

**A sure guide; or, the best and nearest way to physick and chyrurgery
Being an anatomical description of the whol [sic] body of man, and its
parts, with their respective diseases In six books / Englished by Nich.
Culpeper, Gent. and W.R. doctor of the liberal arts, and of physick [i.e.
William Rand].**

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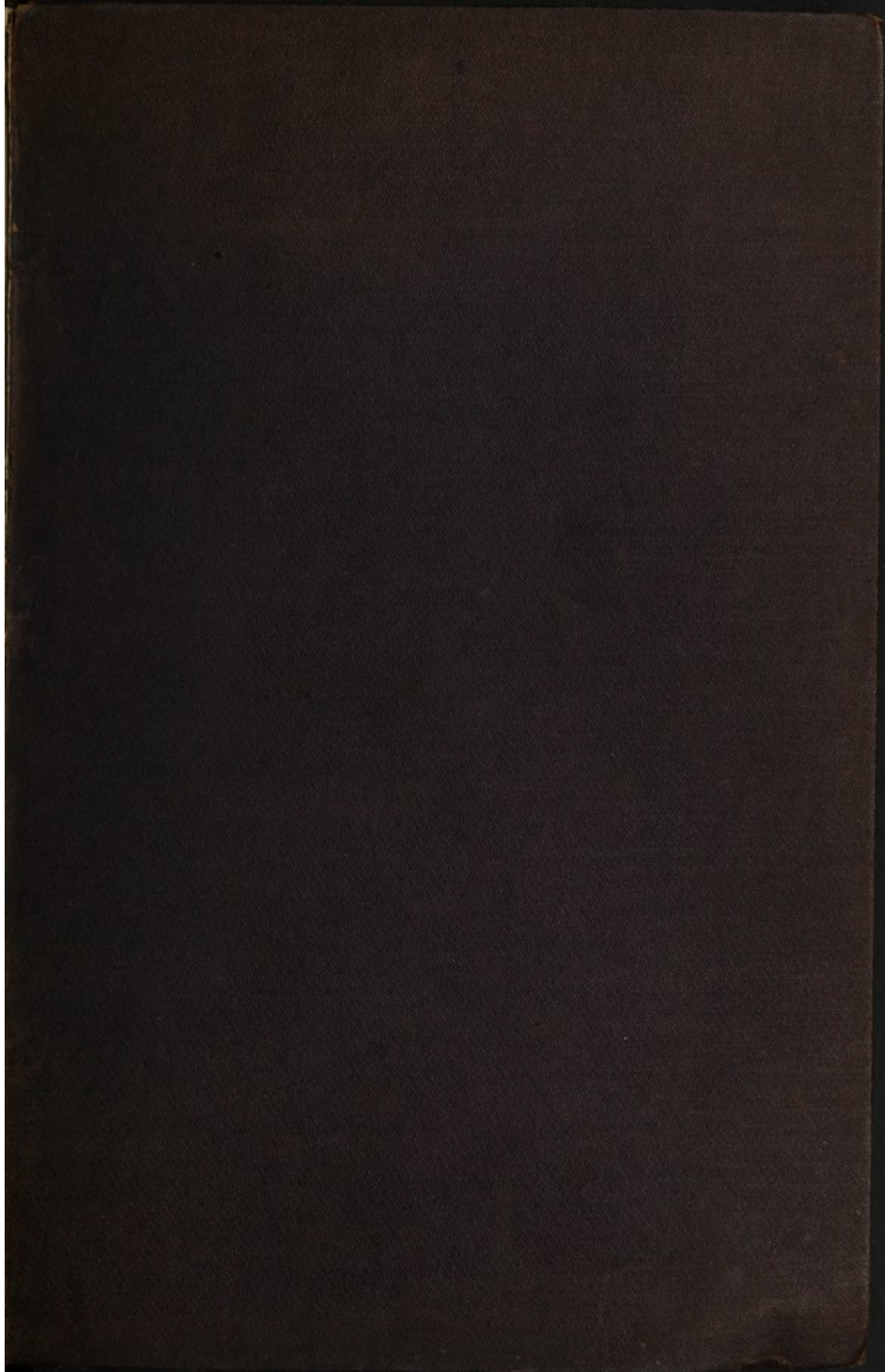
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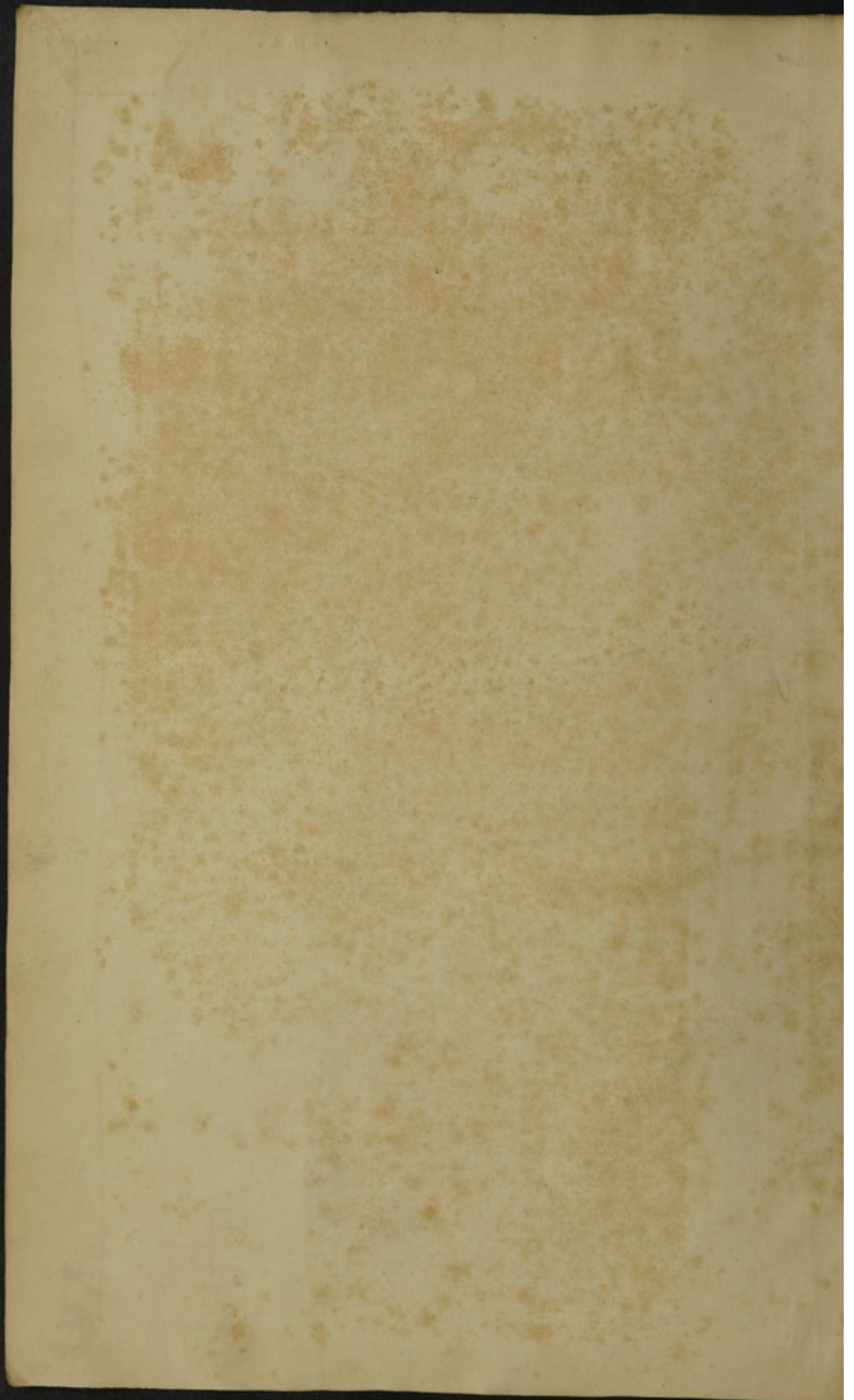
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A
SURE GUIDE;

OR,

The BEST and NEAREST Way

TO

Physick and Chyrurgery:

That is to say,

The *Arts of Healing by Medicine*, and
MANUAL OPERATION.

Being

An *Anatomical Description* of the whole
Body of Man, and its Parts, with their *Respective Diseases*, demonstrated from the *Fabrick* and *Use* of the said
Parts. In Six Books.

VIZ.

- | | | |
|---|---|--|
| 1 Describing all, and every of the
Bones of Mans Body, according to
the Antient Method. | } | 4 Describing the Head, and Face, with
all their Parts containing and Con-
tained, and their respective Diseases. |
| 2 Describing the Belly, and all its
Parts and Bowels, with their re-
spective Diseases. | | 6 Describing the Limbs of the Body,
with the many Regiments of Muscles,
and their Diseases. |
| 3 Describing the Chest and all its
Parts and Contents, with their
respective Diseases. | | 5 Containing a new Description of the
Bones, by a Method first invented by
our Author, handling all the Diseases
and Symptomes of the said Bones. |

At the End of these Six Books, is added twenty four Tables, Cut in Brass, containing one hundred eighty four Figures, with an Explanation of them; all which are referred to above a thousand places in the Books, for the Help of young Artists.

Written in LATIN, By *Johannes Riolanus*, Junior; Doctor of
Physick, Physician in ordinary to the *Queen Mother of France* many years to-
gether, and the last she had: And also the *Kings Professor* of Anatomy and Herba-
rism, in the University of Paris.

The Third Edition, Corrected and Amended.

ENGLISHED by *Nicholas Culpeper*, Gent. and *W. R.*
Doctor of the *Liberal Arts*, and of *Physick*.

London, Printed by *John Streater*, And are to be sold by *George Sawbridge*, at the
Sign of the BIBLE on *Luigate-Hill*. M. DC. LXXI.

SURVEILLANCE

OR

The Best and Nearest Way

TO

Physick and Chyrurgery

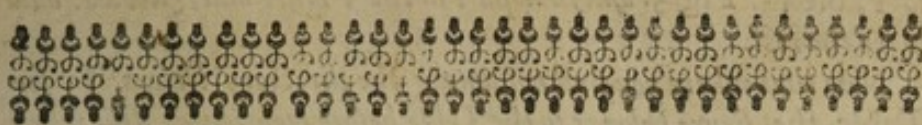
The Art of Learning by Experience, and
MANUAL OF THE

A Description of the Structure of the whole
Body of Man, and its Parts, with the
causes, symptoms, and cures of the
most common Diseases.


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To the Reader.

mong all the Variety of Books wherewith the world hath bin filled within this last Century, those tending to Philosophy whether Moral or Natural deserve the greatest reputation; Divinity consisting of too curious controversy, and History stuffed up with too great Partiality, onely the assertors of Philosophy especially natural (under which head we properly enumerate Physick with all its branches) instead of dubious Obs and Sols have illustrated their portions with more lucid observations: Nor hath any one part either of Physick or Chyrurgery bin handled with more exquisite Learning than this of Anatomy, and therein our Author hath not meanly merited whose labors make the following tract sufficiently famous; having obtained so great reputation, that it hath often bin Reprinted in most European Languages, and received with the highest applause of the Learned; and not without great reason, since it is no small step to the knowledge of the temper of a Mans body, to know the exact deliniaments thereof in an Anatomical way. And tis held as a Maxime, that a Physitian must know in what part of the body a disease lies, the quality thereof, and what relation it hath to any of the rest, before he can rightly apply a remedy.

In this Book you will find 24 Brass Cuts or Tables representing the several parts of the Body, each of which have their respective number at the uppermost corner. Each particular figure also is numbred and the number set over head, and the several parts of each Figure distinguished by Letters of the Alphabet for the more ready finding. But besides this you will meet with other marks, as for example, Chap. 8. pag. 9. line 21. The word Coronalis is marked with the letter ^a which directs you to the end of the same Chapter

To the Reader.

where you will find^a T. 15. f. 3. a. a. a. intimating that you must turn to Table 15. Fig. 3. and that part of the Figure marked a a a. and so for the rest.

Note that where you find not among the directory letters T. for Table, that figure belongs to the Table before mentioned. Also when you see this mark \square between two citations, you are to know the citation is ended.

The Authors name, if the Reader had no other impulse, were sufficient encouragement both to the purchase and reading of the work; being as famed for his learning as eminent for his preferments, having never conversed with other than the most Noble, and Ingenious Souls, who all admired his profound judgement. But what need we enlarge, when his works are able to praise him in the gates. Such as would not have truth presented in ingenious Schemes of discourse, do foolishly condemn the wisdom of the antients, and while they understand not the excellent use of their writings, they are sufficiently answered by the confession of their own ignorance: There are several spirits in the world, some will take a thing one way, some another; A Physitian will not quarrel with his Patient, because he refuseth to take the Pill unless Gilded, nor will we quarrel with any Reader whose want of judgment or misapprehension misguides him to the finding of faults only, but pitty him that his narrow capacities should so impotently desire that all others should be constituted after his size. And this is an ungrateful folly when men are unwilling that others should endeavor to further their good, because they could not prescribe the method or doing it; these should consider, that there are some in the world whose understanding outstrip theirs, and delight in such things as they contemn; if therefore you be pleased with what I have done, I shall not be discontented; but if you be profited too, then I shall believe that I have not labored in vain.

Farewell.



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A New Osteologia, or History of the Bones.

Wherein he Treats of the Bones, Ligaments, and Gristles of the whole Body, by which the Frame of the body is compacted together, the Muscles being removed; handling all the Diseases and Symptoms which happen unto the

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THE



THE
 FIRST BOOK
 OF
 ANATOMY
 AND
 PHYSICK,
 OF
 John Riolanus.

Chap. 1. *The Intent of the Author is Declared.*



Anatomy, is considered and handled two wayes, *Philosophically*, and *Physically*, *Galen, Lib. 1. Anat.* The Philosopher searcheth out the structure of the Parts, their action, and use, that he may know himself, and that the **Work-Master* may be admired in his work; and therefore the knowledge of the Parts alone does content him. But the Physitian, besides the knowledge of this, brings all into a *Practical way*, and searcheth after the Natural dispositions of every Part, that so by viewing the Anatomy of the Carcases of sound and sick men, he may more easily know the accidents against Nature; which happen to those Parts, in such as are alive.

The Consideration of Anatomy is,

Philosophical. (Viz. God)*

Physical.

By Dispositions against Nature, is to be understood Diseases, whose generation and end, whether it will be good or bad, the way and manner of Curing, he that would know exactly, must be skilled both in *Philosophical*, and *Physical Anatomy*; and I dare boldly affirm, that he will be an abler, and more skilful Physitian that is well skilled in this Anatomy, than he that contents himself, with the bare knowledge of the Parts.

Both which are necessary.

This manner of shewing, and teaching Anatomy is new, but gives great light, and is wonderfull necessary for a Physitian, and I will lay it down intermixed with the order of Anatomy in all the Parts, and shew particularly in every Part, what profit will thereby redound unto a Physitian, in his Practice. And seeing the

the Natural Constitution of every Part which *Hippocrates* calls *Euphonia*, and is commonly called *Health*, is three-fold, *Similar*, *Organical*, and *common*. The Preternatural Constitution of the Parts, called *Sickness*, must likewise be three-fold and make three kinds of *Diseases*, *Viz.* A disease of the *Similar*, a Disease of the *Organical* Parts, and a disease common to both. *The Similar Constitution*, according to Nature, consists in *Substance*, and *Temper*; *The Organical Constitution*, which pertains to the construction of the Organ, is placed, in *number*, *Magnitude*, *Situation*, and *Shape or Conformation*; which Conformation is again divided into *Figure*, *Passage*, *Cavity*, *Roughness*, and *Smoothness*; *The common Constitution of Similar, and Organical Parts*, consists in *Union and Connexion*. This three-fold Natural Constitution, I will declare in all the Parts; afterwards I will lay down in a few words, what may be gathered from this four-fold Constitution, for the Knowledge, fore-knowledge, and Cure of a diseased Constitution; and *Anatomy* handled in this Method, will be the beginning, Middle, and end of the whole Art of *Physick*. This is a short, easie, and clear method, Quickly, and rightly to learn the Art of *Curing*; which propounds the same, visible to the Eyes of such as are well vers'd in my Fathers writings, or in the *Institutions of Sennerius*, for by this Method, I shall unlock and display the treasures in *Anatomy* of *Physick*: But perhaps some Fool that is unskilled, will reprove our Design, and Object, that we confound the whole Art of *Medicine*, seeing *Anatomy* is a Part of *Physiology*, distinct from the rest; and therefore ought to be taught apart, seeing *Galen* himself, in the beginning of his dissection of *Muscles*, reproves the Anatomical Book of *Lycus*; because in his Treatise of *Muscles* he inserted the *Diseases* of the Parts. If any prettle such things against us, they will quickly hold their peace, if they read *Gal. Lib. 2. adiu. Anatom.* Relating, That Antient Physicians regarded *Anatomy* so much, that in all their Books of the Cure of *Diseases*, they inserted *Anatomy*; and thus we see with *Hippocrates* did in all his Books. Many are the sorts of the *Figures*, both within, and without the body, (saith *Hippocrates*, in *Lib. de vet. Med.*) *Which have much different qualifications in the sick, and the sound; all which you must perfectly distinguish one from another, that you may rightly know and observe the causes of every one of them.*

And Profitable
in Medicine.

According to *Aristotle*, *Health*, and *Sickness*, are the Fundamental Parts of *Medicine*: Both of them are contained in the Parts; and *Sickness* compared with *Health* is the better discerned. Aid to this, that *Aristotle* Writes, that he that would Cure the Eyes, must first know the structure of the Eye. Again, *Hippocrates* held, that *Diseases* were distinguished according to the Parts they were inherent in; and the principal Curative indications, were taken from the Affect, and the part affected; and Remedies both Medicinal and Chyrurgical were prescribed and administered diversly, according to the parts afflicted. Therefore *Galen* wrote his *Therapenticks* of the composition of Medicines, according to the parts afflicted; and *Avicenna* did wisely, when perceiving that the Seats of *Diseases* could not be known without skill in *Anatomy*, before the *Diseases* of the particular Parts he set down their *Anatomy*. And if we believe *Galen* in *Lib. de Part med.* The first Matter or Subject of *Medicine*, is the Body, as it is the Subject of *Health* and *Sickness*.

The Intent of
the Author.

Our intent then is by a short and easie Method, to deliver in writing, and demonstrate in dead Bodies of the seats of all *Diseases*, and Symptoms, both Internal, and External; and the particular way of Cure according to the order of *Anatomy*, which is publickly observed. A notable piece of Workmanship to learn *Physick* by, by which 'tis easie to manifest, and bring to light the Errors, in the Cures of *Diseases* and to instruct and inform such are Studious in *Physick*, by that time they have been hearers and beholders two years, of two *Anatomies* in a year, with diligent reading of Books, and exercise of the knowing of Plants, and other Drugs, and visiting of the sick with them that is their teacher. Excellently said *Johannes Fernelius* in the beginning of his *Pathology*. *I shall never think any man well skilled*

skilled in the knowledge of Diseases, unless he have been an Eye witness of the seats of them in the Body of man, and know how they are affected against Nature; neither can he come to this unless he be skilful and exquisite in Anatomy, and whatsoever he reads or hears, let him seriously contemplate it in the Body of man; and settle the chief knowledge of things in his mind.

Chap. 2. Why we begin our Anatomy with the Treatise of Bones.

