the con-

¹ In *Epistol. Problem.* Tab. xvi.

tents of which are not red Blood but a *Lymphatic Liquor* and has called them *NERVO-LYMPHATICS*. But I cannot conceive any solid reason why here, there should be any occasion for a new and uncommon *Name*, and especially such a one as is taken from the *Nerves* to distinguish the *Vessels* by, which are derived either from the *Arteries* or *Veins*, and are by others denominated *Arteries* or *Lymphatic Veins* according as they arise either from the one or the other, or else *Arterioso-Lymphatic Vessels*; and therefore I was willing to abstain from the use of a Name which would be apt to excite a wrong Notion or Idea in the minds of Readers and especially of young Students in the Art. Besides this we would also recommend to the further consideration of the Reader some other particulars in this Author. 1. He is of opinion *that the Choroides is to be divided into five Coats*: But I doubt whether he can make this division in a Humane Eye, for all his Experiments, as himself confess'd p. 58. because he could not procure Humane Subjects, were taken from Beasts only. 2. He denies *that the Ciliary Processes, and the Ligamentum Ciliare consist of Muscular Fibres* p. 101 because they are Vessels, but I answer that at this time it is allowed by all experienced *Anatomists* that the *Muscular Fibres*

Fibres are hollow or in other Words that they are Vessels: And therefore according to this Opinion we should no longer maintain that there are any *Muscular Fibres* in the Body which is absurd. For the nature of a *Vascular Substance* is no way repugnant to that of a *Muscular*, which consists chiefly in manifest action of motion or contraction. In the *Pupill* there is evident Contraction and Dilatation, and *Fibres* in all appearance *Muscular* are observed in the *Ciliary Processes* which have not any resemblance of Vessels. These are therefore deservedly to be accounted *Muscular Fibres*. Notwithstanding p. 25. he calls the Substance of the *Uvea Musculo-Membranacea*. 3. p. 21. He contends that the *Arteries of the Eyes* arise from one and the same Source, namely, from an *Internal Branch of the Carotide*, but not from that which is admitted within the *Skull* as Nuck maintained, but from that which is bestowed upon the *Orbit of the Eyes*. In Opposition to that I affirm this in *Humane Bodies* they also run out of the *Skull* to the *Eye*. 4. p. 49. He says that the *Ductus Arteriosus Nuckii* springing out of the *Skull* is not the source of the *Aqueous Ducts* because it is too small. To which I answer that it alone is not the source but in conjunction with the other Branches running to

to the Eye. 5. p. 30. He affirms *that the Choroides is derived from the Pia Mater*, but for this he produces no Proof. For it is not only of a very different Nature, Colour, Figure and Habit, but it is likewise evident that the other *Membranes* of the Body are generated together with the *Pia Mater*, and therefore cannot owe their Original to it. 6. p. 45 He says that the *Chrystalline consists of pellucid Nerves*. But I wou'd fain know why he did not rather choose to say with others that it consists of *pellucid Vessels*? 7. p. 75. He affirms that *Glutinous Humours* cannot be restored in the Blood, without the assistance of a new Acid and that that Acid is separated no where but in the *Glands*: Which propositions he has not proved, nor will I'm afraid be able to establish. 8. p. 77. He says that the *Glands* have not any *Vessels* that furnish them with fluids: Which Affirmation is contrary to all reason and experience. 9. p. 95. He tells us that the *Circulus Venosus* is (pray observe) *SIX OR SEVEN Mathematical Lines distant from the Ligamentum Ciliare*, whereas the whole Eye does not much exceed seven Lines, and this Circle is almost close to the Ligaments. 10. He calls the *Arteries* of the Eyes *Fountains* in several Places, but what need is there of a new Name, and of multiplying Beings

ings without Necessity. II. p. 165. He calls the *Internal Angle of the Eye Canthus minor* which is contrary to our very Senses. I forbear to mention several other such Blunders which are observable in his Treatise. In his Invective Epistle against the Deservedly Famous Mr. RUYSCH, he fain would perswade his Readers that he who is a *Dutchman* never saw *Ruyssches Works*: But I very much doubt whether any will readily believe this Protestation, since they are every where to be had in *Holland*, and known to all the Learned.

Of the Insertion
of the Optic
Nerve.

(23.) p. 217. I think it proper to remark here *that the Optic Nerves do not enter the Eye in a place Diametrically opposite the the Pupill*, but in both sides more near the Nose, lest the Rays coming from the Objects should fall upon the *Nerves* themselves, and so be absorbed and perish. For it must be observed that this part of the Eye, where the *Nerves* enter it, is insensible which is evident from the famous Experiment of Monsieur MARIOTTE in his Treatise of Vision. Therefore many Objects wou'd be Invisible if the *Nerves* enter'd directly opposite the *Pupill*, which Disadvantage is obviated by the Insertion of the *Nerve* on the inside of the *Optic Axis*, that we may not be sensible of such a Defect in our Eyes.