THAT kind of stile is two-fold, which is used in the explication of any thing, Gal. Com. ad Part. 9. Lib. 1. de fract. & Cap. 1. Lib. Synops. de Puls. The first is called *Synopticus*, when the matter is briefly laid down; the other *Diagnosicus*, when it is Copiously unfolded, nothing being passed by which is profitable to be declared: The former helps the memory, the latter clears the matter to the understanding. For which cause Galen divided his Books into *Itagogical*, and perfect; the first being fitted to young beginners, the other to proficients, as himself testifies. Lib. de libris Propriis. This is also confirmed by the authority of Hippocrates; Lib. de vet. Med. Where he adviseth Physicians to teach easie things to young students, and such as may be quickly learned; add hereunto that all men desire to learn space, according to Aristot. Lib. 2 de Rhetor. Chap. 10. And the Method of brief teaching is alwaies grateful both to young students, and to perfect Masters; for it teacheth the former what things must be learned, and in the latter calls back to their memory what they have learned before and almost forgotten, Gal. Lib. 4. de diff. plus.

The Method of teaching double.

Wisely, and Elegantly, did the Emperour Justinian judge, That a compendium of the Laws was first to be propounded, to invite Novices to knowledge. Then are all things delivered most commodiously when they are first delivered by a plain and simple way, and then by an exact and diligent interpretation; for if we burden weak, though studious minds at beginnings, with variety and Multiplicity of things, we either make them desert their studies, or else put young Men to great labor and distrust, and bring them by a longer way to what might be learned with more speed, less labor, and no distrust.

Therefore following the precepts of Galen and Hippocrates, I will describe a brief and clear Manual of Anatomy, following the counsel of Galen, who had rather write a *Synopsis* of his Books of Pulses himself, then to leave the business to another, who by not understanding his mind and sense, should pervert or confound his meaning.

Why the Author wrote a Synopsis.

I begin with the Bones, because they are the foundation of all the Parts of the whole body, which is sustained, included, preserved, and moved by the Bones; which according to Hippocrates, give stability and form to the body.

Why he begins with the Bones.

Therefore he that is studious in Physick, ought to be instructed in the perfect knowledge of the Bones, before he come to behold the Anatomy of the whole body; otherwise he will be ignorant in designing the original, and insertion of the Muscles, and the sticking of other Parts to certain Concreptacles of the bones, unless he be skilled in the History of bones; at which Anatomy is to begin, as Hippocrates taught, and after him, Galen.

The necessity of writing of the Bones.

Chap. 3. *The Division of Osteology, or the History of the Bones.*

The Parts of
Osteology.

THE History of the Bones is called *Osteology*, of which are two Parts; *Practice*, and *Theory*. I call that the *Theory*, which is conversant in the knowledge of their conformation and use. The *Practice* is the manual, operation which comprehends both *Ossilegium*, and *Ossifragium*: *Ossilegium*, is the manner of preparing Bones to make a *Skeleton*; *Ossifragium* is this which searches out the joining, and knitting together of the *Bones* and *Joynts* by *Ligaments*, and *Cartilages*, and by breaking and dividing them; searches out their internal, and hidden Parts.

See Chap. 26. and 27. Lib. 6. Of this Book.

Chap. 4. *Of the Composition, and Definition of a Bone.*

Four Considerations.

THAT the Nature of a Bone may be perfectly understood, there are four things to be considered in it: The Matter, Efficient, Form, and End.

1.
Matter, Proper
Generation.

The Matter of the Bone is Proper, or Diverse.

Proper is considered Generally, or Specially.

Proper Matter, taken generally, is double; the one for Generation, the other for Nourishment; the Bones are made of the seed by consent of all Physicians. The Seed consists of Humor and Spirit, the Humors are of two Parts; the one thinner, of which the noble Parts are formed; the other thicker, of which the bones are ingendred.

Nourishment.

The matter of Nourishment is also twofold; Remote, and Near: Remote, is Blood, by which all the parts of our body are nourished; Near, is the Marrow contained in the Cavity of the Bones, or a Marrowy Juice shut up in the Spongy Bones.

Constitution.

The Proper Matter considered specially, regards the Bone already made, which is various in respect of substance and quality; and so the substance of one Bone is diverse, by reason of the *Epiphysis*, which is softer then the rest of the Bone; or the *Apophysis*, which is harder then the rest of the Bone; also the whole Bone, if it be solid, is harder without, then it is within. If it be hollow, the Internal Surface is hardest.

As for what belongs to Quality, and Namely Color; the Bone, the more solid it is, the more White it is; that which is hollow, is pale or reddish.

Matter diverse.

By the diverse Matter of the Bone, understand that which compasseth it about; and it is a Membrane, and a Cartilage. The Membrane which compasseth about the Bone, is called *Periostion*, and sticks firmly to it. By benefit of which, it obscurely feels. The extremities of the Bones are covered with a Cartilage, which Facilitates the Motion of the Bone, and hinders its wearing.

2.
Efficient cause.

The Efficient Cause of the Bone, is the Implanted Generative Spirit, or rather heat, which torrefies and dries the Matter of the Bone. *Gal. Lib. 1. de facult. natural.* acknowledgeth the faculty which forms the Bones; to which Heat and Spirit, do administer.

3.
Form,
Essential.

The form of a Bone is double; Essential, and Accidental: That is called Essential, which makes it to be a Bone, Namely, the Vegetable Soul.

The Face, saith *Aristotle Lib. 2. de Generat. animal.* is no Face, if it want the Soul; and so is the Flesh and Bone. But with Physicians, the form of Similar Parts, is nothing else then their temper. The temper of the Bone, is cold and dry; therefore Coldness and Driness constitute the form of the Bone. The accidental form, is the Figure of them, which is Proper, and peculiar to every Bone, and is most commonly round in all Bones, both in Longitude, and Latitude.

Accidental.

The end of the Bones, is their Use; and this is general, and particular; That is called General, which serves for the whole Body; and that is three fold. 1. To establish and make firm the soft Parts. 2. To give shape and Figure to the Parts. 3. To help the Motion and Progress of the Body. The Particular end or use, is that which is proper to every several Bone.

4.
End,
Gen'l,
Special.

From what hath been written, this definition of a Bone may be gathered; *It is a Similar Part, most cold and dry, Formed by heat of the thick and Fat substance of the Seed; for the firm and settlement of the whole Body.*

Disposition

Chap. 5. Of the Qualities, or Natural Disposition of the Bones.

THE Doctrine of Bones ought to be double; one which treats of the Bones of infants, which form their Birth till seven years of Age, differ in many things from such as are grown up: the other of perfect Age, which we now handle.

Differ of
Bones double;
Of Infants and
men grown up.

And seeing all Doctrine of Bones is referred to Physical use, we must know the Conditions and affections of Bones, well and naturally affected, which are either common to all, or proper to some.

The common are nine which shall be described, and demonstrated in our new *Osteology*, at the latter end of this Manual. In dry Bones well prepared, are five things shewed. 1. Hardness and solidity. 2. They have holes outwardly, especially toward the extremities, by which is ingress given to the little veins and arteries for nourishment and life. 3. A Cartilaginous Crust at the extremities, and the *Periostion*, which compasseth about the whole Bone, the Cartilaginous extremities excepted. 4. Continuity, and equality in its whole substance; wherefore the Callous, by which broken Bones are united, is not natural. 5. A fit and convenient joyning of one Bone with another.

Affection of the
bones are Com-
mon,

Or

The affections proper to the several Bones, are twofold; either such as regard every Bone severally, or such as regard more Bone then one joyned together.

Proper.

1. The affections of the first sort, are four: Hollowness, Prominence, Roughness, and Smoothness; which affections are considered in the extream superficies of the bone, in as much as bones are referred to mutual conjunction because they cannot subsist alone by themselves. The Head of the ^a *Ossoplatra* is hollow; the ^b Shoulder bone sticks out; the ^c *Ischium* or Huckle-bone, is hollow; the ^d bone of the Thigh sticks out; the Skull is rough behind for the ^e insertion of Muscles, in other places 'tis smooth, and Polish'd: All which affections, if they are such as nature made them, they are according to nature; if otherwise, they are beside Nature.

1.
Of Bones separat-
ted.

Also a Cavity is deep, or superficial; that which is deep, is called ^f *Cocoyle*; the superficial ^g *Giene*. A Prominency, or parts sticking out, is called *Apophysis*, or *Epiphysis*: Both of them are round, or long, or hollow: If it be round, it is called a Head; if it be large and long, it is absolutely Nam'd a ^h Head; but if it be short, and depressed, it is called ⁱ *Condylus*. The Heads or *Condyls* of small Bones, are not *Epiphysis*, but *Apiphysis*; as in the nether Jaw, and in the Ribs, and the Bones of the Fingers, and Toes.

A long

A long *Apophyſis*, is either with a point, and called *Corone*; or ſimply long and that according to the Figure of it, hath diſerſe Names; or^k *Styloides*, ^l *Coracides*, ^m *Odontoides*; or elſe tis terminated in a Head, and then is calledⁿ *Cervix* or a Neck.

Whether Apo-
phyſes have
hollow ſiſſes.

It is not abſurd that ſome *Apophyſis* ſhould be hollow, ſeeing all Cavities are as it were ingraved in the *Apophyſis*; or elſe are made of two or three *Apophyſes*, as in the Cavity of the *Iſchinum* or Huckle-bone; and although ſometimes a Cavity make the body of the Bone, yet it is formed by a bony circumference; which ſeeing it ticks out obliquely, and orbicularly without the plain ſuperficies, it is worthily accounted an *Apophyſis*; *Gal. Lib. de Offibus* acknowledgeth the *Omoſplata* to be an *Apophyſis*, which is a *Cervix*, the extremity of which, ends in the^o *Glens*; therefore Cavities ought to be referred to *Apophyſes*, and a Cavity if it be round and large, may be called a Head, for the Neck is alwaies ſubjected to the Head, *Gal. Proem. Lib. de Offib.*

The body and
Extremities,
which are Apo-
phyſis, and
Epiphyſis.

In every bone which being joynted to another makes a Joynt, I obſerve the body and the extremities, which are *Adnata*, or *Enata*; The body is the principal Part, formed of Nature, that it may be the foundation of the extream Parts; for Nature ever more begins the formation of the Bones in the middle, and produceth them towards the extremities. The extremities of the bones called *Enata*, are ^p *Apophyſes*; *Adnata* are ^q *Epiphyſes*: the Treatiſe of the *Epiphyſes* pertains to the Osteology of Infants, therefore we will not ſpeak of it here.

Yet this you may know, that *Epiphyſes* belong to the extremity of the Joynts of the bones; and that their Nature is to be fought out in Children, for in men grown up, they degenerate into *Apophyſes*, no Foot-ſteps of the antient Division remaining; and yet inwardly they keep the condition of their proper Nature, which ought to be like apumice, and bloody; but the *Apophyſes* are alwaies harder.

The Joynting of
Bones.

The ſecond ſort of Affections are, the Articulations of bones, one with another, which in divers bones are different; which now we come to ſpeak of in General.

^a, T. 21. f. 2. C. ^b, f. 1. a. ^c, f. 4. B. ^d, f. 1. D. ^e, T. 15. f. 4. C. ^f, T. 21. f. 4. B. ^g, f. 4. F. f. 2. Fc. ^h, f. 1. dd. f. 4. a. ⁱ, f. 2. 11. ^k, T. 15. f. b. D. ^l, T. 21. f. 2. d. ^m, T. 13. f. 21. ⁿ, T. 21. f. 2. c. ^o, *ibid* ^p, T. 2. f. 1. aa. f. 2. b c d. T. 15. f. 3. M N d. ^q T. 21. f. 1. 2. g. T. 13. f. 21. a. T. 15. f. 6. D.

Chap. 6. Of the Conjunction of Bones.

Why there are
many bones in
man.

Seeing it is not ſafe nor comely for man, that Divine Creature, to creep along like Worms and Serpents; Nature hath ſet his body bolt upright, with firm and ſolid bones; not only three or four in number, but very many, various, and diſtinct, whereby he may bow, and move himſelf every way; and that this Workmanſhip might be the more Elegant, the bones are ſo joynted together, that the extremity of one, enters into the Cavity of the other.

This ſtructure is called a Joynt, the Nature of which is much controverted amongſt Anatomifts; ſome contending that the touching of two bones one with another makes a Joynt, others beſides touching, add motion. So that it is the movable touching of two bones, which makes a Joynt.

If Metion be removed from the Definition of a Joynt, *Galens* Doctrine may eaſily be defended. He conſtitutes two kinds of Articulation; *Diartroſis*; with

with manifest Motion; *Synarthrosis*, with Obscure, or no Motion: and he assigns the differences of *Synarthrosis*, which are altogether immovable, to be *Sutura*, *Harmonia*, and *Gomphosis*; with those which take away Motion in the Denutition of Articulation, refer to third species of Articulation, which they call Neutral, or mean, between *Diarthrosis* and *Synarthrosis*. Some gave it a new Name, *Amphiarthrosis*, to wit, when the structure is so Obicure, and the Motion so hidden, that you know not whether it appertain to *Diarthrosis*, or *Synarthrosis*. But that place of *Galen* being ill understood, deceives many Anatomists. This D. *Artine* of *Galen* seems more probable thus.

Conjunction of Bones is either by Articulation; or by differences of which are Diarthrosis, and Synarthrosis.

The bones are knit together by *Articulations*, and *Symphyses*: *Articulation*, is the knittings, or touching of two bones; the differences of which are *Diarthrosis*, and *Synarthrosis*; the one hath evident Motion, the other Obscure, or not at all: and therefore the differences of each, are equal: but the one, for example sake, is called *Enarthrosis Diarthrodes*, with a manifest Motion; the other *Enarthrosis Synarthrodes*, with an Obscure Motion; Judge the like of the other differences.

The Common Species of which are.

Enarthrosis, is when a large, and long Head, goes into a deep Cavity; which seeing it is common both to *Diarthrosis*, and *Synarthrosis*, we will give an example of them both. The Motion of *Enarthrosis Diarthrodes*, is manifest in the Joynt of the *Iscium*: the Motion of *Enarthrosis Synarthrodes*, is Obscure in the Articulation of the Ankle with the *Scapulis*.

1. Enarthrosis.

When a depressed, and plain Head, is received by a shallow and superficial Cavity, this Joynting is called *Arthrodia*, an example of *Arthrodia Diarthrodes*, is in the conjunction of the Shoulder with the *Omplata*. An example of *Arthrodia Synarthrodes*, is in the bones of the Wrist, with the *Metacarpus*.

2. Arthrodia.

Ginglymos, is a mutual ingress of the bones, such as you shall usually see in the hinges of Doors and Windows; in which that Part of the Hinge which bears and that which circles about, have a mutual ingress one into another. The Motion of *Ginglymus Diarthrodes*, is manifest in the Elbow; the motion of *Ginglymus Synarthrodes*, is Obscure in the joyning of the Ankle to the Heel. Modern writers add a fourth to those three, which they call *Trochosis*, in which the Motion of conversion is apparent: such is the joyning of the first *Vertebra* with the second, but it is to be referred to *Arthrodia*; As for what belongs to *Ginglymus*, and its various differences, we will thus Methodically handle them: *Ginglymus* is an Articulation of bones, by mutual reception; and is simple, or compound: that is called simple, which is made of two bones, by one only and simple Articulation in the same part, as in the juncture of the Elbow and Arm. Compound *Ginglymus* consists of a double Articulation, which is performed either in the same extremities, or in places distant, of two or three Bones, which by a double Articulation end in the same extremities. It is seen in the *Vertebra* of the Neck. A compound *Ginglymus* by a double Articulation in places distant is seen in the *Cubitus* and *Radius*, in distant places of three bones is seen in all the *Vertebra* of the back and Loynes.

3. Ginglymus.

which is Simple or Compound.

Besides *Synarthrosis*, contains under it, *Harmonia*, *Sutura*, and *Gomphosis*, which are without Motion. ^a *Harmonia*, is a Conjunction of bones, by simple touching without mutual ingress; and is distinguished by a Line, either right, or oblique, or manifold. ^b *Sutura*, is the joyning of bones; as though the Teeth of two Jaws, or two Combs were thrust one within the other, and is altogether of one and the same form. *Gomphosis*, is when one bone sticks fast, and immovable in another, like a Nail in a Post.

Proper Species of Synarthrosis.

1. Harmonia.

2. Sutura.

Opposite to *Articulation*; is *Symphysis*, which is an immovable conjunction of bones, as though they were united, which Nature brings forth at first divided

3. Gomphosis, or by Syn-

physis whose
differences are
three.

Galen's Doctrin
of Joynts.

divided, yet afterward in process of time, they grow together. Some are united without any discernable *Medium*, others with a *Medium* interposed. And therefore, the simple differences of *Symphysis* are three; *Syffarcosis*, *Syncrosis*, *Synchondrosis*. A mixed or compound *Symphysis*; is only one, *viz.* By a Nerve and Cartilage, which *Galen* calls *Neurochondrosis*.^d Of these you may see more in *Com. at Gal. Lib. de Offitius*.

According to *Galen*, I thus expound the Doctrin of Joynts, Methodically. The Conjunction of all Joynts is made by the touching of their extremities: This touching is either *Articulus* or *Symphysis*: *Articulus* is a Natural joyning of Bones, which are divided amongst themselves, to the same use, for which they were formed; this use is either for Motion, or Perspiration, or passage of substance, or distinguishing of parts, or to secure them from hurting, & appears by the Articulations, *Harmonia*, *Sutura*, and *Gomphosis*. *Symphysis* is a Natural Union of bones which were at first divided, which grow together either with, or without an appatent *Medium*, because it is Obliterated, as in the *Sternum*, *Os-sacrum*, or *Iscbium*, and the bony portions of the inferiour Jaw: and therefore the Conjunction of bones is divided into *Articulus*, and *Symphyfis*, as it were into two species. Otherwise if *Symphysis* be taken according to the mind of Modern *Anatomists*, and not according to the mind of *Galen*, wherefoever Articulation is, there must *Symphysis* needs be, for the Collection of bones; and *Galen* had ridiculously opposed *Symphysis*, to *Articulation*.

^a, T. 15. f. 3. R. & c. ^b, f. 4. a. b. ^c, f. b. m. n. o. ^d, See ch. 5. Lib. 6. of ixth Book.

Chap. 7. The Division of a Sceleton.

THe whole Fabrick of the bones sticking together, is by *Galen*, called *SCELETOS*, It is vulgarly divided into the Head, the trunk and the limbs. *Hippocrates*, in his Book of the Nature of bones, constitutes six parts of the Sceleton; The Head, Neck, Breast, Back-bone, Hands, and Feet. *Galen*, into five, the Head, Back-bone, Breast, Hands, and Feet, as may easily be gathered from the series of his discourse. We follow the common division, and according to the example of *Galen*, begin at the Head, which is the first bone formed by Nature; and as it were the foundation of all the rest: which are framed in respect of largeness, according to the proportion of the Head.

Chap. 8. Of the Head, being the first Part of the Sceleton.

What the Head
is.

It's Division.

What the skul
is.

Its Natural
Figure.

THe Head is defined by *Galen*, to be that whole substance which is above the Neck, and the dwelling place of the Brain.

It is divided in the Skul, and the Face, which latter comprehends both the Jaws.

The Skul, is a globous, and round body; hollow within, but this roundness is not exactly, sphaerical, by Reason of those Eminencies, which stick out before, and behind, which make the Skul somewhat longish, and compressed on the sides towards the Temples. If the Skul be not somewhat longish, it is depraved and this depravation is four-fold. 1. When it sticks not out before, 2. When it sticks not out behind. 3. When both Prominencies, are depraved, and then it is exactly round. 4. When its Longitude is turned into Latitude, which is inconsistent with life, because the Structure of the Brain, is perverted.

Not

Not only one Bone, but many make the Structure of the Skul, the number of which is various in Authors, *Galen* Attributes seven thereto, and *Sylvius* follows him: others hold 14. As *Baninus*, by adding the six bones of each Ear, which are parts of the rocky bone, and included in the Cavities of the Ear, and add nothing at all to make the globe of the Skul. But more rightly *Pariens* adds fourteen bones to the Skul, but distinguisheth them, into containing, and contained; the containing are eight, the contained are the six small bones of the Eares. *Hippocrates*, *Lib. de Off.* Constitutes the Skul of eight bones, and yet he seems to comprehend some bones of the Face, this number the most excellent Anatomists follow; as *Vesalius*, *Columbus*, *Fallopini*, from whom we will not dissent, because this number our Eyes can witness, in Dissections.

The number of the bones of the Skul.

The intervails or connections of those bones, are called *Sutura*, which knit and unite the bones together.

Sutura w^{at}.

Of *Sutura*'s, some are proper, others common: They are proper, which distinguish the bones of the Skul one from another; they are common, which distinguish the bones of the Skul from those of the upper Jaw. The proper are divided into true, and false; the true, are the Saw-like Conjunctions of the bones intertexted, like the Teeth of a Comb. They are held by Anatomists, to be in number three. 1. ^a *Coronalis* is on the forehead of the Skul, which passeth transversely from one temple to the other. 2. Opposite to this is, ^b *Lambdoides*, placed in the hinder part of the Head. 3. ^c *Sagittalis* knits both these together, passing from the top of the *Lambdois*, by the longitude of the Skul, and sometimes comes even to the top of the Nose. The concurrence of the Sagittal and Coronal suture, the Greeks call *Bregma*; commonly 'tis called *Fontanella*, to which we apply causticks. Above the Ears, are two Sutures not like others, and therefore they are called false, or Bastard; they are called ^d *Squamosae*, from their scaly likeness, and joyn the bones of the Temples, to the bones of the top of the Head. Modern Anatomists hold the common Sutures to be three: The first is called ^e *Frontalis*, beginning at the outward Angle of the Eye, and passing by the middle of the *Orbita*, even to the Eye-brow, and keeps the same way by the other Eye. The second is called ^f *Sphenoides*, which Circumscribes the *Os-sphenois*, beginning at the hinder part of the Head, and ending at the furthestmost Tooth of the upper Jaw. The third is called ^g *Ethmoidea*; and compasseth about the *Os-Ethnois*, on every side; it seems rather to be Proper than Common, and belongs rather to *Harmonia* than *Sutura*.

How many of it.

Proper are.

Three true ones.

1. *Coronalis*.

2. *Lambdoides*.

3. *Sagittalis*.

Two false ones.

Common are three.

1. *Frontalis*.

2. *Sphenoides*.

3. *Ethmoidea*.

The eight bones of the Skul.

The Sutures being well known, 'tis an easie matter to distinguish the bones of the Skul; which are eight in number, and sometimes nine when the Sagittal Suture passeth to the Nostrils, and passeth through the middle of the Frontal bone; which is often seen in the Skuls of such as are grown up; all of them are proper, none common, unless the *Sphenois*, according to *Galen*.

1. The Bone of the ^b Forehead distinguished by the first, Common, and Coronal Suture, which sometime is cut into two parts by the Sagittal Suture, is that Eminent feat of the Eye-brows; it includes two Cavities derived into the Nostrils.

Os Frontis.

The Second and third are called the bones of the ⁱ forehead of the Head, and are separated from one another by the Sagittal Suture; below by the Scaly Suture, before by the Coronal: behind by the *Lambdois*.

Os sincipitis.

Under these are the bones of the ^k Temples, which on the upper part are attenuated like a Scale, but the inferior part is hard and rough, and called rocky; therefore it is commonly divided into the Scaly, and Rocky Parts.

The Bones of the Temple.

In the Rocky part are four *Apophyses*; ^l *Mastoides* ^m *Styloides* and ⁿ *Lygomatica*; and the fourth is placed in the basis of the Skul, and may be called ^o *Auricularis*; in little Children it is an *Epiphysis*, and may easily be pulled off from the Rocky Bones.

Its Apophyses.

- The Cavities of the Ear. 1. In this last *Apophysis*, are the three Cavities of the Ear contained: The first is external, and called the P Passage of hearing, The second is called ^q *Concha*, and contains the internal Aire, and the three small bones called ^r *Malleolus Incus* and *Stapes*, as also a hole passing into the Cavity of the *Mastoidis*. The extremity of this Cavity is directly opposite to the *Timpanum* and hath two small holes; of which the greater is called the ^f oval window and is the ingress into the third Cavity, which is called the ^s Labyrinth by reason of its various Circulations and turnings; the other hole is narrower, and is the Passage to the fourth ⁿ Cavity which is called ^x *Cochlea*, from its rough and wreathed Figure.
- Passage of hearing. 2. The sixth bone of the Skul is called ⁷ *Lambdoides* and *Occipitale*, and is compassed about with the Suture *Lambda*, the extremities of which are called Horns by the Antients; but by *Galen*, Aditions to the *Lambda*. To these are Causticks sometimes applyed.
- Concha*. 3. The seventh Bone is ^z *Sphenoides*; in which we must consider the external; and internal table: In the internal Table are three *Apophyses*, which are called ^a *Clinoides*; between these is a Cavity interjected, which is ^b called *Sella Sphenoidis*. The external Table hath four *Apophyses*; of which two resembling the hollownes of a ship, are called ^o *Naviculares*; by *Galen* they are called *Pterigoides*: the other pass under the *Zygomata* to the Temples, and are called *Temporals*. Between the two Tables or Plates, is an empty ^d Cavity passable to the Nose by a double hole, and severed within by a Bridge in the midst; this is alwaies wanting when the bone of the Forehead is solid.
- Labyrinthus. 4. The eighth bone is called *Ethmoides*, or according to *Galen* *Spongides*; it consists of seven different portions. The first is pierced through like a ^c Sieve, from which within the Skul ariseth an *Apophysis*, which is the second portion of the bone, and is like a ^f Cocks Comb; without the Nostrills, from the same Sieve-like Table, depends that bony substance, which makes the ^g bridge between the Nostrills; and this is accounted the third portion of the bone. To this bridge of the Nose stick two spongy bones, which make the fourth and fifth part of the *Ethmoides*. The sixth and seventh portions of the *Ethmoides*, are thin scales, plain and smooth, as broad as a mans Thumb; which make the internal side of each *Orbita*, beside the great *Cantus*, and underneath they cover three, and sometimes four cells, disposed from the great *Cantus*, even to the lower-most *Orbita*.
- Os Occipitale*. The *Sinus* are eight, two *Maxillares* in the upper Jaw, as many *Frontals* in the bone of the Forehead, so many *Sphenoides* in the bone *Sphenoidis*, and no fewer *Mastoides* in the *Apophyses* of the *Mastoidis*.
- 1s. *Sphenoides*. Holes are internal, or external; Internal are twenty five commonly, sometimes twenty seven; twelve or thirteen on each side, and one without a fellow; which gives Egress to the Marrow of the Back. The first, is ^h *Ethmoides*; the second, ⁱ *Sphenoides*; the third, ^k *Opticus*; the fourth, ^l *Scissura Orbitalis*; the fifth, ^m *Temporals*, from the nerve of the third conjugation which passeth to the temporal muscle; the sixth, ⁿ *Gustavus*; the seventh, *Gustavus Secundus*; the eighth, ^o *Cervical*; the ninth, *Caroticus*; the tenth, ^p *Ariditorium*; the eleventh, ^q *Jugulare*; the twelfth, ^r *Motivum Lingua*, or *Linguisum*; the thirteenth, and last, ^f *Impar*, or *Occipitale*. The external holes are ten on each side, according to *Sylvius*; to which add an eleventh, to wit, the external hole of the Ear; besides at the Root of the *Stilois*, in the extremity of the auricular *Apophysis*, on the external part, is a hole divided into two within, divided with a very thin Scale. Of the external holes the first is called, *Superciliare*; the second, *Laerimale*; the third, *Orbitarium extremum*;
- Its *Apophyses*.
- Os Ethmoides*.
- Tabula cribrosa Crista Galli*.
- Septum Nasi*.
- Two Spongy Bones.
- Eight *Sinus*.
- Holes internal. 27.
- External hole. 10.

externum; the fourth, *Orbitarium Etbmoideum*; the fifth, above the pallat; the sixth, in the extremity of the Pallat; the seventh, the cleft under the *Zygoma*; the eighth, and ninth, *Supra Pterigoides*; the tenth *Mastodes*, the eleventh, the external hole of the Ear.

The pits are internal, and external: six are in the internal basis of the Skul, two frontals, two temporals, and two occipitals. The external are seven on each side, to which I add an eighth, to wit, the Cavity of the Nose: The first, *Orbitaria*; the second, *Nasalia*; the third, *Zygomatica*; the fourth, above the Pallat; the fifth, under the Pallat; the sixth, *Pterigoidea*; the seventh, in the joynting of the inner jaw; the eighth, in the hole of the sixth Conjugation.

Pits interna & external.

^a T. 15. f. 3. ^{aca.} ^b f. 4. ^{bb.} ^c f. 3. ^{bb.} f. 4. ^{aa.} ^d E. 15. f. 3. ^{cc.} ^e T. 15. f. 3. ^{Supra K.} ^f T. 15. f. 5. ^{aa.} f. 6. ^{oo.} ^g f. 4. ^{AB.} ^h f. 3. ^D ⁱ f. 6. ^{cc.} f. 3. ^{d.} ^k f. 6. ^{DD.} ^l f. 6. ^{EE.} f. 3. ^{F.} ^m T. 15. f. 5. ^{ff.} ⁿ T. 20. f. 6. ^{A.} f. 3. ^{B.} ^o f. 6. ^{B. C.} ^p f. 7. ^{ABC.} ^q f. 6. ^{B.} ^r f. 9. ^{BB.} ^s f. 6. ^{C.} ^t f. 9. ^{AA.} ^u T. 15. f. 4. ^{C.} ^x f. 5. ^{B.} f. 6. ^{F.} ^y f. 5. ^{Supra inferius B.} ^z f. 5. ^{aa.} f. 6. ^{G. H.} ^a T. 15. f. 6. ^{G. H.} ^b T. 15. f. 5. ^{B.} ^c T. 15. f. 5. ^{CC.} ^d *ibid.* ^e T. 15. f. 6. ^{I.} ^f T. 15. f. 5. ^{CC.} ^g f. 5. ^{aa.} ^h f. 5. ^{aa.} ⁱ f. 5. ^{bb.} ^k f. 5. ^{cc.} ^l f. 5. ^{dd.} ^m f. 5. ^{ee.} ⁿ f. 5. ^{††} ^o f. 5. ^{bb.} ^p f. 5. ^{ibid.} ^q T. 15. ^{oo.} ^r f. 16. ^{BB.}

Chap. 9. Of the upper Jaw.

The other parts of the Head, is called the Face; it comprehends both Jaws, and is separated from the Skul, by the first common Suture. *The Face vocat*

The upper Jaw consists of many bones, about the number of which is some controversy amongst Anatomists; but passing by the vain and foolish opinions of modern Authors, I admit only of Eleven, passing by those portions of the *Etbmoides*, which some Anatomists reckon for several Bones: for those Bones only belong to the Jaw which are separated from the Bones of the Skul; neither are portions of them, but some of those bones contained within the *Orbita*, and from the *Orbita* of the Jaw; with other bones are portions of the bones of the head, as the productions of the *Sphenoid*, the broad portion of the *Etbmoides*; and therefore they are Childishly referred to the Jaw.

How many bones in the upper jaw

If any object, that they do belong to the Jaw, because they are beneath the common Suture that divides the Skul from the Jaw; wherefore seeing they are placed beneath the said Suture, they may be attributed to the Jaw. But if the *Apophyses* of the bones of the Skul, which stick out beyond the roundness of it, be referred to the Face; by the same rule the *Apophyses*, called *Pterigodes*, which stick out without the Globe, and rotundity of the Skul, and are placed in the same plain with the *Vomer*, and the Angles which sustain the Jaw, are to be reduced to the Jaw itself. And when *Galen* reckons the *Os Sphenoid* amongst the bones of the Jaw, he reckons it as a Supernumerary. And therefore we must reckon but eleven bones of the Jaw.

Five bones are placed on each side, and one without a fellow, which sustains the midst of the Pallat. The first, *Galen Lib. de Off.* Calls ^a *Melon*: It may be called *Zygomaticus*, because it constitutes the greatest part of the *Zygoma*, and a great part of the *Orbita*, and Angles of the Eye: now *Zygoma*, is nothing else than a bony Semicircle made of two *Apophyses*, by the oblique Suture; of which the one passeth from the rocky bone; the other from the bone of the Cheek. The Second is called ^b *Os unguis*, or *Ossiculum Lacrimale*. The third is called the ^c greatest bone, and contains the middle part of the Teeth; and finisheth the

The first bone of the Jaw.

The 2^d inferior

4. inferior part of the *Orbita*, and the internal part of the Noſe. The fourth bone forms the *Noſe*, and ſo the Noſe is formed of four bones, two are Proper, which we mentioned laſt; and two common. Modern Anatomifts add the bone called *Vomer*, which is placed under the *Sphenoids*, and *Pallat*, which was not unknown to *Hippocrates*. It is like a Plow-ſhare, and holds up the bridge of the Noſe, to which it is Joyned by *Sutura*, or *Harmonia*.

^a T. 15. f. 3. E. ^b f. 3. G. ^c f. 3. I. ^d f. 3. K. ^e f. 6. j.

Chap. 10. Of the Orbitaly Bone.

The Orbitaly
Bones of the Eye
have many.

The error of
Piccolomini's,
touching their
number.

THE Orbitaly bones, which *Hippocrates Lib. de Offibus* calls *Hypopia* by which the Eye holes are made, were firſt of all by *Piccolomini*s propounded to be five; but he ignorantly pretermitted a portion of the *Maxillar* bone, which joyned to the reſt makes ſix, of which the hole of the Eye is made; but theſe bones are not Proper, excepting the angular, or *Lacrymal* bone, but partly portions of the bones of the Skul, partly portions of the bones of the upper Jaw. The firſt is the *Frontal* bone, which make the forehead of this vault. The ſecond is a portion of the *Sphenoids*, ſituated in the deep external ſide of the Eye hole, even to the leſſer corner. The third is *Lygomaticum*, which makes the leſſer corner, and the middle pavement of the *Orbita*, or Eye hole. The fourth is *Maxillare*. The fifth *Lacrimale*. The ſixth the Scaly table, of the *Oss Ethmoidis* which makes the other ſide of the *Orbita*, and the greater Corner: theſe bones are to be diſcerned within the *Orbita*, with their proper and common *Sutures*.

^a T. 15. f. 3. A. ^b T. 15. f. 3. E. ^c T. 15. f. 3. j. ^d T. 15. f. 3. G.

Chap. 11. Of the Inferior Jaw.

Its Parts.

B. f.

Apophyſes.

THE Inferior Jaw in ſuch as are grown up, is but one bone; in which is to be noted, its baſis, and its extremities. Its baſis is the middle part of it, hollow within ſticking out outwardly and is called the *Chin*. The extremities are Angles, each extremity ſends out two *Apophyſes*, of which one is Sharp called *Corone*, and receive the tendon of the *Temporal Muſcle*; the other is a *Condyle*, and may be called *Articulatoria*, becauſe it ſerves for *Articulation* of the Jaw. Below theſe *Apophyſes* is a ſingular hole by which *Veins*, *Arteries*, and *Nerves* paſs to the *Teeth*; one portion of which paſſeth back again near the *Chin*, and is diſperſed to the *Muſcles* of the *Lips*.

^a T. 15. f. 3. L. ^b T. 15. f. 3. M. ^c f. 3. N. ^d f. 3. Infra M. ^e f. 3. L. l.

Chap. 12. Of the Os Hyois.

Its parts.

Baſis.

Horn.

THE *Os Hyois* may be referred to the bones of the Head, becauſe it is faſtened by *Nervous* bones to the *Apophyſes* of the *Stylois*. It is Compounded of five ſmall bones, of which that which is greateſt and hollow is called the *Baſis*, they which add a ſixth and a ſeventh bone underſtand the *Ligaments* wherewith this bone is tyed which as they are uſually *Nervous*, ſo in ſome they are obſerved to be *Cartilaginous*. From the extrem parts of the greater and Fundamental bone, one *Cartilaginous* *Horn*, which is ſeldom bony, ſprings on the top, one each ſide it is faſtened to the *Cartilage Tyrois*, which two *Horns* are uſually numbered for the eighth and ninth bones.

The

The *Os Hyois* is the foundation of the *Larynx* and Tongue, and by the Judgment of all Anatomists receives the Tongue in its Cavity, but if a man may believe his own Eyes, they will shew him that the *Epiglottis* only is received in its Cavity, and that the Tongue resteth on the upper side of its Basis.

Error of Anatomists.

^aT. 13. f. 11. 12. AA. ^bT. 13. f. 11. 12. BB.

Chap. 13. *Of the Teeth.*

THe Teeth, are the instruments of Chewing the Meat, and forming the voyce. They are bones although they differ in Nature from other bones.

Their Nature.

They consist of two parts, one of which sticks out without the Gum, and is called the Basis. The other is hid within the Gum, and called the Root, the Root is not solid but hollow, and so hollow, that it receives a small Vein, a small artery, and small Nerve.

Parts, Basis and Root.

The Roots of the Teeth are various in number and diverse in figure. The Root of the Cutters is alwaies simple and right, distinguished only with a small cleft for their firmer sticking. Also the Roots of the Dog-teeth are simple. The superior grinders have a threefold Root and Crooked, because they hang downwards, in the inferior grinders they are double and sometimes treble.

The number of the Roots of the Teeth.

The number of the Teeth is various in regard of Age. In Children from the seventh Month even till they are two years Old and upwards, twenty of them usually come out by degrees one after another, and before they are well towards four years of Age, they have no more, afterwards eight, or twelve others come out: So that they have twenty eight, or thirty two in both Jaws.

The number of the Teeth.

This number is distinguished into three orders by reason of their Situation and bigness, the first four Teeth are called ^a *Cutters*. Those two which are next these, one on each side, are called ^b *Dog-teeth*. The rest being eight or ten, are called ^c *Grinders*, they are placed in the Cavities of each Jaw, which Cavities are not continual but divided into Cells, and their conjunction, or Articulation is called *Gum-phosis*.

Their Order.

^aT. 15. f. 6. M. ^bT. 15. f. 6. n. ^cT. 15. f. 6. oo.

Chap. 14. *Of the Trunk, being the Second Part of the Skeleton.*

THe Trunk comprehends the Back-bone and such bones as are fastened thereunto.

Of what it consists.

It is compounded of the Back-bone and the Chest.

The Back-bone is a bony Channel which gives passage to the Marrow of the back, and is stretched even from the Head, to the *Os Coccyx*. It consists of very many bones for its security and that it may not easily be hurt, as also that a man may bow himself, for necessity of action. These bones the Greeks call *Spondils*, and the Latins *Vertebra*.

The Backbone what.

In every *Vertebra* you may observe two parts of which the one is internal, thick and round, and is called the body: the other external with various *Apophyses* and hath no Name, the differences of the *Apophyses* are three, right, Oblique, and transverse, the hindmost is sharp and is Properly called ^a *Spina*; that which is ^b *Lateral*, and transverse is double, the ^c *Oblique* fourfold by which they are joynd together by *Singlyms* in which three bones are required.

Two parts of a Vertebra.

Difference of the Apophyses.

In

In the Oblique *Apophyses* two are above, and as many below; and therefore in all the *Vertebra* are seven *Apophyses* found. The whole *Rachis* or Back-bone, is divided into four Parts. The *Neck*, *Back*, *Loyns* and *Os Sacrum*: The Neck hath seven *Vertebra*, the Back twelve, Loyns five, the *Os Sacrum* is either one, or three-fold in such as are grown up; in Children it is divided into five or six Parts: Wherefore the Back-bone in such as are grown up, is composed of twenty four *Vertebra*; to which, if you add the *Os Sacrum*, which is a great *Vertebra*, it makes twenty five or twenty seven. The crooked-streight Figure of the Back-bone, which is admirably described by *Hippocrates* in *Lib. 3. de Articulis*, from verse 33. to 35. Cannot be noted in a Sceleton, though never so exactly made; but in a Carcass the Flesh of the back being taken away it may; in the *Vertebra* of the neck, this peculiar thing is to be noted, That all the transverse ^d *Apophyses* are pierced through, that so they may give passage to the cervical Veins and Arteries; they have Cavities in the extremities, through which the Nerve being yet soft, is deduced: The ^e hindermost *Apophyses*, are double, for the use and injection of Nerves; but the two superiors have another structure and conformation, by reason of the motion of the Head; for the first wants a *Spina*, and hath a thick round Body; the second sends out a ^f Tooth like *Apophysis*. All the *Vertebra* of the Neck are strictly joyned and implicated lest they should slip asunder in the vehement Motions of the Neck.