(24.) p. 231. The celebrated *Ravinus* ^{Of the Ravi-} places this hole which some call *Hiatus* ^{an Aperture in} *Ravini* in that part of the *Tympanum* ^{the Membrane} of the Drum. where the *Chorda* is situated, and the Handle of the *Malleus* join'd to its little Head as *Teichmeyer* who was his Pupil and Auditor marks it out, and illustrates it with a Figure in his *Anthropologia* lately published, which Book came to my Hands when I had almost finished this Compendium. Others describe this hole in another place, and often in another manner: Mr. *CHESELDEN*, who is one of the latest Anatomical Authors, affirms ¹ that the *Membrana Tympani*, which is extended upon almost a circular *Bony Ridge*, is left so much open as this wants of a Circle; yet he confesses that this Aperture is various in different Persons and in some it has been left so open that they have been able to blow out a Candle by forcing the Air from the Mouth thro the *Tuba Eustachiana* and the External Ear, and that he had seen a Man smoke a whole Pipe of Tobacco out this way, and that this Man could hear very well. But he mentions not whether he performed this thro' one only, or thro both Ears.

As for my part I willingly confess that I never had a certain view of that Aperture, nor could I ever discover it, al-

tho' I made strict search for it in a very considerable number of Humane Ears, as also in those of Beasts; I also keep by me such *Membranes* fixed in their Natural Situation which have been taken from Humane Subjects, but these are very perfect, nor can I find any the least *Aperture* in them. I know also that the Famous R U Y S C H and R A V I U S, whom all will allow to be very much conversant in *Anatomical Dissections*, have very often made Researches but in vain for such an *Aperture* in the *Membrane* of the *Drum*.

I indeed also saw a Man *who cou'd transmit the Smoke of Tobacco from his Mouth thro his Ears*. But he by violent Strokes which he received when he was a Boy, had been made Deaf: Therefore there was reason to suspect that the *Membrane* of the *Drum* had been broken. But I never yet cou'd find any one who had his perfect hearing that cou'd perform this, altho there have been many and frequently of the Students in Physick who for experiment sake have often attempted this with the utmost of their Power. Hence I think it is undeniable *that this Meatus or Aperture, if any such there be, is not in all, but wanting in most*, otherwise a far greater Number would be found who cou'd do the same. Nevertheless because some (and of these a considerable number) can perform the same

as several Authors testify; *I am of opinion that this Aperture should not at all be denied.* However it is very much to be desired that *Anatomists* would make further and more diligent enquiries into the matter, that the truth and constitution of this passage or hole may be made to appear in a proper light.

I understood by some who attended RAVINUS's Lectures, that that great Man was wont to demonstrate this *Meatus* by thrusting a Hogs Bristle thro the *Membrane* of the Drum in the place above mentioned, but that he could not discover it by sight. I also tryed the same Experiment after the same manner, and found that the Bristle had a passage that way: But I always was doubtful and continue so still whether the Bristle went thro a natural *Meatus*, or rather thro a new *Aperture* which it had made on so fine a *Membrane*, for the Experiment had not the desired success, without such a remarkable pressure as was capable to force a passage thro any other part of the *Membrane*.

(25.) p. 231. Concerning the little Bones of the Bones of the Ear; it will be proper to remark of the Ear further, viz. that the famous TEICHMEYER in his *Anthropologia* already mentioned, numbers six in each Ear; and besides the four commonly taken notice of, describes two more, and represents

B b

them

them fig. 14 and 15. He affirms that the first of these by him called *Lenticulare* is situated like a little *Sesamoide* Bone between the *Malleus* and *Incus*, and join'd to them by *Ligaments* in order to make this *Articulation* the more perfect. That the other or sixth little Bone, adheres to the End of the Tendon of the Muscle of the Stapes; and that this Muscle is not inserted in the Head of the Stapes as is commonly believed, but in this little Bone which is of an Oval Figure and *laterally* connected with the Stapes; and that this has been taken notice of before by VESLINGIUS, but that the other has never been observed by any.

That which adheres to the Stapes is easily found in Calves, and has not only been long since delineated by COWPER¹, but always Demonstrated by me also in my Lectures. However because it cannot be discovered in Humane Bodies, I have hitherto omitted it in the Number of the little Bones of the Ear. But for the future I shall take more particular care in examining, whether the other, which is situated at the *Articulation* of the *Malleus* and *Incus* can be found in a Humane Subject, for in those Organs of hearing taken from such Bodies which I

¹ Mytom. Reform. fig. ix.

keep by me, I neither can see nor observe any such thing. SCHELHAMMER indeed observed such little Bones in Beasts¹, but never could make any such discovery in a Humane Body. I have already delivered my thoughts of the *fourth little Bone call'd Orbiculare*, p. 16. for if the *Epiphyses* are to be reckoned in the Number of distinct Bones, then the *os Femoris* should not be accounted one, but be divided into five different Bones.

(26.) p. 128. Because the Book, in which this singular reptile Course of the *Auditory Nerve* is described, is rarely to be met with in these Parts, and perhaps in many others, and is even omitted in MANGETUS's *Anatomical Theatre*, I therefore thought that it would be no unacceptable Entertainment to the curious Reader, and those who have an Eager desire to enquire into this discovery, if I should insert a Translation of the whole Description, and because there was some vacant space in the second Table I have also thought it proper to add the Figure which may be seen under Number 21.

The Title of the Book is — LETTRES Simon Celli-
us's Distributi-
on of the Ner-
ves.
G. DESNOVES *Professeur d'Anato-*

De Auditu. p. 41. &c.