The *Vertebra*
of the Neck.

The *Vertebra*
of the Back.

The *Vertebra*
of the Loyns.

Os Sacrum.

Co. yr.

The twelve ^h *Vertebra* of the Back, are altogether one like the other; their *Apophyses* are all solid, and continual, without any hole or division. The twelfth, or eleventh *Vertebra*, hath a different Articulation from the rest; all the rest are joyned by *Ginglymos*; the eleventh, or twelfth, only by *Arthrodia*. And therefore the whole Motion of the back-bone, bowing, extending, and Obliquation, is performed by that *Vertebra*.

The five *Vertebra* of the Loyns, differ in *Apophyses* from those of the Back; for the hinder *Apophyses*, or ⁱ *Spina*, do not descend as they do in the Back, but are straight, and broad: the ^k transverse *Apophyses* are longer, and stand instead of Ribs.

Under the Loyns is the ^l *Os Sacrum*, which though it seem one simple bone at the first view, yet being boyled a long time in Oyl, it is divided into five parts, and sometimes into six.

To the extremity of the *Os Sacrum*, is another cartilaginous bone joyned, which is divided into three, seldom into four Parts and is called ^m *Coccyx*, the Crupper-bone.

^a T. 2. f. 2. d. ^b f. 2. bb. ^c f. 2. ccc. ^d T. 13. f. 20. bb. ^e f. 21. b. ^f f. 20.
^g f. 21. a. ^h T. 10. f. 3. ⁱ T. 2. f. 2. d. ^k T. 2. f. 1. aa. ^l T. 2. f. 5. b.
^m T. 2. f. 5. bb. c.

Chap. 15. Of the chest.

The chest what
It is four-fold.

The Sternum.

The Cartilage
called sword-
like.
The Ribs.

THE Chest, together with the Back-bone, make up the trunk of the *Sceleton*. The Chest is a bony Circumference, which holds the vital Parts, and is constituted of a four-fold kind of bones; the *Sternus* before the Ribs on each side, the *Clavicula* at top, and the Back-bone behind, to which the Ribs stick.

The ^a *Sternum* or Breast-bone, in such as are grown up, is one only continued bone, distinguished by three or four transverse lines, which are but the footsteeps of the *Articulation* divisions; and these lines are more conspicuous on the inside, than on the out. On the extremity of this bone, depends the Cartilage or Gristles called ^b *Xyphoides*, or the sword-like Cartilage; it represents a Shield in brutes.

The Ribs are twenty four, twelve on each side; of which, the seven upper most are called ^c *True*, because they are committed to the *Sternum*; the other five inferior

terior, are called ^d *Bastard*, because they are never joynd to the Breast-bone, but are joynd in a Cartilage, that they may the better give way to the swellings of the Liver and Spleen, and yield to the Motions of the *Diaphragma*.

The ^e *Clavicula* are two, one on each side; whose Figure represents an *Italiana Clavicula*. They retain the *Scapula* in its Proper seat that it fall not upon the Breast.

^a T. 10. f. 2. A. A. ^b f. 2. B. ^c f. 1. 2. 3. 4. 5. 6. 7. ^d f. 2. 8. 9. 10. 11. 12. ^e f. 1. f. T. 21. f. 2. A.

Chap. 16. Of the Limbs, being the Third Part of the Skeleton: and first of the *Scapula*.

Seeing the *Scapula Omoplata*, or shoulder-blade; belongs nothing at all to the constitution of the Breast, I separate it from the Trunk, and set it at the beginning of the hands. In the *Omoplata* many Parts come to be noted for the original and Insertion of Muscles. A very Necessary Part of the *Omoplata* being stretched to the Longitude of the Back, is called the ^a *Basis*, the extremities of which are called Angles; one is ^b *Superior*, the other ^c *Inferior*. The *Basis* is the sides of the *Ribs*; of which, the one is shorter and thinner, which is called the ^d *Superior Rib*; the other longer, and thicker which is called the ^e *Inferior Rib*. The whole Latitude of the *Scapula* is called the table: The external Part of which, is Gibbous; the internal hollow, that so it may receive the Muscle. The famous process or *Apopophysis* ascending upwards from the *Basis*, is called ^f *Spina*, the broad extremity of which is called *Acromium*, which according to *Galen* and *Hippocrates*, is a distinct bone, and Cartilaginous in Children; but hard and bony, in such as are grown up. Which after the twentieth year, and something sooner is turned into an *Apopophysis* of the *Spina*. The pits on each side of the *Spina* are called *Interscapulinum*; one pit is above it, the other below it, but the middle prominence of the *Spina* of the *Scapula*, which is great, subject to the *Acromium*, and opposite to the *Basis*, is called the ^g *Neck*; in it you shall not, that *Apopophysis* called ^h *Coracoidea*, which was made for the security, and firmness of the Joynt of the Shoulder, the Cavity of the Neck, is called *Glenoides*.

Its Parts.

^b *Superior Angles.*

Ribs.

Process.

Pits.

^a T. 21. f. 2. bb. ^b f. 2. f. ^c f. 2. g. ^d f. 2. ab. f. ad. d. ^e f. 2. ag. ad. c. ^f f. 2. e. ^g f. 2. c. ^h f. 2. d.

Chap. 17. Of the Shoulder.

The Arm hangs upon the *Omoplata* or *Scapula*, which is divided into three Parts; the *Shoulder*, the *Cubis* and the *Hand*. In the *Shoulder* are two extremities for the insertion of Muscles; the uppermost is called the *Head*, which a membranous Ligament, bred from the Cavity of the *Glenoides*, compasseth about, besides the four Muscles which it involves; a little below this, the Orbicular narrow place, is called the *Neck*: In the *Head* is a long Chink, by which the Nervous Head of the Muscle *Biceps* riseth. In the other extremity of the Arm, you may observe the *Trochlea*, about which the *Cubis* is turned: About the *Trochlea* are two ^a *Cavities*, of which the external is wider than the internal; in these are the Coronal *Apopophyses* of the *Cubis* received; with the *Trochlea* are two *Apopophyses*, which are called *Condilis*; the one inferior, and interior; the other superior, and exterior.

The three Parts of the Hand. The Head of the Bones of the Shoulder.

The Neck.

Trochlea Cavities. *Apopophyses.*

^a f. 2. f.

Chap. 18. Of the Cubitus, and Radius.

Radius
Cubitus1700 1700. are
2.

The second Part of the hand is called *Cubitus*, and consists of two bones; of which the one which is superior and shorter, is called ^a *Radius*; the other, which is inferior and subject to the former, is called by the Name of the whole ^b *Cubitus*, and by some *Ulna*. Two bones are necessary in this Part of the Arm by reason of their double and contrary Motions, which could not be performed by one bone united by *Ginglymus*; for *Ginglymus* suffers only bowing and extending, and in no wise inversion; which the *Radius* being joyned by *Arthrodia* performs. The Obliquation of the *Radius* cannot perfectly be discerned unless in a new carcass, all the Muscles being taken away; for with great admiration you shall see the *Radius* turned about, upward and downward upon the Cubit, being unmoved and also moved together with the *Cubitus*, when it is bowed and extended.

Cavity.

Apophyses.

There is something worthy the noting in the extremity of the *Cubitus*: For in the upper extremity, is the Cavity called *Sygmoides*, which embraceth the *Trochlea* of the Arm; about this are two *Apophyses*, called *Corone*; the lowermost is called ^c *Olecranon*: In the inferior part the *Cubitus* is an *Apophysis*, which is called ^d *Styloides*; the extremities of these bones alone, are joyned together by that *Ginglymus*, which consisteth of two bones passing into one another, in diverse, and distant places.

^a f. 2. E. ■ ^b f. 2. D. ■ ^c T. 21. f. 2. g. ■ ^d f. 2. e. regione. ■ ■

Chap. 19. Of the Hand.

Division.

Carpus.

The Hand is divided into three Parts *Carpus*, *Metacarpus*, and the *Fingers*.

^a *Carpus* consists of eight bones, distributed into two orders, which are joyned amongst themselves by *Symphysis*, by a kind of *Harmonia*; because the bones of the *Carpus* are moved the one from the other, either obscurely or not at all; the first orders makes *Arthrodia Diarthrosis*, with the inferior Cubit; the same order is joyned with the second order of the bones of the Wrist, or *Carpus*, by *Arthrodia*; which second order is joyned with the *Metacarpus*, by *Arthrodia Synarthrosis*: So that this Motion, is either none at all, or insensible; but the first order with the second is moved obscurely.

Metacarpus.

The ^b *Metacarpus* succeeds the *Carpus*, and is framed of five bones, if we add the first bone of the Thumb, which some reject, because it is Obliquely added to the *Metacarpus*, and endowed with manifest Motion, and contrary to the Nature of other bones of the *Metacarpus*, which make *Arthrodia* with the Wrist, and *Enarthrosis* with the *Fingers*; and yet the fourth bone of the *Metacarpus* which sustains the Ring Finger, hath manifest Motion.

Fingers.

From the several bones of the *Metacarpus*, are several ^c *Fingers* stretched; only the Thumb excepted, the *Fingers* consist of three bones which are joyned to one another by *Ginglymus*; and therefore they admit only of bowing, and extending; the Oblique motion of them depends upon the *Enarthrosis* of the first bone with the *Metacarpus*.

■ f. 1. FF. f. 2. F. ■ ^b T. 21. f. 1. GG. f. 2. G. ■ ^c F. 8. f. 11. CDE.

Chap. 20. Of the Bones of the Ilium.

The greatest and largest bones of the body, which being joyned with the *Os Sacrum*, sustain and erect the whole Trunk, are by the greatest Part called *Os Ilium*: In such as are grown up, they are one bone; but in Children divided into ^a three Parts; which yet hold their antient appellations, though the very Foot-steps of them be obliterated by Age. The broader Part of the bone which frames the latitude of it, and is stretched out to the middle of the funnel, is called ^b *Ilium*; the other half and superior Part, is called ^c *Pubis*; the other inferior Part ^d *Ischium*: Of these three portions, is made that great hole called the ^e Funnel.

In these bones some particular things are to be noted; for Anatomists call the external Face of the *Os Ilium*, the *Back*; the superior internal Cavity, they call the *Belly*; the extremity of which, is called the *Rib*; the brims of which, both external, and internal, are called *Lips*, or *Brows*, so as one is external, the other internal. The extremity of the Rib, which sticks out, and is joyned to the *Os Sacrum*, is called the *hinder Spine*. And the other ^f extremity of the Rib towards the Funnel, is called the *foremost, uppermost Spine*. There is under this, another called the *former and nether Spine*.

In the *Os Pubis*, a Spine is observed near the *Symphysis*, by its top: In the *Ischium*, a Spine, and a Banch is noted; which Banch is called *Condylus*.

^a T. 8. f. 12. CDE. ^b T. 2. f. 3. A. ^c f. 3. C. ^d f. 3. BB. ^e T. 21. f. 4. B. ^f T. 2. f. 4. aa.

Its Parts.

Ilium.

Pubis.

Ischium.

Back.

Rib.

Lips.

Spines.

Chap. 21. Of the Bone of the Thigh.

The Feet, as well as the Hands, are divided into three Parts; the *Thigh*, *Leg*, and *Foot*.

The Bone of the Thigh is but one, and the greatest in all the Body. In the superior extremity, the ^a Head is round, to which a slender part is added, called the *Neck*: from the Neck are two *Apophyses* produced, to which, the Muscles called *Rotatores*, are fastned; and therefore they are called *Trochanters*: the foremost is called the lesser ^b *Trochanter*, the uppermost on the side, the greater ^c *Trochanter*. The other extremity of the Thigh, hath two ^d *Condyls*; a ^e *Cavity* being left between, which admits the ^f middle, and eminent *Apophysis* of the Leg; and in like manner the *Condyls* are received by the ^g Cavities of the Leg, by a loose ^h *Ginglymus*, the fore Part of which, is called the *Knee*, the hinder Part the *Ham*: this Articulation is strengthened before, with a small bone called the ⁱ *Knee-pan*, which is Articulated to no bone.

^a T. 21. f. 1. dd. f. 4. a. ^b f. 1. gg. f. 4. c. ^c f. 1. ff. f. 4. b. ^d f. 1. bb. f. 4. ee. ^e f. 4. d. ^f f. 4. f. ^g f. 1. bb. f. 4. ee. ^h f. 8. cc. ⁱ f. 1. LL. f. 8. d.

The Thigh Bone.

Head.

Neck.

Apophyses.

Knee.

Ham.

Knee-pan.

Chap. 22. Of the Leg.

The Leg is composed of two bones; of which the greater and internal, is called ^a *Tibia*: The lesser and external, ^b *Fibula*. The *Fibia* is Articulated by *Ginglymos* to the Thigh; the *Fibula* sticks to the *Tibia*, and toucheth not the Thigh. The interior, and buncy Parts of them both, are called *Ancles*; of which, the *Fibia* makes the ^c internal, and the *Fibula*, the ^d external.

^a f. 1. M. f. 4. D. ^b f. 1. M. f. 4. D. ^c f. 1. ii. f. 4. gg. ^d f. 1. KK. f. 4. b.

Two Bones of

the Leg.

Tibia.

Fibula.

Chap. 23. Of the Foot.

Div'fion.
Tarsus.

THE Foot is divided into the *Tarsus*, *Metatarsus*, and *Toes*. The *Tarsus* consists of seven Bones, which *Ruffius Ephesus* calls *Ostracodea*, by reason of their hardness: The first Bone Articulated with the *Tibia*, is called *Astragalus*, or ^a *Talus*: The Bone under this, *Pterna*, or ^b *Calcaneum*: The third joyned to the *Astragalus*, *Scaphoides*: The fourth ^c *Naviculare*; to which is joyned the inner, and foremost portion of the Heel, which is called ^d *Cuboides*; the other three have no Names, or else are called ^e *Calcoidea*. The ^f *Metatarsus* follows the *Tarsus*, and is formed of five Bones, and answers to the *Metacarpus* of the Hand.

Metatarsus.

Toes.

The *Toes* succeed the *Metatarsus*, constituted of ^g three Bones a piece, except the great Toe, which hath only two Bones: small Bones fill up and strengthen the internodes of the Fingers and Toes in such as are grown up, which are uncertain in number, and called ^h *Sesamoidea*.

In the second Articulation of the great Toe, are two small Bones worth the noting, and indifferent big, which are alwaies found in all Carcasses, and two at the original of the two Muscles of the Feet, mentioned by *Vesalius*, which are but seldom found, and are to be numbred with the *Sesamoidea*.

^a f. 5. A. ^b f. 5. B. ^c f. 5. C. ^d f. 5. D. ^e f. 5. e e e. ^f f. 4. g. ^g f. 4. ^h T. 21. f. 6.

Chap. 24. In what Particulars the Bones of Men differ from those of Women.

Those which differ are.

THE Bones of Men and Women, differ in some parts, which *Platerus* first noted, and *Banbinus* follows him; but by their leaves, they noted many differences which are not found, and omitted some that are: we shall speak of them both severally.

In Substance of the Bone.

It is true, all the bones of Women, are less then those in Men, both in weight, and thickness, as also in length. *Galen* adds they are not so hard, but saith, that in all living Creatures, the Bones of the Females, are softer then those of the Males; and *Aristotle* held so before him.

The Bones of the Head.

The bones of the Head are altogether alike, have neither more, nor fewer Sutures; although *Aristotle* thought otherwise: Namely, that Males had more Sutures then Females, *Chap. 7. Lib. 1. de hist. animal. and 7. Lib. 3. ejusd. operis, and Chap. 7. Lib. 3. de part. animal.* Yet the ^a Sagittal Suture, more often in Women, passeth to the Nose, dividing the ^b Bone of the Fore-head in the middle.

Teeth.

It is false that *Aristotle* held, *Viz.* That Males have more ^c Teeth then Females, as is clear in Men, Sheep, Hogs, and Goats.

Larynx.

The ^d *Larynx* (if it may be numbred amongst the Bones) is less in Women, and the Cartilage ^e *Thyroides*, sticks out less.

Breast.

The ^f Breast in Women is depressed in the fore part, and sticks not out as it doth in Men, for the more accomodation of the Dugs.

Clavicule.

The ^g *Clavicule* in Women are not so crooked, for the more comeliness of their Neck and Breast.

Sternum.

The Inferior Part of the ^h *Sternum*, is broader then in Men, and many time hath a manifest hole in it; and the lower Bone upon which the ⁱ Sword-like Cartilage depends, is cleflike a crescent Moon and makes a large hole for the Egreis of the *Mammaria Interna*.

Cartilages of the Ribs.

It is false that the ^k Cartilages, which in men become bony about the forty or fifty years of their Age, become bony in Women so soon as their Breasts grow; Though it be true in Women when they are Old.

In Women with great Breasts, *Thorax* is narrow, and almost pointed, by reason of the weight of their Breasts.

That

The Part of the Back above the Loyns, is no more bowed Backwards in Women, *Back.* then it is in Men.

The *Os Sacrum* is shorter, broader, and more bowed outwards in Women, *Os Sacrum.* then it is in Men.

The *Os Coccyx*, or Crupper Bone, is more movable, and not so strongly knit; *Coccyx.* and more bowed Backwards in Women; not according to the opinion of *Galen*, but of Later writers. *Galen: Lib. 1. de Semine.*

The Buttocks of Women are broader and according to *Aristotle, Lib. 4. de hist. animal.* Women are stronger in their lower Parts, and therefore the *Os Ilium* *Buttocks.* most commonly is larger, but that largeness bends more outward; by which means the *Offa Ilium* are more hollowed outwardly. *Os Ilium.*

Upon this largeness of the Bones, the Womb when it is great with Child leans as it were upon Pillows, and sits as it were in a Saddle. Elegantly said *Galen Lib. 1. de usu Partium*, when he called the concourse of these Bones with the *Os Sacrum*, THE GREAT BONY VAULT or Arch. The Oval hole is smaller in Women than the portion of the *Os Pubis*, near the *Symphysis*, may be larger; but the *Spina* of the *Os Pubis* is turned outwards. *Os Pubis.*

The inferior or tuberous Parts of the *Os Ischium*, it fitted with a double Car- *Os Ischium.* tilage, thicker softer; and this commissure is perfected by a short line, that in the travail, it being softened and loosed, the Bones of the *Pubis* may part.

The space between the *Os Sacrum*, *Ilium*, and *Os Pubis*, where they are joined together, is larger in Women than in Men, lest the narrowness of the Passage should hinder the coming out of the Child. The rest of the structure of Bones in Women, is like those in Men.

^a T. 15. f. 3. bb. ^b f. 3. A. ^c f. 6. m n o. ^d f. 13. ad f. 10. ^e f. 8. A. ^f T. 10. ^g T. 21. f. 1. R. ^h T. 10. f. 2. AA. ⁱ f. 2. B. ^k f. 2. CC. ^l T. 2. f. 5. and 6. ^m f. 5. and 6. b. c. ⁿ f. 3. and 4. A. ^o f. 3. 4. b. ^p f. 3. 4. C.

Chap. 25. Of the Number of the Bones in a Mans Body.