B b 2

mic

mie & de Chirurgie, de L' Academie de Bo-
logne; & Mr. GUGLIELMINI Professeur
de Medecine, & de Mathematiques de l'
Academie Royale des Sciences, & d'autres sca-
vans sur différentes Nouvelles decouvertes. A
Rome MDCCIV in 8vo. In which MASTI-
CHELLUS a Roman Physician describes the
Auditory Nerve in the following manner.
 " The *Auditory Nerves* which spring from
 " the *Medulla Oblongata*, enter the hole
 " of the *os Petrosum*, and after the *Por-*
 " *tio Dura* has retired from the *Portio*
 " *Mollis*, the latter passes thro' a little
 " hole which is formed by the Central
 " Line of the *Cochlea*, and from thence it
 " goes out thro' a small orifice which ascends
 " upwards from a straight Basis. Besides
 " these, in the upper part are not only
 " the small holes that are scarcely per-
 " ceptible, which *VALSALVA* demon-
 " strated, but a certain *Meatus* also, into
 " which a Bristle may be thrust: Thro'
 " this a free passage is given to the *Por-*
 " *tio Mollis* appearing now in the form of
 " a filament, which is enlarged in the be-
 " ginning, as in its Center, is lengthened
 " out in its Progress, and winds it self as
 " in a circuit thro the *Spiral Cavities* of
 " the *Cochlea*, of which we have discours'd
 " already. But after it descends to the
 " End of the Basis, it passes thro' a little
 " hole to the *Vestibulum*. In this Place,
 this

“ this soft and Nervous Substance is in-
“ volved in a certain *Mucous Substance*,
“ and by different Windings proceeds gra-
“ dually to the very arch of the *Laby-*
“ *rinth*, where assuming again the form
“ of a soft and *Nervous filament* it im-
“ mediately enters a narrow Orifice of a
“ very small Canal, and passing thro’ its
“ Cavity, it returns thro’ the proper Orifice
“ of a little Channel, and after it has pass’d
“ thro’ this Cavity, it afterwards goes out
“ through a great Orifice of the same Arch.
“ From hence it enters the proper Orifice
“ of the small Canal, and goes out again
“ from the common Orifice of this Arch,
“ thro’ which it enters a second time in-
“ to the great Canal and passes out a-
“ gain thro’ the proper Orifice, and at the
“ length goes from the *os Petrosum* thro’
“ one of the holes which open trans-
“ versely into the *Vestibulum*, and in re-
“ turning into the Scull it insinuates it self
“ into the Brain, but while it penetrates
“ this, it expands it self into Branches,
“ and joins it self to many other small
“ Branches, as may be observed in the
“ *Venous* and *Arterious Ramifications* in
“ the *Dura Mater* in the upper surface
“ of the Brain, about the *Glandula Pineal-*
“ *is*. — That the Circuit of this *Nerve*
may be the more easily understood, con-
sult the Figure (Tab. ii. f. 21.) which
B b 3 shews

shews the *Nerve* apart, and separated from the *Bones*, that thereby it may be observ'd how it pass'es thro' these *Cavities*. This is the Description of this *Nerve*, whose wonderful Circuit *MASTICHELLIUS* informs us was discovered by *SIMONCELLUS* a *Roman Surgeon* and *Anatomist*; by which he principally intends to demonstrate that the *Portio Mollis* of the *Auditory Nerves* runs thro' the *Cavities* of the *Cochlea* and *Labyrinth* neither in the form of a *Membrane* (as is commonly thought,) nor that of *Zones* (according to *Valsalva's* opinion,) but in the form of a soft *Nervous filament* which at length returns to the *Brain*. He tells us also that *Simoncellius* will in a short time publish this, and several other curious Observations on the *Ear* in a particular Treatise, and that the *Copper Plates* are already finish'd, which Promise altho made *An. 1705* has not as far as I know been as yet performed. Without all manner of doubt this Description of this *Nerve* will to many appear intricate, altho great care has been taken in Translating it from the *French*, for even in the *French* 'tis so very obscure that I believe there are but few who can rightly understand the meaning of the Author.

Of the *Aorta*. (29.) p. 236. Many *Anatomists* and *Physiologists* divide the great *Artery* into
its

its ascending and descending Trunk after the same manner as the *Vena Cava* is divided. But in Humane Bodies this *Artery* is situated after another Manner. For after it has risen with one Trunk about three Fingers length, it bends in the form of a Bow, and marches downwards thro the *Thorax* and *Abdomen*, and is called, from the place of its Inflexion towards the lower parts the *descending Trunk of the Aorta*, from which are derived all the *Arteries* of the lower parts. In Humane Bodies commonly *three remarkable Branches* ascend upwards from the Superiour part of the Bow, the Right of which is afterwards divided into the right *Subclavian* and *Carotide*, but the middle constitutes the left *Carotide*, and the third the left *Subclavian*: Which afterwards are distributed to the whole Head and Arms. I have sometimes found, (but this rarely happens,) four ascending Trunks in a Female Subject, the right and left of which constituted the two *Subclavians*, and the two middle both *Carotides*, which Heart together with these Vessels fill'd with Wax, I keep preserved in Spirits. But it seldom or ever happens *that we find only two descending Trunks in humane Bodies*, and much less only one, wherefore the *Aorta* cannot be divided into the Ascending and descending Trunk. Indeed in Dogs, Calves

and other Beasts, we for the most observe only one remarkable ascending Branch from which I suppose this Error has taken its rise: But this has commonly another ascending Branch nigh it.

Of the Moti-
ons of some
Muscles.

(28.) p. 194. It must be observed here that many *Muscles*, considered separately, perform other Uses also than what are ascrib'd to the whole Pair, or are perform'd by the whole Pair acting together. So the *Muscle Mastoideus*, *Rectus major*, &c. when they act on both sides together, they bend the Head straight forwards; but when on one side only, they pull the Head obliquely downwards and to one side. Hence from the diversity of the *Muscles*, which act either alone or in Conjunction with their Partner or with others, many other Motions arise which are middle and different from the Primary or Principal Motions, which is observable not only in the *Muscle of the Head*, as well *Flexors* as *Extensors*; but in many others also, but especially in the *Muscle of the Eyes*, *Lips*, *lower Jaw*, *Tongue*, *Neck*, and *Carpus*, &c. otherwise there would be no possibility of understanding the various and admirable motions of the Parts.

Of the Vesi-
cles of the
Kidneys.

(29.) p. 172. We add the following Considerations to what has been already proposed p. 171 and 172. concerning *Littrius's* famous Observation on the Kidneys

neys of a Fætus which he found Vesicular, and full of little Bags, by which many believe that it is *plainly demonstrated that the Substance of the Kidneys in a Natural State is Vesiculous.*

1. That these were monstrous and very different from the State of Nature, appears as I think very evident in that the *Ureters* not only near the Kidneys, were about an Inch breadth entirely solid or closed by a Coalition of the sides, but the sides also of the very *Pelvis* were found concerted or grown together, which demonstrates a State altogether preternatural, not according to Nature.

2. Altho *Littrius* has deduced from this Observation eight *Conclusions* or *Inferences* to prove the Substance of the Kidneys *Glandulous*, yet he appears to me to have omitted one which might be drawn perhaps with greater appearance of Reason from the same Observation. Namely that the Humane *Fætus* does not so absolutely stand in need of the Excretion of *Urine* in the Womb, and consequently has no such occasion for the *Allantois* as many have thought. For this *Fætus* cou'd arrive to perfection without the Excretion of the *Urine*, (for the *Fætus* was nine Months enclosed in the Womb, and ex-

cluded at the due time, but in hard Labour in which it died,) may not the same happen in others? For as *Littrius* affirms, the *Pelvis* and *Ureters* were so solid and concreted that they did not yield a passage to the most subtile fluid, nor to Air or Wind, and much less as himself says, cou'd they transmit the *Urine* which is a far grosser Liquid. Therefore in this *Fætus* no *Urine* passed, nor cou'd pass either into the Bladder *Urachus* or *Allantois*. But *Littrius* is of opinion, that the *Vesicles* of these Kidneys which he found full of *Urine* prove that there is a Secretion of *Urine* in the *Fætus*; and consequently that the *Fætus* either evacuated the *Urine* into the *Allantois*, or discharged it thro' the *Urachus* into the said *Membrane*. But I think neither of these is a just Inference. I take it for granted that there is some Secretion made in the Kidneys of a *Fætus*, but it has not as yet been demonstrated that this is so very large that it cannot be all contained in the Bladder *Ureters* and Kidneys. For if we consider the Kidneys figured by *Littrius*, we may easily judge that the whole quantity of Liquor contain'd in these *Vesicles* of the Kidneys did not exceed one Ounce, and that nothing more was secreted in this *Fætus*, appears evident from the Coalition of the sides of the *Pelvis* and *Ureters*.

Ureters. But since the Humane *Fætus* can easily contain a quantity of *Urine* considerably larger in its Bladder, which according to the proportion of its Body is large enough, as also in the *Ureters* and each *Pelvis*, and that *Fætus* arrived to perfection without any other Disorder in Body than that in his Kidneys, and yet there was no Excretion made into the *Allantois*, I am perswaded it may appear manifest that this Excretion into the *Allantois* is not absolutely necessary in other *Fætus*'s. Therefore until the *Urachus* be far more frequently found pervious in the Humane *Fætus*, and the *Allantois* be more certainly and clearly demonstrated than has been hitherto, it is not I think to be admitted at least ordinarily in a Humane *Fætus*. For there is no manner of doubt but that the same Canals, whatever they were, thro' which all the *Urine* was excreted in *Littrius's Fætus*, excepting that small quantity which was contained in the *Renal Vesicles*, may also grant a passage to the *Urine* in other *Fætus*'s. For if it be not absolutely demonstrated, yet it appears to me very reasonable from that Coalition of the *Ureters*, besides the abovemention'd reason, that the Author of our Being has been pleased to free Women, who are supported only by two Feet, from the Burthen of the *Urine* which in Cows is indeed

deed very great, and to transmit the Urine together with the Blood thro' the *Umbilical Arteries* to the Blood and Kidney of the Mother, least Women with Child should upon every slight occasion be exposed to Falls. Lastly that all the particulars which *Littrius* has delivered concerning these Kidneys, did not appear so plain and perspicuous in them, as they are represented by the Author in the fore-mentioned place, may be manifest from the Remark or Judgement which *Monsieur Fontenelle*, Secretary to the Royal *Academy of Sciences*, makes upon the Case, when he says ¹: How Tumid or distended soever the Kidneys were in which D. *Littrius* made his observations, yet he was obliged to make use of a Microscope to assist him in the Discovery of the greatest part of those particulars which he has remarked in them.

¹ *Histor. Acad. Reg. Scientiar. An. 1705. p. 5. 8 & 99.*
Edit. Amstelodamens.

THE
EXPLICATION
OF THE
Tables and Figures.

I have added to this Compendium of Anatomy some Figures of the new Anatomical Observations, which excepting two, are not as yet to be found in other Anatomical Authors; but most of the others are taken from our own Observations.