THE Number of the Bones of Mans Body amongst Anatomists is uncertain *Vesalins* held 307. *Galen* 242. But in the *Skeleton* of a perfect man, there are two hundred and fifty six necessary Bones for the structure of it; which are thus numbred. Of the Skul, eight; of the upper Jaw, eleven; of the nether Jaw, one; of the *Os Hyois*, three; Teeth, thirty two; Back-bone, twenty four; *Os Sacrum*, three; *Coccyx*, three; *Clavicula*, two; Ribs, twenty four; of the *Sternum*, three; of each Hand, divided into four Parts, sixty two; *Ossoplatas*, two; Armes, two; Cubits, four; both Wrists, sixteen; both *Metacarpus*, eight; of all the Fingers, thirty; of each Foot, divided into four parts, sixty two; Namely the Bones of the *Ilium*, two; Thigh, two; Legs, four; Knee-pans, two; *Tarsus*, fourteen; *Metatarsus*, ten; Toes, twenty eight.

Besides these Bones, whereof the *Skeleton* is made, there are eighteen other manifest small Bones, In each great Toe four, *Sesamoida*; in the Head of the Muscles, called *Gemeli*, on each side four. The rest of the *Sesamoida* are so small that they consume or vanish away in boyling the Bones to make a *Skeleton*.

There is in each Ear three small Bones, which ought to be kept apart with the *Sesamoida*; neither come they into the structure of the *Skeleton*. So that if you add the first number to the second, you shall find two hundred and fifty six Bones.

Chap. 26. The History of an Infants Bones, till the Age of seven years.

SEeing the bones of Infants, from their Birth till seven years of Age, differ much from the Bones of such as are grown up, both in Number, and Figure, and especially

especially in the Multitude of *Epiphyses*, and defect of *Apophyses*, therefore I thought it well worth the while, to add the Bones of Infants, to the Bones of men grown up, that the difference between them may appear more evidently, for this comparison makes much to take away the differences amongst Anatomists; and to untie the difficult knots, you shall find in *Galen's* Doctrine of the Bones.

Its Antient.

That this Osteology, was known to *Galen*, is manifest by various places in him; in which he declares the Bones of Infants, in his Book of the formation of the Child in the Womb, he describes the Head of the Infant, in the first book *De semine*, he treats of the Teeth of Infants, but before *Galen*, *Hippocrates*, was a diligent studier and observer of this Osteology; as his divine monuments of the Nature of Children, and of their breeding Teeth witness.

And profitable

And the profit of this Doctrine is very great: not only in the education of Children, which are marred, by the unskillfulness either of the Midwife, or Nurse. We see diverse Children at this day Born, with great Heads, Bunches, Bow-Legs, great Ancles, unseemly Knees, and at last are Lame when they begin to go, which deformities in the beginning of their Age, whilst their Bones are soft, may be amended, and how can a man amend them rightly, unless he know the Bones at that time exactly?

Excellently said *Galen*, in *Lit. de causis Morborum* Chap. 7. When he describeth the deformities of Bones, which are in Children. *The Natural figure*, (saith he) *of the members, and of the whole Body, is changed either in the Womb, or at the Birth, or after the Birth: It is depraved in the Womb when the formation is vitiated, by reason of abounding, or unfit matter, It is depraved in the Birth, when the Midwife takes it not rightly, or binds it not up rightly, being born, after the Birth the Nurse, intaking of it up, laying it down, or carrying of it, or washing of it, or binding it up; in all these the Nature of every member is easily turned out of its course, and corrupted. These also happen in unfit Motions, whilst it is set to stand or walk, before its time, or exposed to vehement Motions. For unseasonable, and vehement Motions weaken the Limbs, and the Legs are turned inwards or outwards by the weight of the Body; and those Limbs which should be straight are made crooked, the Parts of the breast are usually inverted by Nurses, by binding them too hard, in their first education; this we see almost continually in Virgins, whilst Nurses study to encrease those parts, which are about the Hips and Bowels that they may exceed the bigness of the Breast, they bind the Parts about the Breast so vehement hard, that the breast becomes sharp, and they look as though they were broken back; and sometimes are crook Shouldred.*

You see by *Galen*, what miseries and deformities little Children are subject too; by reason of ill forming the Bones, which may be corrected whilst they are Young, and Flexible, and brought into what form you will.

Hippocrates *Lib. de Septimestri Partu*, gives the reason, why Children are Born Blind, Lame, or otherwise ill formed; *The Women that go with such Children are ill, or like to miscarry in the eighth month, for the maimed Embrion was grievous sick, in the eighth Month; and the Disease, Caused Imposition, as it doth in men, but when the Embrion is main sick, at any other time it rather dies then suffers Apostumation: Hitherto Hippocrates, and Aristotle writes Sect. 10. Probl. 40. That Children may be hurt in the Womb, because their Legs are so tender.*

The Marrow of the Bones bloody Tuber Epiphyses.

The greater Bones of Infants are hallow, and the Marrow Bloody. After six Months, the Marrow waxeth white, they have a *Periostion*, and a *Cartilage* at the ends, the extremities of the Bones, are *Epiphyses*, some few *Apophyses* they have, but a great number of *Epiphyses*, that according to *Ingrassias* they amount to, three hundred twenty one. But I think tis no such matter, neither indeed, have I yee been very solicitous about the counting of the number.

How they wax hard.

I never observed any Bone, of any bigness or length; which ended not in an *Epiphyses*; now all the *Epiphyses* of Infants are *Cartilaginous*, and grow hard and are turned into Bones by degrees: Their hardness begins not at the Bone, to which they

they are joynd, but they take their bony substance first at the Centre beginning at the internal part and encreasing by degrees to the external. Or from the Centre to the circumference, outwardly they grow dry and hard by heat which is stirred up by Motion and rubbing the Joynts one against another in walking.

Chap. 27. Of the Head.

The Sutures of the Head seem to be rather *Harmonia*, distinguished by a Line, and not joynd together like Teeth of a Saw by mutual ingreiss. The joynings of the Skul are loose, so loose that they suffer the *Dura Mater* to pass out for the forming of the *Pericranium*. The Sagittal Suture alwaies passeth to the extremities of the Nostrils, but very seldom descends by the hinder part of the Head to the hole of the Marrow of the Back. The coronal Suture hath a membranous gaping at which place the pulsation of the Brain may be both seen and felt, this place is vulgarly called *Fontanelle*.

The temporal Bone seeing it is framed of two parts scaly and rocky, the parts of it are distinguished by *Harmonia*, which is not disanulled above the hole of the Ear, but beyond it, about the *Apophysis Mastoide*.

The Bones of the Skul are very thin, neither shall you find the two tables or plates in them, before one year be Elapied; between the Bones is some disparity because the Bones of the hinder Part of the Head are the thinnest, contrary to what they are in such as are grown up, at the concurrence of the sagittal and coronal Suture is a cleft called *Rhomboides*, which a thick and hard membrane shuts and grows bony in process of time.

The ^b Frontal bone is alwaies two without any sinuous Cavity, the Bone of the hinder Part of the Head in Children new born, most commonly consists of four bones even till they are a Year Old. The first is the whole and superiour breadth of the bone which compasseth and embraceth the *Cerebellum*, this is rarely divided and yet there is a certain cleft in the top, caused by the sagittal Suture produced thither. The second and third portion make the sides of the hole of the Marrow of the Back, and the middle part of the Circle. The fourth bone is placed in the extremity of this, and makes a portion of the great hole, this as yet I never observed. A transverse Line intersects the circle as though it were two. The Bones of ^c *Bregma*, at the concourses of the sagittal and coronal Suture, are imperfect by reason of the *Fontanelle*.

The Bones of the Temples are manifestly separated into two Parts, scaly and rocky, neither the *Epiphysis* called *Szylois* nor the *Apophysis* called *Mastois* appear in it, only the *Zygonthica* is seen, but that part of the rocky Bone subject to the hole of the Ear, makes the Basis of the Skul, it is called next to the *Sphenois* and next to the *Lithois* by some, but may be called *Auricularis*, because it comprehends the whole structure of the Ear, in Children it is an *Epiphysis* which easily is severed, and this is often observed in the Sculs of brut Beasts that are grown up, in which notwithstanding it is otherwise framed.

In this auricular *Epiphyses* many things come to view, the passage of hearing is altogether Cartilaginous, about the fifth or sixth month it begins to be bony, and yet it may be separated even to the seventh month, but in the basis it is hollowest, even to the third year and longer.

But proceeding inwards to the extremity of this passage there is a bony ^d circle to which the *Timpanum* is fastned, this also is easily severed, but when the passage of hearing grows hard, the bony circle is so strongly knit to it, that it is inseparable. The Cavities are very straight, neither can the admittable structure of the Labyrinth be perceived in Boyes, and yet that which is wonderful the three little Bones of the Ear ^e *Malleolus* & *Incus* and ^f *Scapes*, are of the same substance, bigness and form, even from the birth to extream Old Age.

The *Os Sphenois* is divided into four Parts according to *Fallopis*, of which the

The Sutures.

Sagittal.

Coronal.
Fontanelle.Bones of the
Skul.
Their thicknes.

Of the Forehead.

Bregma.

Bones of the
Temples.Passage of the
Ear.

Bony Circle.

Os Sphenois.
process

process called *Pterigoides*, constitute two; the seat which receives the *Glandula Pituitaria*, a third; The fourth part is subservient to the optick Nerves, which portions grow together, not long after the Nativity: but *Fallopini* very ill described these portions of the *Sphenis*; for the third comprehends the seat, or Saddle, and also is subservient to the Optick Nerves: The fourth is stretched out below the Saddle, even to the *Corone* of the hinder part of the Head, and that division remains conspicuous, even till three or four years be passed. In this Bone, are no winding Cavities; and the *Os Ethmoidis*, is totally Cartilaginous; the bridge of the Nose is bony at first, but grows hard along time after the other parts.

The Bones of the Eye-holes.

In the Eye-hole of such as are grown up, are six bones noted, *Zygomaticeus*, *Sphenoides*, *Frontal*, *Ethmoides*, *Lacrymal*, and *Maxillare*: The portion of which makes the pavement in Children, and is severed with a kind of Suture, which remains even till three or four years of Age.

upper Jaw.

The Lines, or *Harmonia* of the upper Jaw, are like those, in such as are grown up, a certain cleft only appears in the brim of the *Inferior Orbita*. In the beginning of the Pallat is a transverse line espied, which is stretched from one of the Teeth, called Cutters, to the other; and comprehends the four Cutters. As for the bones they are like the bones of such as are grown up, both in figure, number, and Scituation. The Jaw-bone is not hollow, and the cells of the Teeth are covered, and as it were stopped up with a membrane.

Inferior Jaw.
Teeth.

The ¹ Interior Jaw in the midst, where the Chin is, divided by *Harmonia*, and so consists of two parts, so continuing till two years be past.

The Teeth are ingendred in the Womb, when the rest of the parts are ingendred; but within the holes of the Jaws: they are in number twenty, ten in each Jaw; of which; are four Cutters, two Dog Teeth, and six Grinders, they all want Roots.

They begin to pass out of the Gums about the seventh Month, sometimes sooner if the Nurses Milk be very hot. Some few have Teeth when they are born, as *Cneus Papyrius Carbo* and *M. Curtius*.

At what time they appear.

They do not break out altogether, but by degrees, in two years space; and the upper Teeth usually come out sooner then the lower: first of all the Cutters, afterwards two Grinders, then the Dog Teeth; the breeding of which, is most painful to Children.

When Children have twenty Teeth, then they usually say, they have all their Teeth; neither indeed have they more, before they are three or four years of Age.

Where the hinder Teeth lie.

But when Anatomists say, that there is only twenty Teeth contained in the Gums, They do not tell you where the other eight or twelve reside; neither doth it seem like a truth, that new Teeth should be bred after the other are formed, and lie hid in the Gums. In the upper Jaw I have observed the other four, or six, hid under the *Zygoma*; but those of the lower Jaw under the extremity of the same, where they lie hid like points. Under the coronal *Apophyses*, because the space of each, seems at the narrowest, to comprehend twenty eight, or thirty two Teeth.

When they break out.

Neither do these eight or twelve Teeth break out before the Jaws are made larger, which happen about the fourth year of the Age: but contrary to the Nature of other Teeth, they continue as long as life continues: neither do they come out, as the other twenty Teeth do; neither being plucked out, do they grow again.

Their generation

Their generation is two-fold; one in the Womb, the other without the Womb; for in the Womb the Teeth are formed with the other parts, but are imperfect. Within each hole, is contained a Mucous, and hardish substance, concluded in a little white Membrane, which grows dry, and take a bony Nature by degrees, and to get out pierceth the Gum with its top; the Membrane compasseth the hole round, and like Glue retains the Tooth: The other portion, namely, the Root of the Tooth, remains still within the hole, being soft and Mucous, as the Feathers of Birds

Birds are; but it grows hard by degrees, and is parted in the middle, into three or four Roots.

Under these Teeth, in every hole, is subjected the Seminal matter of another Tooth, a Membrane passing between them; which whilst it is fermented by the formative faculty, and growing up, it expels the former. The second matter thus included with a membrane, hath deceived many Anatomists, which thought the Teeth consisted of two Parts; and that other Part of the Tooth, was an *Epiphysis* of the Root: therefore *Vesalius*, and *Columbus*, held the Teeth in Children, ought not to be pulled out by the Roots, but transversely to be broken off, as thinking that a new Tooth grew up from the same Root, which could never be, if the former were pulled up by the Root. But *Celsus* in my Judgement wrote more truly that there was a new Tooth in Children, which did expel the former, and sometimes grew out besides it, either above, or below it.

The middle part of the *Hyois*, being the basis of the whole bone, is Cartilaginous, but soon becomes bony; and yet the sides remain Cartilaginous a good time. *Hyois.*

^a T. 15. f. 4. C. ^b T. 8. f. 4. C. ^c T. 8. f. 4. A. A. ^d f. 4. B. B. ^e T. 8. f. 5. ^f f. 7. and 8. ^g f. 6. A. ^h f. 6. A. ⁱ f. 1. 8. f. 6. C. ^k T. 8. f. 4. D.

Chap. 28. Of the Back and Breast-bones.

THE Back-bone consists of twenty four *Vertebra*, the *Os Sacrum* excepted: all of them for one years space, are divided into ^a three parts, the two first of the Neck excepted: the first part constitutes the Body; the other two make the sides of the hole, neither do they send out any process. *Fallopins* hath seen the first *Vertebra* of Children constituted of five parts; but the rest, of three only. The first part was where it was joyned with the Tooth of the second *Vertebra*, called *Pyrenois*; the second, and third parts, were on the sides, in which both the superior, and inferior Cavities of the Joynts were; the fourth, and fifth parts perfected the rest of the hole. The second *Vertebra* of the Neck, besides the three parts common with the rest, hath a fourth eminent *Epiphysis*, called *Pyrenois* or the Tooth. *The Vertebra.*

In all the *Vertebra*, the hinder part is ^b Acute, and altogether Cartilaginous, and then grows bony, and like an Appendix is joyned to the other parts. The transverse processes, are also Cartilaginous, but soon acquire a bony Nature. *Fallopins his Observation.*

The *Os Sacrum* consists of ^c five *Vertebra*, with Cartilages between: So as they may easily be discerned the one from the other: the hinder sharpness is totally Cartilaginous. *Os Sacrum.*

All the *Vertebra* consist of three parts, as all the Spines of the *Vertebra*. The *Os Cocciæ* is altogether Cartilaginous, and undivided; Age divides it into three or four parts, which remain Cartilaginous till seven years be expired. *Os cocciæ.*

The extremities of the Ribs that are ^d joynted to the Back, are altogether Cartilaginous, yet they soon grow hard: the *Sternum* of Infants, is at first Cartilaginous, and yet divided by no line, and yet the Superior are sooner bony, then the inferior, and the middle parts of them before the extremities, whence it comes to pass that the bony part is compassed about with a Cartilage on each side, and resembles so many bony Knots in a board. *Ribr. Sternum.*

So soon as the Child is born, the inferior part of the *Sternum* is Cartilaginous, and hath no division; then it grows bony, as I shewed you before; at last it is cut into six particulars, by a transverse line drawn from the Cartilages of the Ribs, to which you must number that which is by the Sword-like Cartilage.

Fallopins in his Observations, notes eight bones in the *Sternum* of Children; which afterwards are brought to seven, the two last being reduced into one: afterwards they are brought to fewer, six only appearing by that time the Child is seven years of Age; and though *Fallopins* think six alwaies remain, yet I have alwaies observed fewer. *Fallopins his Observation.*

Fallopins

Fallopins thus describes the Union of the bones. After seven years the bones of the *Sternum* are joyned together and become fewer by degrees, so that six only appear, one bone being made of the fourth and fifth, and another of the sixth and seventh. Besides this Union increasing, there are only four found, the third fourth fifth sixth and seventh growing together. Of the *Sternum* of Infants Read *Sylvius*, *com. ad ch. 2. Lib. Gal. de Ossibus.*

^a T. 8. f. 9. A B C. ^b f. 11. ^c f. 12. B. ^d f. 10. 11. A.

Chap. 29. Of the upper Limbs.

Scapula.

IN the *Omo-plata* both *Apophyses*, and *Epiphyses*, are Cartilaginous, also the Neck with the Cartilage *Glenois* are of the same Nature. The eminence called *Coracoides* is an *Epiphysis*, yet the bone *Acromium* doth not seem separated but it is an *Apophysis* incruited and terminated with much Cartilage, which is dried after three or four years, and changed into a bony *Epiphyses*, called *Acromium*, as it is described by *Hippocrates* and *Galen*, at last that *Epiphysis* is turned into an *Apophysis*.

^a The appendices of the shoulders in each extremity are Cartilaginous, and grow hard by degrees. Also the *Trochlea* is Cartilaginous, but is sooner turned into bone than the superior parts: the superior part of the Cubit called *Olecranon*, is an *Epiphysis* and after one years time grows hard and is joyned to the bone.

Wrist.

The ^b bones of the Wrist when the Child is born, are composed of one Cartilage, afterward they grow bony and are distinguished from one another. But first they are spongy as the rest of the bones are, which from Cartilages become bones. The eighth bone of the Wrist, turns bony last of all.

Metacarpus
and Fingers

The extremities of the ^c bones of the *Metacarpus* and Wrist are Cartilaginous, which are hardened within less than a year.

^a T. 8. f. 13. a b. ^b T. 8. f. 13. c. ^c f. 13. d.

Chap. 30. Of the Inferior Limbs.

Ilium.

THE *Ilium* in Children is composed of three bones even till they are seven years of Age, to which the Antients gave proper Names. ^a The first bone comprehends that wideness which passeth to the midst of the Funnel, the other part is equally divided into two parts, a line being drawn by that Cleit of the Funnel cross the Oval hole, and makes the Symphysis of the *Os Pubis*, the superior Part of this division is called ^b *Os Pubis*, the inferior ^c *Os Ischiium*, the Lips of which are Cartilaginous.

Pubis.
Ischiium.

Thigh.

^d The Thigh on the superior part sends out three appendices; a Head, and two *Trochanters* which remain Cartilaginous *Epiphyses*, a good time, the inferior part of the Thigh hath two knobs, the appendix is Cartilaginous.

Patella.

The Knee-pan at first is totally Cartilaginous, and is a long time ere it grow bony.

Tibia:
Fibula.

The bones of the *Tibia* and *Fibula*, differ nothing from those that are grown up save only in their appendices, both above and below, which are Cartilaginous, then grow hard, and remain separated even to the tenth year and upwards.

Tarsus.

In the Foot all the bones of the ^e *Tarsus* are Cartilaginous for some months, the bone of the Heel excepted which is Bony within, though covered with Cartilages, without.

Sesamoides.

The *Sesamoides* remain Cartilaginous almost to consistent Age, two only excepted, which are in the first Joynt of the great Toe, for these grow bony presently after the Birth.

^a T. 8. f. 12. C C. ^b T. 8. f. 12. D D. ^c f. 12. E E. ^d f. 14. a. b. ^e f. 14. c.

CHAP.

Chap. 31. *Of the Number of Bones.*

Ingraffias, Propounds a fourfold number of the bones of Infants, the first contains two hundred thirty seven. The second three hundred forty five. The third two hundred fifty nine. The fourth one hundred ninety two. But this last Number I doubt is devised, or else I do not understand what *Ingraffias* means. The Number.

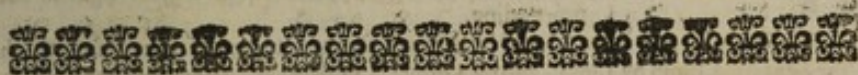
These Numbers he thus composeth.

In such Children as are grown up are found three hundred five bones, in the Head seventy, to wit, eight in the Skul, twelve of the upper Jaw, one of the lower Jaw, six of the Ears, thirty two Teeth, eleven small bones of the *O: Hyois*, which all joyned together make seventy. The Trunk comprehends sixty seven, *Vertebra* twenty four, *Scapula* two, *Inguia* two, *Sternum* three, *Ilium* two. These joyned together make sixty seven. But if the *O: Sacrum* consist of five and the *Coccyx* of three, (as often it doth) then there will be only sixty six. In both hands, eighty four, (adding the twenty four *Sesamoides*) in both Feet eighty four, the twenty four *Sesamoides* being also added, the total Number of bones will be three hundred and five; from this Number if you take away thirty two Teeth which doth not appear in Infants, the result is two hundred seventy three, although the Teeth being formed lie hid in the Gums, yet because there is no use of them, they are not reckoned amongst the bones.

In reckoning the second Number he proceeds thus, the *Vertebra* of the back-bone and *O: Sacrum* in Infants are divided into three Parts, the second excepted which is divided into four by reason of the Teeth, the *Ilium* is divided into three bones, the *Sternum* into eight, the inferior Jaw of two, and the Frontal bone is double.

These diligently considered you should find amount to seventy two, which added to two hundred seventy three make three hundred forty five, from which if you take away the bones which deserve rather the Names of Cartilages than bones, as the bones of the Wrist sixteen, of the Instep eight, of the *Coccyx* four, *Sesamoides* forty eight, each Knee-pan and *Hyois* eight (the three small bones remaining) which are in number eighty six, there remains two hundred fifty nine. In these Numbers the three hundred fifty one Appendices are not Numbred which if you add to three hundred forty five, the Body of the Infant will be composed of six hundred seventy Bones.

The End of the First Book.





THE
 SECOND BOOK
 OF
 ANATOMY
 AND
 PHYSICK,
 OF
 John Riolanus.

Chap. I. *General Precepts, which he that would be an Anatomist, must be first Acquainted with.*



Being that according to *Aristotle Chap. 1. lib. 1. post. Analyt.* Every Doctrine and discipline which consists in reason and intelligence, is perfected by fore-knowledge, and *Nullius Lib. 2. de nat. Deorum*, saith that without fore-knowledge, neither any thing can be understood nor studied, nor disputed. Before I set about my Anatomical work I thought good to premise certain general Precepts, which are the foundations of Anatomy, and will give great light to our proceeding.

How Anatomists Consider the Body of Man.

Its Parts.

Solid Parts how many fold.

Similar Parts what how many.

The Body of man is considered by Anatomists as composed of many Parts, which they examine Limb by Limb, and by a diligent Dissection, they divide the whole Body. into its smallest Parts. They divide it first into three grand Parts, Containing, Contained, and Impelling; that is into the Parts, Humors, and Spirits. But in the Anatomical dissection of a dead Body, the Humors and Spirits, are not considered the Speculation of which belongs to Physiologie, only the Solid Parts are regarded, which are either such as make, or such as contain Humors and Spirits or the instruments of Motion, which is the Chief Action of a living Creature, for which it was made. The Solid Parts are similar or dissimilar. They are called similar Parts because they are most simple, from which, as from a principle, the dissimilar Parts are composed. The similar Parts according to Anatomists are Bones, Cartilages, Ligaments, Membranes, *Fibres*, Veins, Arteries, Nerves, Flesh, Fat. These

be well instructed what these similar Parts are, that when he searcheth out the structure of the Organical parts, Limb by Limb, he may know the Fundamentals of this structure.

1. A bone is a part of the Body, most cold and dry, Terrestrial; and therefore hardest, that so it may prop up the other parts of the body.

1. A Bone.

2. A Cartilage or Gristle, is not so hard as a bone, which in Old Men sometimes degenerates into a bone: The Cartilages are placed about the extremities of the bone, to ease them in their Motion; some are found separated from the bones, as the Cartilages of the inferior Jaw, in the Articulation of the *Clavicula*, in the *Sternum*, in the Articulation of the *Tibia* to the Thigh; besides the Cartilages of the *Larynx*, Wind-pipe, and such as are placed to prop up other soft Parts, as the Nostrils, and Ears.

2. A Cartilage.

3. A Ligament or bond, is a part which binds the bones together, being of a middle substance, between a Cartilage and a Membrane; softer than a Cartilage, harder than a Membrane.

3. Ligament.

4. A Membrane, Skin, or Coat, is very soft, and subject to dilation. It is the covering of others parts, or the Receptacle of something, as the stomach, Bladder of *Gal*: It being a hollow body, it receiving something, it may be called *Tunica*, a Coat; If it Embrace and cover a solid body, it is properly called *Membrana*.

4. Membrane.

5. A *Fibra* is like a thread stretched over a Membrane, or Interwoven therewith, to strengthen it: and because of its various Scituation, it is called *Right*, *Oblique*, and *Transverse*; not only to help the Membrane, but also to strengthen it. Every sort of *Fibres*, is thought to perform a several action; as the *Right*, to draw to; the *Transverse*, to retain; and the *Oblique*, to expel. Which Motions notwithstanding, absolutely depend upon the inbred faculty of the Part, which as it hath a violent dilation, so hath it a willing and natural contraction, and is helped to these by the *Fibres*.

5. Fibra.

6. A *Vein*, is a Membranous Vessel round and hollow, allotted to contain Blood, and distribute it for the Nourishment of the whole Body.

6. A Vein.

7. An *Artery* is a Membranous Channel of the same Nature, but something harder and thicker; ordained for the containing and Distributing of the Arterious blood: The Original of which, *Aristotle* thought was from the heart; but wiser Physicians hold the beginning of the Veins to be in the liver, but of the Arteries in the heart.

7. Arterj.

*abscissioe terminali
Cochim. aff.*

8. A *Nerve* is a Channel made to carry animal Spirit; and because this spirit is most subtil, therefore the Cavity so small, that it is not discernable.

8. Nerv.

9. The *Flesh* is the foundation of Organical and dissimilar Parts, where bone is wanting, and makes up the chief part of our bulk. The flesh is in substance soft and thick, made of blood alone, compacted together, and well concocted if it be red; but of blood and Seed, if it white.

9. Flech.

A four-fold sort of flesh, is observed in the Parts: *Viscerous*, and *Musculous*, both of them very red; *Membranous* and *Glandulous*, both of them white. For every substance of the bowels is called *Flesh*, or *Parenchyma*. The thicker substance of certain Membranes, which are the containers of something, which by dilating and contracting their bodies, they attract, retain and expel, are also called *Flesh*, or a *Flesh-like* substance. The thick, and spongy substance of the *Glandula*, is called *Flesh*; but especially the substance of the Muscles deserves the Name of *Flesh*.

10. The *Fat* although it appear not till the whole body be formed, and when the Child is big, and grows to the Parts; yet because in the composition of Organical Parts, it often concurs to make up the bulk, it is Numbered amongst the similar Parts. Fat is the thinnest substance of blood, Fat and Oily, sweating out through the tender Coats of the Veins, and hardning between the Membranes: It is two-fold, according to *Aristotle*; Soft, and external; Hard and internal. The one is Grease, the other Suet.

10. Fat.

These three similar Parts; *Bones, Cartilages, and Ligaments*, shall be treated of, as they are shewed in a Carcass, from top to Toe, after we have shewed the Muscles, because they are so joynd together, that one cannot be shewed without another.

But I desire all such as are studious in Physick, first to be well acquainted in the Osteology or History of the dry bones in the Skeleton of a Man, before they come to the inspection of a Carcass; for so they will the better understand the whole anatomical discourse of the dissection, and find out the reason of my other *Osteology* in the bones of Carcasses.

The Rest of the similar Parts shall be shewed severally in the explication of the dissimilar Parts, seeing of the similar Parts aforesaid, viz. *Bones, Cartilages, Ligaments, Membranes, Fibres, Veins, Arteries, Nerves, Flesh and Fat*, the Bulk, Material substance of the dissimilar Parts is made up, and therefore you shall hear similar Parts often mentioned, in the explication of them; howbeit, in some places they exist apart, no waies joynd or united unto others, to constitute an Organ, but are considered with reference to their Particular uses.

Organical
Parts, what?

But they concur together, and are united one with another, in Organical Parts, that they may perform their various Offices: for the effect of which, they are divided into four orders: For in every Organ there is the principal Part by which the Action is performed: Another, without which the Action cannot be done: A third, by which the Action is preserved. But in every Organ, the principal Part ought to be similar and proper to it, such as is not found in another Organ. But this similar Part cannot perform its action alone, unless it be helped by others, and therefore the concurrence and Union of similar Parts is necessary. Wherefore, every Movable action belongs truly, and properly to an Organical Part; and none unless it be alteration, belongs to a similar Part; which out of the composition of the Organical, hath only use, which notwithstanding, it contributes to perfect the action of the Organical.

How many.

Moreover, Organical Parts according to the dignity of their action, are divided into *Principal*, and *Adminisfring*. They are called *Principal*, which supply the whole body with matter and faculty: Physicians hold them to be three; the *Liver, Heart, and Brain*: *Aristotle* held but one principal Part of the body, viz. The *Heart*, which is King and Ruler of all others. The rest of the Parts Minister, and are subservient to the principal. According to the various composition of the Organical they are divided into compound, more compound, and most compound: For the Finger is compound; the Hand, or Foot, more compound; the Limbs, are most compound.

What is to be
observed in
each Part.

But that we may seek out the structure of each Part exactly; we must observe the *Name, Substance, Temperature, Original, Scituation, Quantity, Number, Figure, Color, Connexion, Communion, Action, and Use*. Connexion differs from communion; for Connexion is the sticking of one Part to another, of one or more Parts by which they depend; it is sometimes taken for the Original of the part it self, and yet the Original of some Parts is distinguished from Connexion; but communion is either universal, with Parts remote and near, which is done by *Veins, Arteries, and Nerves*, by intervening of which, all the Parts have community with one another; or Particular, when some particular Part communicates it self to some near or remote Parts, and so the Gall communicates it self by the *Biliar passages* to the *Liver*, and the Gut *Duodenum*: The *Reins, and Bladder* have communion by the *Ureters*. In this Method you may comprehend whatsoever may be spoken, or demanded of any Part: But in the History of Parts we must begin first of all with those things that are common to the whole Organ, then with those things which are Proper to the same Organ: but in describing the *Fabrick* of the body of *Man*, we will follow the common order of *Dissection*.

Chap. 2. Of the Natural and Legitimate Conformation of the Body.

Being my design and intent of handling Anatomy, doth not consist in a bare and simple contemplation of the Parts of the Body, but is also referred to the use of Medicine; before we come to the dissection of the body of Man, we will describe in a few words the Legitimate and natural conformation of the Body of Man when it is alive, which is the Basis whereby we judge of the Sickneses and Imperfections of Men or Women: this was necessary of Old in buying of Servants, in joyning Men and Women in Marriage that they might have Children, and in chusing select Men for Souldiers. And this knowledge is necessary even to this day; for in some Monasteries such as desire to lead a religious life, the Physicians views them Naked from the Crown of the Head, to the Sole of the Foot; and notes their respiration, and pulse, and voice in singing. This is done in buying Slaves in divers Countries, and also in buying Horses; and also Nurses are exactly viewed by Physicians for the education of Children, I mean the Children of Princes.

The necessity of it.

Therefore in Man-kind, you may consider the differences of Sex: Substance of Body, Temperatures, Greatness, Color, form or Figure; as they are convenient in a perfect and well formed body, that for by this, the difference of a body not well formed may be known.

Considerations in a Man well formed.

As for that which belongs to Sex, Man-kind is twofold: Male and Female. The Latin word *Homo* comprehends both; and a Woman has been called *Virgo*, and therefore a stout Woman is called *Virago*; the differences of both I have Accurately expounded in my *Anthropographia. Lib. 2.*

1.
Sex.

The substance of the Body in Man ought to be fleshy not Fat, firm and solid, not soft; the Limbs meanly hairy; for smoothness in Men, such as is in Women, argues effeminate conditions.

2.
Substance.

A Healthful temper ought to be hot and moist, because life consists in, and is preserved by such a temper, yet is there a peculiar temper in every person, which by Physicians is called *Idiosyncrasy*; which if *Galen* could exactly have known, he would have thought himself equal with *Aesculapius*: but we must reduce this to the General. But by what signs this may be known, *Galen* hath declared in his little book of *Art of Physick*, and other Authors.

3.
Temper.

The Magnitude of the body is threefold, according to the threefold Demension of the body. We shall consider chiefly the Longitude and Latitude. The natural and decent Longitude of the body ought to be four Cubits, the Latitude one Cubit as *Goropius Becanus* teacheth: this also is confirmed by *Victrivius* who defined the just Longitude of the body of man to be six Roman Feet. And *Agellius Lib. 3. ex Varrone*, Noted that the highest pitch of a Mans height was seven Foot: but more Men are shorter, than taller than this. *Vegilius* Writes that Souldiers ought to be chosen six Foot high, yet by Reason of difference of Sex, Region, and Diseases, Men are either taller or shorter, for each soyl hath its Particular Nature: so the people of *Asia* are taller than those of *Europe*, and in *Europe*, those of the North as *Denmark*, the Low-Countries and those of upper *Germany* are tallest.

4.
Magnitud.

The various Mensuration of bodies *Hippocrates* hath described *Lib. de aer. ag. et loc.* Commonly men are taller than Women; whereas in some other living creatures, Females are greatest.

The Latitude or thickness in a well Proportioned body ought to be, almost half the Longitude, so that if the Longitude be six Foot, the Latitude ought to be almost three; slenderness of body is subject to Consumptions, neither can the body be strong and fit for labor unless it be thick.

In the bigness of the body is Magnanimity and beauty, quoth *Aristotle, Ethic. Lib. 4.* For a man of a little and small body cannot be fair; yet if you regard understanding,

understanding,

understanding, there is little Wit commonly in those Tall Bodies.

Elegantly said *Celsus, Lib. 2. Ch. 1.* The best disposed body is well set, neither slender nor Fat, a tall stature is comely in youth but not so in Age, a slender body is weak, a Fat body dull.

5. Color.

The Colour of the body is diligently to be marked, for such a colour as flourisheth in the Skin and countenance, the same is predominant in the humors, and therefore sanguine people are Red, Chollerick Yellow, Melancholy Black or brown and dusky, flegmatick are pale; a brown and ruddy colour are preferred before pale, which argues softness of body.

There is some difference in Authors about the colour to be Chosen in a Nurse, *Aristotle* prefers brown, others a mingled colour of Red and white.

6. Form of the Head.

Now the Natural and Legitimate form of the Head, Breast, Belly, and Limbs, is to be considered. The Head ought to be round, and not Copped unless the Neck be very thick; a great Head is preferred before a little one; from the Head ought the Nature of the Nerves, Veins, Flesh, and Humors to be collected.

A great Head requires a great Neck: which gives indication of a great breast, by reason of the Parts contained in the Neck: a great breast makes a large belly, and therefore the proportion of the rest of the Cavities depends upon the Head.

Breast.

The Chest ought to be large, of an Oval Figure, and the Back-bone straight, the breast ought to be somewhat convex, not sharp, nor flat, nor depressed.

The Papps of Men ought to be depressed, but in Women swelling round, and Glandulous, rather than Fatty or Flethy, because they are the Emunctories of the breast if the Woman give not Suck. If the Duggs be small the Women are sickly, and if the Nipples look pale the Womb is Diseased, according to *Hippocrates*.

what Breasts are to be chosen in Nurses.

Whether are large breasts to be chosen in Nurses, or such as are mean in bigness? Great breasts please not *Moschus*, because they are Fat, neither have they plenty of Milk, and therefore Fat Nurses are not to be preferred before such as are Lean, and Juicy; neither such as are tall, before such as are of a mean Stature: *Aristotle Lib. 3. de hist. animal.*

White coloured Women, because they are Flegmatick, have but bad Milk.

Belly.

From the breast, we pass to the belly, which ought to be round and sticking out: Women that have such bellies, the Poets praise, and say *Venus* had such a one, *Hipp. Lib. de vet Med.* Notes that long and round bellies, ought to be considered of Physicians, because by looking upon them, 'tis easie to know which are fit for strong Purgations; for such whose Parts in the *Abdomen* are strong, and well disposed, may easily Purge; but such as are slender, take strong Medicines with danger.

Very Fat Women are hard to conceive with Child. *Hippocrates, Aph. 4. Lib. 5.*

Privities.

As for what belongs to the Privities; *Helioabalus* chose such for Souldiers as had large Privities, because he thought they were lusty stout Men. A very long Yard is not fit for Venery, either because the strength of the Seed passeth out, by reason of the length of the Yard, if you will believe *Galen*; or because the Muscles are tyred, by erecting a great and long Yard. A mean Yard is most fruitful, and gives most and longest pleasure in the act of Copulation. A long Yard, though indeed it fill the Neck of the Womb, yet it makes it not so fruitful; and is hurtful to such Women as are subject to the fits of the Mother, by stretching the Genitals: Neither are the Testicles when they are great and Pendulous, to be commended.

Limbs.

We pass to the Limb, viz. The Hands and Feet, which ought to be equal in proportion to the rest of the Body: The Longitude of the Foot, from the *Os Pubis*, to the extremity of the Heel, ought to be equal to that of the Hand, from the *Ala*, to the top of the middle Finger. If the whole body be six Foot long, the Foot is three: both Hands and Feet are somewhat fleshy in strong bodies; for although slenderness of Legs be commended in Horses, 'tis not so in Men.

An example of a perfect and absolute body well formed, is to be Read in *Sidonius Apollinariu,*

Apollinaris. Lib. 1. Epist. 2. de Theodorico rege, wherein is one remarkable fault to be amended, not Noted by interpreters, for Excrementa read Extrema. Inter Extrema Costarum spina discriminat.

Chap. 3. The Division of Mans Body.

BEfore we expose the whole Body of Man, to Anatomical dissection, it ought to be divided into its Parts, or principal Regions, that the Number and order of the Regions, and where they begin, may be known.

Amongst the various divisions of the Body of Man, this in my mind seems the best, and to be preferred before the rest. *Division of the Body.*

The Body is divided into the Trunk, and the Limbs.

The Trunk is divided into three Principal Regions; the Head, Breast, and Belly.

The Head obtains the Superior place: The Breast, the middle; and the Belly, the lowermost.

The Members or Limbs are four branches sticking out from the Body; two Arms, and two Legs.

What are the bands of these Regions, I shall shew, when I come to speak of each Region apart.

The Medicinal Consideration.

I will not stand here in rehearsing and designing the external Parts of the whole body, which are expounded in every Region of the same; but only consider the corporature, or fleshy habit, which is covered with the Skin, like a Garment, which though it look for the most part beautifully without, it looks ill favouredly within. This habit of the whole body, makes the third Region of the body, to which the Humors come from the deepest Parts; the ill effects of which, are clearly seen in the Diseases, and Symptoms which appear outwardly. The jayce which is seen in the leaf and branch comes from the Root.