T A B. I.

Fig: 1. Shews the *Malleus* of a Humane Ear with the *Ravian Process*.

a The little Head of the *Malleus*.

b Its *Handle*.

c The lesser *Apophysis*.

d The *Apophysis Raviana* or the longest.

The *Figure* immediately below, is the same *Malleus* delineated by a Microscope, that every thing may be more discoverable where the Capital Letters A B C D. shew the same as in the former. It

It may be proper to be observed here that this *Apophysis* or *Processus Ravianus* always appeared to us as if it was no true Bone. For it is flexible and elastic like the smaller Spines of Fishes, so that if any pressure be made in the point, it bends and yields, but if the pressure be taken off, and the point relax'd, this *Apophysis* returns to its former State, which kind of flexibility I have not, as far as I can remember at least, found in other Bones.

In the next place I could divide it at the End when fresh, and some times also when somewhat hardned, with a Pin or Needle into various little *Fibres*, as Hairs are split in the point, or as a *Tendon* a little hardned, which I first saw with the famous *Ruyfch*, so that it is more like the hardned *Tendon* of that *Muscle* which is inserted there, or the Spine of a Fish than a true Bone. Most of such processes which I examin'd with a Microscope, about the Angle E were found to be Cartilaginous, but the other from the Angle E to D was more bony and in appearance a peculiar Bone. And hence I suppose it happens that it is so easily broken in the Extraction of the *Malleus*, so that hitherto this *Apophysis* or rather *Epiphysis* has either been omitted or not discovered by *Anatomists* especially those who have treated particularly of the sense of Hearing and the Humane Ear.

Fig.

Fig. 2. Shews the lower part of the *Os Femoris* with the two little *Sesamoide Bones*, not as I remember as yet delineated by other *Anatomists*.

A The *Os Femoris*.

B The Internal *Condyle*.

C The External *Condyle*.

D The *Os Sesamoideum majus* or greater of the two, situated in a remarkable Cavity of the External *Condyle*, which I have seen far greater in another Subject.

E The *Officulum Sesamoideum minus*, or less *Sesamoide Bone* in the Internal *Condyle*, which is found but very seldom, but the former more frequently.

Fig. 3. Shews the *greater Sesamoide Bone* apart from its Cavity in the External *Condyle*.

Fig. 4. Demonstrates the *lesser Sesamoide Bone* of the Internal *Condyle*.

Fig. 5. Shews the Bones of the little Finger.

A The Bone of the *Metacarpus* with which it is articulated.

B The first *Phalange* of this Finger.

C The *Os Sesamoideum*, which is very often found between the Junction of the Bone of the *Metacarpus* and the little Finger. This is often found somewhat greater than

than this represented here, sticking in the *Tendon* of the *Abductor* of this Finger.

Fig. 6. Shews the right part of a Humane Stomach inflated and dry'd with the *Valve* or large Circular *Membrane* which is found in its right Orifice call'd *Pylorus*.

A A A The right part of a Humane Stomach inflated.

B B B Part of the *Duodenum* opened and turned back.

C D The *Valve* of the *Pylorus* or Circular *Membrane* constituting the *Pylorus* sufficiently large, and in its Natural Situation, as it appeared in this Subject.

E The *Aperture* into the Stomach.

From this Figure it evidently appears first that the *Pylorus* has not an Horizontal Situation as tis commonly represented by WILLIS in his *Phamac. Rational*. VERHEYEN in his *Anatomy*, and others, but an oblique; and indeed so placed that this right side C descends obliquely downwards towards the left side D. Secondly that the *Pylorus* does not only consist of a Series of Circular *Fibres* surrounding this Orifice of the Stomach as it is commonly describ'd, but of a pretty large *Membrane* two and sometimes three lines broad which fills up this Orifice

Orifice, and therefore prevents the undigested Aliments from passing too speedily into the Intestines. However it must be observed that this *Valve* is not of the same magnitude in all Subjects, for in some it is far less and scarcely one Mathematical Line broad. On the contrary it is often found somewhat greater, and I have by me a Stomach in which the Magnitude and Figure of the *Valve* is such as is represented by F and G, in which the part G is narrower, but the part F which is the upper is larger.

Lastly, we remark that the like Figure which we communicated to the *Ephemerides* was by a mistake of the Ingraver inverted. *Cent. v Tab. ii. fig. iv. p. 158.*

T A B. II.

Fig. 7. Shews a part of the Gut *Ileum Cæcum* and *Colon* with *Bauchin's Valve of the Colon*. We have already given various figures of this *Valve* in our Dissertation on the *Valve of the Colon*, and have represented in particular two remarkable Diversities in the same Treatise Tab. i. ii. namely one where all these parts are very large, and the other in which they are very narrow. But here we exhibit one which is of a middle size, and as it is more frequently

quently found: that notwithstanding these differences it may be known that there really is such a thing as *Bauchin's Valve of the Colon* at the End of the *Ileum*, and that it is not feigned and suppos'd, as *BIANCHUS* affirms in *Mangetus's Theatrum Anatomicum*.

AA The Gut *Ileum* ascending obliquely to the *Cæcum*, and insinuating it self into the left side of this *Intestine*.

B The *Cæcum*.

C Its *Vermiform Processes*.

DDDD Part of the *Cæcum* and *Colon* opened that their Inside may be view'd.

E The *Aperture* of the *Valve* of the *Ileum* into the thick Guts.

F The upper part of the *Valve*.

G The lower part of the *Valve*.

HH The *Membrane* supporting this *Valve* (or rather these *Valves*) on each side, which may be call'd its *Ligaments* or *Bridles*.

III The various *Connivent Valves* of the *Colon*.

Fig. 8. Shews the **LACTEAL VESSELS** as I lately observed them in Humane Bodies. vid. p. 334.

AAA Part of the Gut *Jejunum* with its Wrinkles or Folds transparent.

BBB

BBBB The Roots of the *Lacteal Vessels* forming many *Inosculations*, the Number of which *Vessels* appeared here far greater than is usually observable in Dogs.

CCCC, Their Reptile Course which here is also far more frequent thro the *Mesentery* where they communicate with one another by frequent *Inosculations*, and privately enter the *Glands* of the *Mesentery* and partly pass over them.

DDDD The larger *Glands* here and there in the *Mesentery*, besides which there are several smaller observable up and down.

Fig. 21. Which we have placed here because of the conveniency of the Space : Shews the Distribution of the *Auditory Nerve* thro the *Labyrinth*, as it is represented in *Novesius's* Epistles see the Note. p. 371.

A The *Auditory Nerve*.

B Its Distribution in the form of a Thread thro the *Cochlea*.

C Its Progress thro the *Vestibulum*.

D Its Winding thro the *Semilunar Canals*:

E Its Extremity returning to the Brain, and distributed to it in numerous small Branches.

T A B. III.

Fig. 9. Gives a triple Scheme of the *Tortuosity and Valves of the Ductus Biliaris Cysticus*, with a part of the Gall-Bladder, as I observed it in divers Subjects.

- A A Part of the Gall bladder open.
- B Its Extremity which is very *Tortuous*, entering the *Cystic Duct*.
- C The *Cystic Duct* twisted like a Rope, having within *several Spinal Valves*.

Fig. 9. D. Another Gall-bladder.

- E Its Extremity and sigmoide inflexion.

FF The *Ductus Cysticus* opened shewing the *Spiral Valves* formed after another manner than in the former Figure.

Fig. 9. G. The third Gall-bladder.

- HH Within it has various little Cells, and transverse, straight and oblique, little *Membranes*; all which are perforated or patent for the passage of the *Bile*, which give a passage to Air, but did not admit the Style into the *Bladder*. vid. p. 348.

These

These *Valves* have been hitherto neglected by most *Anatomists*, but I believe were they more frequently search'd for, they wou'd be oftner observ'd, because in most Bodies which I have dissected, I found some thing *Valvulous* but always with some diversity.

Fig. 10. Shews one of the *Tubæ Fallopi-
anæ* from D R A K E, whose Vessels are
fill'd with Mercury and Air to demon-
strate their Progress in one of the *alæ*
Vespertilionum together with the *Reticular*
Distribution of the Veins in the Parietes of
the Tubæ, and its Expansions or Foliage,
whereby these Parts, in the Act of Ge-
neration, are distended, erected and ren-
der'd capable each of embracing the
Ovarium on their own side, as well for
conveying the *Semen Masculinum* from
the *Uterus* to the *Ovarium*, as to trans-
mit the Impregnated *Ovum* from the
Ovarium to the *Uterus*.

A That Part of the *Tube* next the *Uterus*.

B Its other Extremity which is a little
contracted before it makes its *Folia-
ted Expansions*.

CC Its *Foliage* or *Membranous Expansi-
ons* distended with Wind.

D The Orifice of this Extremity dilated.

E The *Ala Vespertilionis* of this side with
its

F Veins and Arteries from the *Hypogastricks*.

G The Veins making a Cavernous or reticulated Body on the sides of the *Tube*.

Fig. II. Shews also one of the *Fallopian Tubes* with its Veins fill'd with Mercury which I prepared in a publick Dissection last *January*, in which the Distribution of the Veins appeared very different from, and more beautiful than the *Tube* delineated by D R A K E.

A The part of the *Tube* next the *Uterus*, ty'd with a Thread lest the Mercury should rush into the *Uterus* and *Hypogastric Vessels*, and thereby hinder the *Tube* from being perfectly fill'd,

B The other Extremity in which

bb The *Foliage* or *Membraneous Expansions* entirely fill'd to the very Extremity, with small but conspicuous Vessels which could not be represented by the Painter so beautifully as they appeared to the Eye.

D The Orifice of this Extremity.

E One of the *Alæ Vespertilionis* or part of the broad *Ligament* of the *Uterus* which at first sight was crouded with Vessels full of Mercury, but while the Painter was sent for, the Mercury ran out thro a little hole, and therefore the Distention of the Vessels fell.

F

F A Vein into which Mercury was injected springing from the Spermatic of the *Uterus*.

G Its greater Divisions.

HH A remarkable Branch marching parallel as it were with the *Tube* of the *Uterus*, almost in the same manner as the Veins of the *Intestines* in the *Mesentery*, from which parallel Branches spring.

II Numerous Branches marching to the *Tube*, almost like the Vessels in the *Intestines*, and filling it with such a Number of small branches, that the whole *Tube* seem'd to be made up of mere Vessels, for they were as Numerous as the Vessels which are represented by R U Y S C H in the *Pia Mater*, Heart and the other most Vascular Parts, which *Tubes* nevertheless have been generally delineated by Authors without Vessels. Therefore tis no wonder if those parts can be distended and erected in coition by the copious quantity of *Blood* that rushes into these Vessels.