I shall reckon up the chief Diseases which use to infest the outward habit of the body. *Viz.* Immoderate Fatness, or Leanness; Defluxions, Gouts, Dropfie, Cachexia, the whores Pocks, Plenty, or defect of Sweat, by reason of the opennes, or closeness of the Pores, Palsie, Convulsion, Unquietness, and weariness and all kind of swellings.

The Flesh of man, because its Nourished by purer Blood, is delicater than the flesh of other Creatures, and preferred before it by Canibals, or Man-Eaters.

Flesh, seeing it is Porous and Muscous, it hath empty spaces, which in men in health are filled with spirit and blood, but in such as are sick, with Water and wind; thence come Defluxions over the whole body, and other Diseases of the Skin.

The Habit of the whole body, is Purged and emptied by sweating, by Cupping-Glasses, Scarrification, and Rubbing, according to the Doctrine of *Galen, Lib. de Sanitate*; by Buthings, Whippings, and Beatings, and blistering; and Rubifying, or Pimple-raising Applications.

Therefore seeing the small Pocks and Measles, are but the scum of the whole habit of body, that is, of the Flesh, and solid parts, their coming out is to be furthered, either at the beginning, or at any other time, with Sweating Medicaments, and such things as draw to the external Parts. Neither need you let blood so often, though the Patient be strong, twice if need be, is enough, because it hinders the Motion of Nature in expelling, unless either a dead sleep, or strangling with a Fever, or bloody Flux, which is for the most part deadly, draw us to that remedy; not neglecting young Pidgeons Cut alive through the middle, laid to the Hands and Feet, and sometimes to the Heart, and small Cupping-Glasses fastned all about the body,

with

with light Scarification. And sometimes bathing the Body in Luke warm Water profits, if the season of the year be convenient, to make the Measles and small Pox come out the better.

Chap. 4. Of the lower Ventricle.

- Why the Dissection begins at the lower Ventricle.** THE Dissection and Anatomical demonstration, must be begun at the belly, because it is the sink and Kitchin of the body; and therefore soonest Putrifies and stinks.
- Its Substance.** It is called in Greek *Coilia* because it is coile that is hollow; in latin *Venter*, in English the *Belly*.
- Temperature.** Its substance is fleshy composed of various similar parts, which we shall propound in order hereafter.
- Original.** The belly seeing it is a most compound part, its own temperature is none at all, but it follows the temperament of the parts contained in it, and especially of the Liver.
- Situation.** It hath its Original from the first conformation with the rest of the Parts.
- Quantity.** It is Scituated in the inferior part of the Trunk of the Body.
- Quantity.** Its Quantity or wideness is from the bastard Ribs, or *Diaphragma* to the *Os Pubis* or share Bone; and with these bounds it is Circumscribed above and below.
- The whole wideness of the belly is distinguished into three Regions; the superior called ^a *Stomacal*, the middle called ^b *Umbilical*, and the lower called ^c *Hypogastrica*.
- Again in every part, both the lateral and middle parts ought to be observed; the lateral parts of the stomacal Region are called ^d *Hypochondria*, of the middle Region ^e *Ilio*. The middle is called the ^f *Navil* which is the centre both of the belly and of the whole body.
- The lateral parts of the Hypogastrick Region are called ^g *Groyns*, the middle ^h *Pubis*, the share which after the fourteenth year both in Men and Women is adorned with Hair, as a natural covering for those parts, which the common Law of bashfulness commands us to conceal.
- In respect of number, the belly is but one; yet by the *Peritoneum* it is divided into Cavities; The greater holds the parts which prepare for nourishment. The lesser holds the bladder, and Genitals in men; and the Womb also in Women which never bear Children.
- It is divided into parts containing, and contained. Parts containing, are proper, common, and diverse: common are five; ⁱ *Cuticula*, or scarf Skin; ^k the *Skin*, ^l the *Fatty Membrane*, ^m the *Fleshy Membrane*, and the *Common Membrane* of the Muscles.
- Proper.** Proper are, the Muscles of the ⁿ *Abdomen*, and the ^o *Peritoneum*.
- Diverse.** Diverse are, partly Fleshy, partly bony: bony are the ^p *Vertebra*, and ^q *Pelvis*, which are parts of the *Os Sacrum*, and *Ilium*. Fleshy are the Muscles ^r *Psoas*, ^s *Sacro-lumbus* ^t *Latissimus*, ^u *Sacer* ^x *Semispinatus*, ^y *Quadratus*. I call them diverse, because those bones and Muscles, being Scituated in the hinder part of the belly, do make something toward the constituting of the belly, though they are referred to another part, and pertain to another use.
- Contained.** The parts contained, are manifold; which are divided into such as nourish, and such as engender; such as nourish are such as make Chyle, and such as make blood. The Genitals are of Men, and of Women. The Figure of the belly, is Oval, by reason of the parts contained; which if removed, it is hollow, that it may be the seat of the Vessels dedicated to nourishment, and Generation; and therefore the Latins call it *Abdomen*, and the Greeks *Epigastrion*.
- Color.** The color of the superficies of the belly, is like the color of the rest of the body; in men of ripe Age it is Hairy from the *Pubis*, up to the Navil.
- Coarction.** It is outwardly knit to the breast, and inferior limbs by the Skin; inwardly by the *Peritoneum*.

It communicates with the principal parts, by *Veins, Arteries, and Nerves.*

The use of the Belly is, to comprehend, and involve the parts of nourishment, and generation; take it individually, it consists of Musculous Flesh.

It hath action to compress the parts contained within its self, for the expulsion of excrements, upwards and downwards; and to force the Child out of the Womb.

^a T. 1. f. 1. A. B. ^b f. 1. C. C. ^c f. 1. E. E. ^d T. 1. f. 1. A. B. ^e f. 1. D. D. ^e infra. C. C. ^f f. 1. F. F. ^g f. 2. D. D. ^h f. 2. B. B. ⁱ f. 2. C. C. ^j f. 2. D. D. ^k T. 2. f. 8. 9. ^l T. 2. f. 3. ^m T. 2. f. 4. ⁿ T. 10. f. 10. O. O. ^o T. 23. f. 1. A. ^p T. 14. f. 2. L. L. f. 3. B. B. ^q T. 17. f. 1. C. C. D. D. ^r f. 4. B. B. ^s f. 3. D. D. f. 4. A. A. ^t f. 2. O. O. ^u f. 4. C. C. ^v T. 10. f. 1. N. N.

The Medicinal Consideration.

From this discourse, a Physitian collects many things, in his Practice useful. 1. That the Belly is the Sink of the Body, in which the vices of our intemperance reside; the Mother of all mischeifs, and the Nurse of Physitians; in which condition 'tis called *Collatibus Venter*, and *Aldermars Belly*.

He whose Belly grows to a great bigness, is called *Vantrosus*, Fat Guts. Some we read of, whose Bellies grew to a monstrous bigness, as *Nichomachus Smyrnaeus*, in *Galen*; in *Athenaus*, Lib. 12. *Deipnosophist*, we read of a King that was choaked with Fatness. But famous is that History in *Michael Neander*, in *Eros. Hebr. ex. Taloud*. in *Jona. Rabbi. Ismael*, and *Rabbi Eliazer*, had such great Bellies, that when they stood with their Faces together and their Bellies touched, two great Oxen might pass between them, and touch neither of them.

By reason of the fleshy, and fatty substance of the Belly, it is subject to diverse swellings, especially *Apothumes*, either from the liver by the Umbilical Vein; or else the matter is sent from the Suppuration of the Reins; which being shut up in the Doublings of the *Peritonium*, may send their impurities into the external parts of the Belly.

This fleshy and fatty substance, ought to be mean; if it be greater, 'tis a discommodity to life, if lesser it shews an ill Disposition of the Bowels; Therefore *Hippocrates* wrote, that in every Disease, the parts belonging to the Belly, had better be somewhat gross, than to slender; for if they consume, 'tis very evil: therefore Physitians were wont to handle the whole belly, especially the *Hypochondria*, which ought to be soft, equal, and fleshy.

The Situation of the Parts in the Belly.

The largeness of the Belly is considered, according to longitude and depth, that so the Physitian may know in pains and wounds in the Belly, which part is afflicted or wounded.

According to depth, the parts are divided into upper, and lower; and therefore according to *Hippocrates* the pains in the upper part, are more light; those in the lower, more strong and dangerous.

According to Longitude by the division of the places, you may understand by the bare looking upon them, or feeling them with the hand, what parts are afflicted, pained, or wounded. In the right *Hypochondria* is the liver, which passeth even to the Cartilage *Xyphois*; It passeth a fingers breadth beyond the bastard Ribs, on the sides forwards, two fingers. In the middle Region is the Stomach placed, which inclines more to the left *Hypochondrium*, and descends four fingers breadth below the bastard Ribs.

In the left *Hypochondria* lies the Spleen, which Naturally hangs under the bastard Ribs, the breadth of a mans Thumb.

The Umbilical Region, the Navel possesseth, above which, is the Gut called *Colon*, transversly seated; and in the whole compass of that Region, is the Gut called *Jejunum*, disposed: Toward the Back-bone, are the Kidnies. The beginning of the *Colon* being bowed back from the right Kidney, under the Liver and Stomach,

Use.

Affliction.

Swelling in the Abdomen.

Its Constitution what it should be.

The Situation of the Parts in the lower Ventricle.

Viz.

Liver. Stomach.

Spleen.

Colon.

Jejunum.

- Kidneys.* Stomach to the Spleen, afterwards passeth obliquely to the left Kidney; and therefore the pains of the Colick, must diligently be distinguished from those of the stone.
- Ilium.* In the middle, and side Region of the Hypogastrick, in the Gut called *Ilium* contained; in the bottom of the belly, the bladder, under which lies the right Gut.
- Bladder.*
- Right Gut.*
- Womb.* In Women, the Womb lies between the Bladder, and the right Gut: under the Guts lies the *Mesenterium*, as the Sweet-bread doth under the Stomach. A little below the Navel, the *Omentum* is stretched about all the Guts, and divides all the internal parts with the *Peritonaeum*, from the external; those that lie deep, from those that lie at top.

The Medicinal Consideration.

- Diseases of the Abdomen.* In the Belly are frequently all sorts of Tumors, Imposthumes, Rumbling of the Guts, and Croaking; which proceed either from Tumors of the Parts contained, or from wind, or collection of Water.
- It is Cut on the sides towards the *Hypogastrium*, in the Caesarian dissection, to draw out the Child in a difficult labor. It is pricked near the *Os Pubis*, to draw out Urine, when a *Catheter* cannot be put in. It is pierced in the bottom of the *Hypogastrium*, near the Navel, to draw out Water in the Drop sic *Ascites*, which Operation is called *Paracentesis*.

Chap. 5. Of the Scarfe Skin.

- A**Mongst the parts which make the *Abdomen*, the first that comes to view, the Greeks call *Epidermis*, the Latins *Cuticula*, and we the Scarfe-Skin.
- Substance.* Although, by its substance it seems to be Spermatical yet it differs much from it.
- Original.* It's Temperature is none at all, and therefore no more words about it, but for its original, it is framed of the Excrementitious and Viscous Vapors of the Skin, which Sweating out grow dry by the coldness of the Air, and like a thin Skin, compasseth the Skin round, and therefore it sticks to the Skin firmly and universally, and hath no other bounds then the Skin hath.
- And although to the sight its substance appears simple, yet *Fabricius ab Aquapendente* will have it double, one which is inseparably fixed to the pores of the Skin, the other separable, without any offence to the Skin it self, but the thickness of the *Cuticula*, be it more or less, doth not encrease its number, for though in some places it may be divided into many small skins, yet in no place can one be pulled off without another.
- Figure.* It hath no Proper figure besides what it borrows from the skin it self, from which it differs in this, that it is no way porous.
- Color.* It is thought to partake alwaies of the same colour with the skin, and yet in Black Moores this being pulled off, the Skin it self is white.
- Consexion.* It sticks firmly to the true Skin, and is an Excrementitious part as the Hairs are, and hath no communion with the principal parts, by Veins, Arteries, nor Nerves, because it wants them, and is insensible, as you may find, if you please to scrape it off from your hands, or any parts, or thrust a Pin or Needle under it.
- Use.* It hath no action, only use, which is to shut the pores of the Skin, to make it smooth, and be beautiful, polished and even.

The Medicinal Consideration.

By these things thus considered, a Physitian may see that the scarfe-skin hath also its diseases, though *Hippocrates* thought them to be only deformities, He makes a distinction

a distinction whether they may be called Impostumes or diseases; at the end of *Lib. 2. Prorrheticorum*, because such as belong to the Scarf-skin, pertain most of all to the dignotion and Cure of Affects.

It is infected with divers Spots both natural, and sickly; natural, are those many deformities of the Skin; sickly, are the Meazles, small Pox, purple Spots in Feavers, or any Spots of other Colour; sometimes without a Feaver, when Nature sends any Wheyish substance of another Colour into the Scarf-Skin.

Diseased spots of the Scarf-Skin may, and ought to be cured: but such as are Original from the birth, are very difficultly taken away, because they stick firmly to the Skin, as well as to the Scarf-Skin.

This Scarf-Skin may be beautified, which *Galen* denies to be done by an honest, and honourable Physitian; but allows it to be done by Court Physitians, and Bawds, and Chamber-Maids that wait upon their Ladies. In Women, the *Cuticula* is thick, smooth, and many times stops the pores of the Skin, and hinders free perspiration. In men it's usually full of pores, that so the Hairs may pass out.

Lastly, as the Scarf-Skin of the Body being well looked after, and adorned, procures beauty and comeliness to the Body; so being made rough with spots, or burnt by the Sun, it unhandfoms a man. It is ridiculous to draw it off with blisters, that so it may come again the clearer, you lose your labor as much as though you washed a Black-more.

The Scarf-Skin peels off in divers persons whilst it is dried or burnt, and the Skin itself in Leprosies, and diverse that have the French Pox; the Skin it self comes off by fleakes in such as are Leprous, and in some that are troubled with the Whoremasters Pox.

Cap. 6. Of the Skin.

After the Scarf-Skin, follows the Skin called in Greek *Derma*; it hath a substance diverse from other Membranes, the like of which you shall never find in the whole Body, because it consists of Seed and Blood mixed together; yet so as that portion of Seed is predominant, which may be bowed, and distended: from which the Skin is accounted Spermatical.

Its temperature is cold and dry, or more properly, exquisitly temperate, yet so it may be the Judge of feeling.

It is extended over the whole body, and on wraps it like a garment, and therefore its dimension is as the dimension of the Body is.

Although it seem but one, both to sight and touching, yet some hold it to consist of two Skins; but I could never find them to be separable, only it may be cut into many parts by reason of its thickness.

It hath the same Figure which the body hath, that it cloatheth. Its texture is slight and very full of small holes, for insensible transpiration, and the passing out of excrements: and in diverse places, it hath visible great holes; as in the Ears, Eyes, Nose, Mouth, fundament, and privities of Men and Women.

It takes its Colour from the predominant humor; for of what colour the Humor predominant in the Body is, of that colour is the Skin, unless it be such from their birth, as in *Erbiepiea*.

It is straightly knit to the Parts under it, and therefore immovable, excepting the Skin of the Forehead.

It hath communion with the principal Parts, by innumerable veins, Arteries, and Nerves; the extremities of which, it takes on every side, for it hath neither of them all three peculiar to its self.

Whether by reason of its feeling, it perform action, a man may make a doubt; for otherwise the membranes, which are the instruments of inward feeling, perform action also; but what Author ever said that the Membranes performed action?

It may be beautified.

Its Names. Substance.

Temperature.

Number.

Figure.

Color.

Communion.

Communion.

Action.

use. We grant that it hath an excellent and particular use, to defend and adorn the body, to receive the excrements of the third concoction to cleanse the Body of fifth, fuliginous Vapors, and Sweat.

The Medicinal Consideration.

Affects in Substance. Let us now reduce this same conformation of the Skin, to a Physical use. Its substance against Nature, consists in its over thickness.

Temper. Its temperature is changed in diverse diseases.

Number. Its number is vitiated, when the *Cuticula* is vitiated, or gnawn through; or the Skin it self lost.

Figure. Oftentimes its smoothness is turned into roughness, or it is disfigured by pustles. Sometimes its passages are stopped, or more open then they should be.

Connexion. Its connexion, is marred in wounds and Ulcers.

use. Sometimes its use is hurt, when it is insensible; or when it receives not only the excrements of the third concoction, but also of the whole body.

Therefore the Skin, seeing it is the breathing place of the whole Body, is subject to an infinite number of Diseases; and if the pores be shut, the Body suffers great discommodities, by reason transpiration is hindered; for the Body ought to ease it self that way, according to *Hippocrates, Lib. de Alimento: The motion of the Body, to perspiration, the wider it is, the healthfuller are men; the less perspiration men have, the more sickly are they; they which have quick perspiration, are weaker, though better in health, and soonest recover when they are sick: such whose perspiration is bad, are strongest before they are sick; but when they are sick, their Cure is most difficult.*

Diseases proceeding from disorder of the Skin, are more dangerous in winter; and in malignant Fevers, by reason of the interception of the transpiration, the Native heat is choaked. Breathing a Vein is a remedy for such.

From the substance and Colour of the Skin, *Hippocrates* propounded two prognosticks: *Lib. 5. Aph. 71. and Lib. progn. Part. 7. and 8.*

Of the spots of the Skin, read *Soranus, Chap. 38.*

The Skin is like in Colour, to the predominate humors in the Body, *Hippoc. de humoribus.*

Of divination by the Moles of the Skin, wrote *Polemon* a Greek Author; and amongst modern Writers, *Ludovicus Septalius, Mediolanensis,* Wrote most accurately.

Aristotle concluded the subtilty of a persons wit, from the subtilty and thinness of the Skin, rather than of the blood.

The thinness of the Skin, is the cause why man alone is troubled with the Leprosie, according to *Aristotle, Prol. 5. Sect. 10.*

It is certain that contagious Diseases, may be drawn in thorough the pores of the Skin.

whether Skin lost, can be regained. The Skin grows hard and dry, through burning Fevers, and sometimes it becomes as thick as an Elephants Hide: especially about the Back, Limbs, and Thighs, as I have seen it in many, like a tand Hide. The Skin lost, grows not again, but degenerates into a Scarre: For it is made by the first intention of Nature, but repaired by the second.

Chap. 7. Of the Fatty Membrane

Its Names. **T**HE Greeks call it *Stear*, and *Pimele*; it makes a common Membrane, by reason of its substance; in Brits it is called *Aruina*, and why not so then in Men?

Substance. Its substance, although it be something solid, yet it is soft, and Oily, as you may perceive

perceive if you handle it with your Fingers, or lay it by the Fire.

It ariſeth from the thinner portion of the Blood, diſtilling through the Veins like dew, and congealing about the Fleſh: this is the certain matter of the Fat; of the efficient cauſe only is the queſtion made: Namely, Whether it obtain its conſiſtence by heat or cold. All acknowledge a moderate heat about the Membranes, compelling, and applying this ſame fatty, and Oily Liquor.

The Temperature then of the Fat, is moderately hot and moiſt.

It is contained under the Skin, univerſally over the whole body; the Forehead, Cods, and Yard, (where there is no Fat) excepted.

Therefore the Fatty membrane is large as the Skin is.

In Number it is only one, unleſs you connex the Fleſhy Membrane, internexed with it, as *Sylvius* doth.

It hath no Proper Figure.

In Colour it is white; if at any time it be red, it is becauſe blood, by reaſon of ſome Laceration, is mixed with it.

It ſticks firmly to the Skin, neither can it be divided from it without ſcraping; and ſo it doth to the fleſhy membrane.

The Fat cannot communicate with the principal Parts, becauſe it is not truly nourished; nor yet lives, unleſs by appoſition, as ſtones do; neither yet is it ſenſible: therefore it wants both Veins, Arteries, and Nerves; and yet all three of them paſs through the Fat, that ſo they may come at the Skin.