Fig. 12. Shews the *Liver* of a *Fetus* new Born.

AA The Liver.

B The lower concave Part of the Liver, in which are various inequalities,

C c

C

- C The Gall-bladder
- D The *Umbilical Vein* marching with one Trunk from the Navel to the Liver.
- EE The Sinus of the *Vena Porta*, into which alone the *Umbilical Vein* inserts it self with one Trunk.
- F The Trunk of the *Vena Portæ* cut off,
- G Principal Branches of the Sinus of the *Vena Portæ* distributed to the Liver, which become conspicuous if the Liver be but slightly scrap'd.
- H The Trunk of the *Vena Cava*.
- II The *Canalis Venosus* or *Ductus Venosus* opposite the Insertion of the *Umbilical Vein* springing out of the Sinus of the *Vena Portæ*, and inserting it self into the *Vena Cava*, which Canal transfers straight into the *Vena Cava* and Heart, a great and perhaps the greatest part of the Blood convey'd to the Liver of the *Fætus* thro the *Umbilical Vein*: But after birth it gradually dries up.
- K The Place where the *Umbilical Vein* is inserted into the Sinus of the *Vena Portæ* with a single Extremity not a double as is reported by VERHEYEN and others.

Fig. 13. Shews the *Diaphragm* which I lately had delineated from a Humane Body. Because *Verheyen's* and *Mangetus's* Figures

Figures represent it inverted; by which Readers, especially young Students, may be easily deceived.

A A The upper *Muscle* of the *Diaphragm* springing from the *Sternum* and *Cartilages* of the *Ribs*.

B B The lower *Muscle* as if it were double.

C Its right and longer *Tendon*.

D Its left and shorter *Tendon*.

E E The *Tendinous Part* or *Tendinous Centre*, to which the upper part of the *Pericardium* adheres.

F The Hole thro which the *Vena Cava* passes.

G The Hole thro which the *Œsophagus* descends to the *Stomach*.

HHH The *Diaphragmatic Vessels*.

I The Place or distance between the two Heads of the lower *Muscle*, where the great *Artery* descends from the *Thorax* into the *Abdomen*; and where the *Ductus Thoracicus*, and often the *Vena Azygos* ascend from the *Abdomen* into the *Thorax*.

T A B. IV.

Fig. 14. Represents the *GLAND THYMUS* from a Humane *Fætus* new born.

A A The *Heart* enclosed in the *Pericardium*, to which the *Thymus* in a great Measure adheres,

B B The

- BB** The *Gland Thymus* as it appeared in this *Fœtus*, divided into two as it were in the lower part, but into three in the upper part. Whose parts, a a, adhere to the upper part of the *Pericardium*; the middle part, b b, to the Trunk of the *Aorta*, but the upper parts, c c c, lye on the beginning of the Ascending branches of the *Aorta*.
- CCC** The three ascending Branches of the *Aorta*.

Fig. 15. Shews the difference of this *Gland* from another *Fœtus*. Several instances of this kind might be produc'd, for it varies as well in Figure as Magnitude almost in every Subject.

- A A** The upper part of the Heart enclosed in the *Pericardium*.
- B B** The *Gland Thymus* divided above, into two parts, a a, below only slightly excavated, b.
- CCC** The ascending Branches as in the precedent: vid. p. 173. and 32c.

Fig. 16. exhibits the *Cerebellum* from a *Humane Subject*, in which its Divisions into Lobes, which have not as far as I know been describ'd by others, are beautifully demonstrated.

a a a a

a a a a The *Cerebellum* cut perpendicularly in the middle and into equal parts.

B B B The Interiour *Cortical* and *Medullary* Substance.

c c c The *Medullary Tracts* not so thick nor so short as they are commonly figured.

d d d d The Divisions of the *Cortical* Substance, first into larger *Lobes* which are divided into lesser, and at last are every where beautifully subdivided into very small ones, so that every greater Lobe has its own peculiar *Medullary* Branch, and every less and even smallest Lobe has also its own little branch of the *Medullary Substance*, each of which is distinct from one another: yet at length all unite again near the *Medulla Oblongata*. These Divisions and little Lobes cannot be duly shewn by Letters but they are easily comprehended by considering the Figure.

e e The *Medulla Oblongata*.

f f The beginning of the *Spinal Marrow*.

I have formerly proposed at large, the Method of preparing with Spirits of Wine and rendering this Structure very visible in *Ephemerid. Natur. Curios. Cent. v. p. 157.*

Fig.

Fig. 17 Shews the *Cerebellum* of a Calf divided also vertically in the middle, with some Parts annex'd, that in it the little Lobes of the *Cerebellum* may be also seen, just as they are in a Calf.

aaaaaa The greater and principal little Lobes of this *Cerebellum*.

bbbbbb The chief Divisions of the little Lobes of the *Cerebellum*, commonly accounted one continued Substance.

cc The principal *Medullary Branches* from which innumerable smaller arise like little Branches of Trees.

dd The *Crura* of the Brain cut off.

e The *Chink* leading to the *Infundibulum*.

f The *Glandula Pinealis*.

gg The *Nates*.

hh The *Testes*.

ii The *fourth Ventricle* of the Brain or the *Calamus Scriptorius*, in the middle of which is the *Nib*; in the upper Part

k The *Anus* or Orifice to the *Aquæductus Sylvii*.

Fig. 18. Shews a fresh *Sow's Eye* frozen with cold, and dissected vertically, that the Situation of the three Humours of the Eye may be duely discovered.

aa The *Cornea*.

bbbbb

- b b b b The *Circumference* of the *Sclerotica* as also of the *Choroides* underneath and *Retina*.
- c The *Uvea* in whose middle is the *Pupilla* or *Sight*.
- d d The *Ligamentum Ciliare* inserted nigh the *Chrystalline* Humour.
- e e e The *Glassey* Humour filling up the back part of
- f The *Chrystalline* Humour in the *Sinus* or *Cavity* of the *vitreous*, suspended as it were by the *Ligamentum Ciliare*.
- g The *Aqueous Humour* between the *Chrystalline* and *Cornea*, where it may be observed that there is a greater quantity of the *Aqueous Humour* between the *Cornea* and *Uvea*, or that there is a far greater quantity of the *Aqueous Humour* in the fore, than in the hinder part, or between the *Uvea* or *Chrystalline*, where may be seen a part of this Humour, but 'tis by far the least, and scarcely the thinnest *Lamella*.

Fig. 19. Demonstrates the same things, but from a Humane Eye; in which also there is more of the *Aqueous Humour* before than behind the *Uvea*. But no other remarkable difference than that in Humane Bodies, the *Chrystalline* f is far less in Humane Bodies than in Hogs, Dogs, Calves, Sheep, Hares, and all other Beasts which I dissected on this account. Consult what has been said on this Head.

Fig.

Fig. 20. Exhibits a **HUMANETONGUE** with its three *Teguments*, which if I remember are not as yet delineated any where else.

A A A A The upper Surface of the Tongue in which the Papillary, Headed and Pyramidal Eminencies every where appear in sight.

B A Piece of the Exteriour Coat separated from the rest, and turn'd back, in which innumerable *Nervous Papillæ* are obvious to the sight adhering to its inner surface.

CC The second Coat of the Tongue call'd *Corpus Reticulare Malpighii*; thro' whose holes the *Nervous Papillæ* pass from the third to the first or outermost.

D The *Corpus Reticulare* separated from the third *Membrane* beneath, and turned back.

E E The *Membrane* or *Papillary Nervous Body*, in which innumerable *Papillæ* sprout out which pass out of this Body thro the *Reticular Membrane* to the External Coat.

FF The *Lingual Glands*, as also the *Papillæ* conspicuous in the back Part of the Tongue, which are far greater than the *Papillæ* in the fore part; the Number of which is sometimes greater and sometimes less.

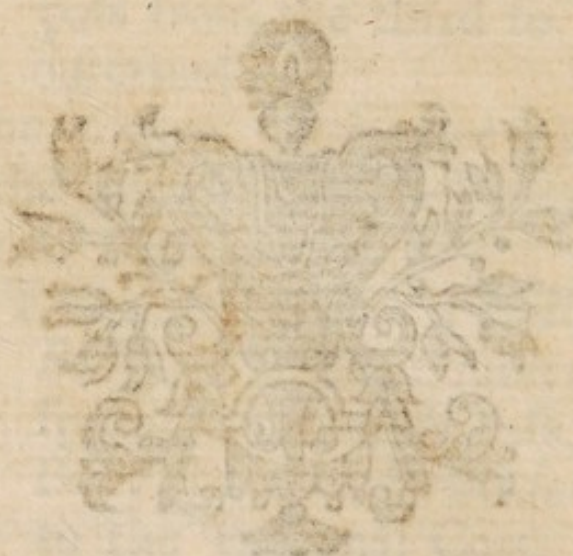
G The Hole which is often observable in the back part of the Tongue, the Figure of which is uncertain and doubtful; being sometimes round, sometimes triangular, and at other times oval. Its use is yet unknown. I did not find this hole in the last Subject which I dissected this last *April*.

Fig 21 Has already been presented in Tab. ii.



The Hole which is often observable in the back part of the Tongue, the Figure of which is uncertain and doubtful; being sometimes round, sometimes triangular, and at other times oval. Its use is yet unknown. I did not find this hole in the last Subject which I dissected this last April.

Fig. 21. Has already been presented in Tab. 1.





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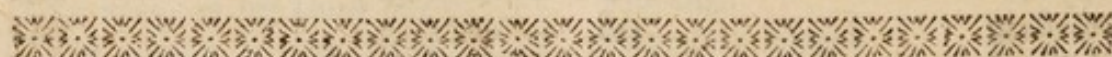
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E R R A T A.

PAGE 1. Line 3. For *Compend.* Read *Compendium.* p. 92. l. 1. f. *Ligaments.* r. *Ligament.* p. 101. l. 20. dele of. p. 102. l. 23. f. *Ligaments.* r. *Ligaments.* p. 165. l. 23. f. *Rectoral.* r. *Pectoral.* p. 184. l. 3. f. and. r. or. p. 231. l. 15. after the. r. bony. p. 277. l. 11. f. these. r. the. p. 280. l. 28. &. p. 281. l. 5. f. *Radius.* r. *Radiens.* p. 323. l. 25. f. *Red.* r. *Redi.* p. 326. l. 22. f. *Lilbrinus's.* r. *Littrius's.* p. 352. l. 27. f. *Spheric.* r. *Splenic.* p. 362. l. 5. f. *proving.* r. *proved.* p. 375. l. 28. f. *ever.* r. *never.* p. 377. l. 13. f. *concerted.* r. *concreted.* ibid. l. 27. after for. r. if.