As for the uſe of it; it warms the body in Winter like a Garment, and cools it in Summer, by hindring the penetrating of the heat: It is like a Caſhion for men to fit on, and in long taſting, it is turned to nourishment of the Fleſhy Parts near to it, which Suck out its juyce.

Original.

Temper.

Situation.

Number.

Figure.

Color.

uſe.

Chap. 8. Of the Fleſhy Membrane.

THe Fleſhy Membrane lies under the Fat, and ſticks to it, and is conſpicuous in young Children newly born, where it is not hid with Fat. It is more obſcure in ſuch as are grown up, and yet it retains its fleſhy ſubſtance, as is evident about the Loynes, Cods, Forehead, and Neck.

Its Temperature, is like the reſt of the Fleſh, hot and moiſt; and it hath its Original from the Blood.

It is ſituated under the Fat, and ſtretched out over the whole body univerſally, and is the fourth covering of the body. In bruits it is next to the Skin, which often moves by the intervening of this Membrane.

It is one ſingle Membrane.

It hath no proper Figure, unleſs the Figure of the body which it covers.

It hath various colours in diſerſe places; for it is more red in the Neck, Forehead, and Cods, than elſe where.

It is joynd to the Fat inſeparable in ſome places, ſo that the fleſhy, and fatty membrane ſeem to make but one; in other places it may be ſeparated.

It communicates with the principal parts, by the extremities of the Veins, Arteries, and Nerves.

And that it is very ſenſible, the rigor, and trembling of the body, which depends upon this Membrane; witneſſeth: beſides it hath a peculiar motion in the Neck, Forehead, and Cods, where it is Muſculous, and endued with Nervous Fibres.

Its uſe is to give foundation to the collecting and generating the Fat, to Cloath the Body, and cheriſh the internal heat, and defend it from external injuries.

The Medicinal Conſideration.

Although Cutaneous Diſeaſes ſeem to belong to the Skin, yet if they continue long

Subſtance.

Temperature.

Situation.

Number.

Figure.

Color.

Conſiſtence.

Communication.

Actions.

uſe.

long they have their foundation in the fleshy and fatty membrane; shivering, shaking and trembling, belong especially to the Fleshy membrane.

Chap. 9. *Of the Common Membrane of the Muscles.*

THe Fleshy Membrane being taken away, the common Membrane of the Muscles of the *Abdomen* follows next, being the fifth common covering of the body, which comprehends all the Muscles in the body, (besides the proper Membrane of every Muscle) left in their motion, they should pass out of their places.

Substance.
Temper.
Original.
Situation.
Quantity.

Its Substance is very strong, yet thin and Nervous.

It is spermatical, cold and dry, in temperature.

It hath its original, from the first formation.

It immediately covers, and straitly binds in the muscles, over which it is stretched.

Its wideness is thought to equal the dimension of the whole body; but in the Face, Neck, and superior Limbs, it is not easily found; and in the Legs, the *Fascia Lata* performs its Office.

Number.
Figure.
Color.

Seeing it is admirable thin, it cannot be divided into two Membranes.

It acquires its Figure from the Parts it contains.

In Colour it is whitish.

Connexion.

It sticks stoutly to the Muscles which it compasseth, neither can it be pulled off, but by a Skillful Dissector.

It hath no peculiar Nerves, Veins, nor Arteries.

Communication.
Use.

It is nourished, and is sensible, like the other common parts.

It is of admirable use, for it compasseth the Muscles like a girdle, and together with the Fleshy Membrane, is the foundation of the Fat; therefore where it, or something like it, which performs its Office, is wanting, there the Fat also is wanting; as in the *Forehead, Head, Face,* and *Cods*, where the Fleshy Membrane immediately toucheth the Skin without any Fat between them.

Chap. 10. *Of a Muscle in the general.*

BEfore I treat of the Muscles of the Belly, I will premise the general Doctrine of the Muscles.

Definition.

A Muscle is an instrument of voluntary motion, which depends upon our own will, and because it governs the actions. It is a dissimilar part, compounded of many similar ones; but of those Parts, Flesh is predominant. So that the substance of the Muscle, is judged to be Fleshy: Yea and the Muscles are to be understood by the word *Flesh* in ancient Authors; as *Hippocrates*, and *Aristotle*.

Substance.

Besides the Flesh, a Vein, an Artery, a Nerve, *Fibres*, a Membrane, a Ligament, or tendon, help to make up the composition of a Muscle.

Temperature.
Original.
and
Insercion.

Seeing then they are Fleshy, their temperature is hot and moist.

The true Original of a Muscle, is from blood in the conformation of the first Parts; but by reason of its Connexion, in two extremities, it is said to arise from a stable Part, and to be inserted into a movable part, because it is ordained for motion, and all motion is caused by that which moves not.

This original and insercion, is known by the ducture and series of the *Fibres*, by which you may Judge of the Situation of the Muscle, whether right, Oblique, or transverse; for in these positions all the Muscles in the body of man, both internal, and external, lie.

Quantity.

Their quantity and magnitude is various, according to the variety of places, and parts to be moved, which require either greater or smaller Muscles.

Number.

These are abundance of them in Number, which according to my Observation and Computation, are four hundred thirty one: but because our body is double, the Muscles also are double; few there are without fellows, such as are the *Sphincters*; and the *Diaphragma*, or *Midriff*. Their

Their Figure is various, ^a Square, ^b Triangular, ^c round, ^d Long, ^e *Trapezia*, ^f *Deltois*, ^g like the Greek Delta Δ & *Scalena*: usually they are round, whether you regard their Circumference, or bulk in long and thick Muscles: Therefore *Hippocrates* in *Lib. de art.* Defines a Muscle to be Flesh Circumducted in an Orb: but the greatest Parts of the Muscles have a longish figure.

For the most parts, you shall observe the middle Part swelled the extremities narrow. The middle part is called the Belly; in the immovable extremity; the Head, the moveable extremity, the Tendon, or *Aponurosis*, which is the end, or insertion of the Muscle into the Part to be moved. Each extremity of the Muscle for the most Part, is Nervous; but the Tendon is Nervous in almost all the long Muscles; the Belly is fleshy, and Seldom Nervous.

The Colour of a Muscle, for the most Part is red; of a leaden Colour in some few, by reason of their impure Situation, in some filthy place.

The Connexion of the Muscles is twofold; in the two extremities, and in diverse Parts; the one of which stands still, the other moves; also the Muscles move the Parts to which they stick, though they were not appointed for that use.

All the Muscles have communion with the Parts, by Veins, Arteries, and Nerves; which they admit above the Belly, or middle part of their Body, by which they obtain their motive power.

The Action of the Muscles, is either universal, or particular. Universal action, is that which agrees to all of them, *Viz.* Motion: particular action, is the motion of some one certain Part; this motion is performed by contraction of the Muscle, whilst it is drawn back towards its beginning, made shorter, and swells outwardly; and this agrees with all the Muscles, those of the *Abdomen* excepted, which being drawn back, swell within, because they have no opposite bone to with-hold them.

Therefore the true action of a Muscle, is contraction, or conservation of what is drawn; which motion is called *Tonics*, in one Muscle remaining long in one figure; or in more muscles extended, and acting together as when the whole hand is long held elevated, and extended.

The motion of others Muscles, as extension and relation, are only by accident; from these motions depend the motions of the parts, which are not only distinguished by difference of place before, behind, upwards, downwards; but also by figure.

Their Situation is either larger, and that right, and is called *Extensio*; or Oblique, and that is either lateral, as the *Abductor*, and *Abductor* of the fingers; or with inversion, as the *Pronatio*, and *Supinatio* in the hand and *Radius*.

Also the muscles, by reason of their like motion, are called fellows, or pairs; fellows are sometimes in diverse and opposite places, and yet perform the same action as the muscles which bow the Arms: such muscles as perform a contrary motion are called antagonists, and so such as bow the Arm, are antagonists to these that extend it.

Such as are fellows are alike, for the most Part, in Magnitude, Number, and strength; such as are antagonists differ according to the weight of the Part moved, or the vehemence of the action.

The ducture of the *Fibres*, shows the manner of action in every muscle; and by them you may easily distinguish a right muscle from a transverse, and Oblique.

The ducture of the *Fibres* is various also in the same muscle, according to the diversity of its rises or insertions; and therefore one muscle performs diverse actions, as the *Trapezius*; for by the extremities of the *Fibres*, you may know the Head and Tendon.

The Tendon is directly opposite to the Head.

If the Muscle act but one action, or many; according to the variety of its originals, it obtains various Connexions, to wit, Heads and Tendons.

^a T. 10. f. 1. NN. T. 14. f. 2. OO. ^b T. 10. f. 1. ^c T. 22. f. 1. CD. ^d T. 14. f. 2. MM. T. 15. f. 18. AA. ^e T. 14. f. 1. AA. ^f T. 22. f. 1. A. ^g T. 13. f. 18. BB.

Chap. II. Of a Tendon.

A Tendon is the least Part of a Muscle, by which we bend and move the bones. It is thought to consist of a Nerve, and a Ligament mixed together; so as that a Tendon is not found, unless it be in that Part of the Muscle where it is affixed to the Parts moved.

Original.

But a mans Eyes (if he will believe them) tells him, that they are from the first formation, and that they are the chiefest Part of the Muscle, and take their beginning where the Muscle begins, and are disseminated through its whole Body. If it be a Nervous Tendon in the beginning, such it is in the end; if it be like small strings at beginning, they are united to form the Tendon afterwards. Such Tendons those Muscles have which perform strong actions, in bowing and extending, and tonical motion; as in the superior and inferior Limbs, and in the back to uphold the Trunk of the body. The rest of the Muscles, as they are fibrous at the beginning, so they are at the end.

The hard and stiff Tendons have much Fat about them to soften them, that they may the easier be moved; and therefore those *Fibres* dispersed amongst the Flesh, are nothing else but the Tendon divided, and the Tendon nothing else but the *Fibres* united; and therefore a Tendon is either compact and solid, or else divided into *Fibres*.

Also Tendons are solid or plain, or Membranous or round; or short or long. If they are Nervous at the beginning of the Muscle, so they are at the end. Sometimes they are Nervous at the end of the Muscle, though the Head of it be Fleshy.

The hardness of a Solid, long and Membranous Tendon, its thickness and Silver colour is excellent: So that *Fallopins* affirmed, nothing was more beautiful in the Body of man, than a Tendon, and the ChrySTALLINE Humor of the Eye.

Wherefore a Tendon, seeing it is a Similary Part, is bred of Seed, and is of a peculiar substance, no where to be found out of a Muscle. It well deserves to be called the chiefest part of the Muscle, upon which the action of the Muscle depends; the other Parts work together with the Tendon in the same action.

Chap. 12. Of the Muscles of the Belly.

THe Flesh extended over the Belly, is Musculous, which being joyned together, do make the Fleshy covering, which is Proper to it.

Number.

They are divided into twelve Muscles, six on each side, which have names partly from their Scituation and rise, and partly from their Figure; of which sort are *Obliquus Descendens*, *Obliquus Ascendens*, *Rectus*, *Transversus*, *Pyramidalis*, and *Cremaster*.

Figure.

Of these ten are ordained to compel the internal Parts, and some to move the *Os Sacrum*, and *Ilium*; the two *Cremasters* hold up the stones.

Every one of them hath his proper Figure; the Oblique ones, in regard of their Scituation action and *Fibres*, are divided into ascending and descending; the ascending and Transverse, carry a plain Figure like a Membrane.

Largeness.

Their largeness is as great as the Latitude and bigness of half the Belly, and yet the descending Oblique Muscle is larger than the ascending, and the ascending than the transverse: the length of the right muscle, reacheth from the sword-like Cartilage to the *Os Pubis*.

Original.

The white line.

Although their Original be different, yet they all joyn so at the white line, that they seem to be but one Muscle. The White Line passeth from the Sword-like Cartilage by the Navel, to the *Os Pubis*, and makes a difference between the Muscles. Although

Although the Muscles of the Belly stick to diverse parts, from which they are said to arise, yet are they all inserted at the white line of the Belly; and at the *Os Pubis*, each of them receives peculiar Veins, Arteries, and Nerves.

The action of the Belly is common, or particular. That is common which all of them equally act, Namely, to compress the Belly on every Part; neither can they act asunder in this. The particular action is, when Muscles that are parts act apart, viz. Ascending or descending Muscles; those compress the breast, these move the *Os Pubis*, *Ilium*, and *Sacrum*, being joyned together, without any the least compression of the *Abdomen*; but these bones remain unmoved whilst the *Abdomen* is compressed.

The use of the Muscles of the *Abdomen*, is whilst they lie still, to cover the internal parts, and defend them from external injuries, to cherish and conserve the internal heat.

Pass we now to a particular description of the Muscles of the *Abdomen*, then of the Muscles that move the *Os Pubis*, and *Sacrum*.

The ^a Oblique descending being situate Obliquely, by reason of its *Fibres*, Oblique descending ariseth from the ^b seven or eight inferior Ribs, by certain fleshy interfections or *Fibres* intertexed with the fleshy *Fibres* of the *Serratus Major*, and sticking to the *Os Ilium*, and *Pubis*; it ends in a broad ^c Tendon in the white line, and together with its fellow, makes one individual Tendon.

The Oblique ^d Ascending, ariseth from the ^e *Os Pubis*, and *Ilium*, and being knit to the brims of all the bastard and true Ribs, even to the sword-like Cartilage, it ends in the ^f white line by a broad Tendon. In this Muscle the late Anatomists observe a double Tendon embracing the right Muscle like a sheath; but the duplicity of the Tendon appears only above the Navel; for below it is altogether inseparable.

The right Muscle remains ^g fleshy from the *Sternum*; near the ^h sword-like Cartilage, and being extended along the longitude of the Belly, it is inserted with a Nervous end into the *Os Pubis*.

In it you may observe three Nervous ^b Interfections which strengthen it, and Veins which run along the longitude of it; and the ⁱ *Mammary descending*, and the ^k *Epigastrick ascending* meet about the ^l middle of this Muscle.

By this *Anastomosis*, *Galen* thought the consent of the Womb with the Dugs, was caused, and many modern Anatomists after him, which indeed is true.

Upon the extremities of the right Muscles, lie two small Muscles, called ^m *Pyramidales*, which sometimes are wanting, especially the right; but flesh makes up the defect. Their office is to compress the Bladder, and therefore they send their Tendons between the right Muscles, into that Part of the *Peritoneum* which includes the Bladder. And in the Child in the Womb, the ⁿ *Urachus* is a production of the Pyramidal Tendons, which in Men of Age, makes but one string affixed to the bottom of the Bladder, and passing to the hole of the Navel, and remains still in such as are grown up.

The ^o Transverse Muscle, arising from the ^p Transverse *Apophyses* of the *Vertebrae* of the loynes, and being fixed to the *Os Ilium*, and the bastard Ribs, ends under the right Muscle, by a broad ^q Tendon in the white line, and is strictly united with his fellow.

Besides the Muscles which compress the Belly, near the *Pubis*, by the Transversal Longitude of the groin, is the Muscle ^r *Cremaster*, prepared for the holding up of the stones. It is distinguished from the flesh of the Oblique ascending Muscle, because it hath red flesh, is thinner, and disjoyned from it a fingersbreadth; it is involved with the *Peritoneum*, even till it come to the Testicle, and makes the Tunicle called ^s *Erithrois*.

You shall perceive in the groin, the perforation of the Tendons of the Muscles of the *Abdomen*, that they may give passage to the *Peritoneum*, and the *Cremasters*.

How the motion
of the Os Ilium
and Sacrum is
performed.

Seeing some of the Muscles of the *Abdomen*, conduce to the motion of the *Os Ilium*, and *Sacrum*, I shall faithfully describe the motion of them, and the Muscles appointed for that motion. These bones are closely joyned by *Symphysis*, and lie above the *Thigh-bones*, and under the bones of the loyns, for the procreation of man in the act of Copulation; in which action, the *Thighs*, and *Back-bone* remaining immovable, only these bones move forwards, and backwards; the right and *Oblique descending Muscles* move them forwards, the breast resting, or very lightly moving, and that by longer intervals; the Muscles, ^r *Sacer*, and ^u *Semispiratus*, move them backwards.

And therefore Sacred Scripture, constitutes the Seat of lust to be in the Loynes, because by the motion of the Loynes, the Reins wax hot, which provokes the Genitals to Ejaculation of Seed: *Gen. 36.* It is written, *Kings shall come out of thy Loynes*; and *Psal. 73.* The Kingly Profit complains, *His Loynes were filled with delusions*, that is, with lustful Concupiscence, as *St. Jerom* interprets it; and in *Luke*, *Let your Loynes be girded*, that is, preserve your Chastity.

^a T. 1. f. 2. GG. HH. II. ^b T. 2. f. 2. G. HH. f. 8. aa. ^c T. 1. f. 2. IIII. T. 2. f. 8. BB. ^d T. 2. f. 8. B. ^e T. 2. f. 8. cccc. ^f T. 2. f. 8. dd. ^g T. 2. f. 8. ee. f. 9. B. ^h T. 2. f. 9. c. ⁱ f. 9. e. ^k f. 9. dddd. ^l T. 2. f. 9. d. ^m T. 2. f. 9. f. ⁿ T. 2. f. 9. e. ^o T. 2. f. 9. DD. ^p T. 8. f. 2. C. ^q f. 9. A. ^r f. 9. aaa. ^s f. 9. b. b. ^t b. f. 2. DD. ^u T. 14. f. 4. BB. f. 3. DD. f. 4. AA.

The Medicinal Consideration.

In the Muscles of the Belly, are often Inflammations, Imposthumes, and pains arising of wind; for according to *Hippocrates*, the pores of the flesh, and space between the Muscles, are filled with Blood and Spirit in such as are healthy; but with Wheyish substance, and wind in such as are Sick; and therefore Cramps happen in these Muscles, as is described by *Sennertus Lib. 3. Part. 10. Chap. 8. Med. Pract.* And therefore these Muscles are sometimes troubled with a windy Spirit, arising from the *Hypochondriacal Parts*, being filled with Melancholly.

Chap. 13. Of the Peritoneum.

THE Muscles of the Belly being taken away, the *Peritoneum* comes to view, which is a ^a Membrane stretched out over all the Parts of the Bowels, or Guts; from which extention, it hath it's Greek Name.

Temperature.
Substance.

Seeing it is spermatical, its temperature can be no other than cold and dry.

Its Substance is not simple and uniform, but double and unequal in thickness; for it is a double Membrane, joyned in some places, and disjoyned in other Some, to give passage to the Navel Vessels; and in the *Hypogastrium*, it is so doubled that it contains the Bladder and the Genitals, and the Reins and Ureters, the *Vena Cava*, and the great Artery, and the Seminal Vessels in its doubling.

The inequality of the substance of it is observed in Women, to be thickest from the Navel to the *Pubis*, that in the conception it may be stretched as the Womb is. But in men it is thickest from the Navel to the *Sword-like Cartilage*, that in Gluttons it may stretch when their paunch is full.

Original.

It takes its original from the first formation, unless, as some think, it take its original from the *Dura Mater*, which as they produce the *Plenra*, so the *Plenra* should the *Peritoneum*; and so their should be a continuation of these Membranes throughout the Body, as there is of the Skin.

Situation.

Its Situation is immediatly after the Muscles, and compasseth about all the Bowels of the *Abdomen*.

Quantity.

Its the largest Membrane in the whole Body, and most capacious, and answers to the inferior Ventricle both in Longitude and Latitude.

It

It is double every where, because it consists of two Membranes; of which, the internal is the shortest; not so much because it bestows a Membrane upon every Part of the Belly and produceth the *Mesenterium*; but because it doth not accompany the external to the Testicles, but ends in the Cavities of the *Abdomen*.

The external passeth even to the Cods, and wraps the Testicles round; and makes the tunicle called *Erythrois*, and in its progress makes a small Channel by which the Spermatick Vessels pass.

The same production of the external tunicle, is observed in the groyn of Women, and is deduced even to the *Clitoris*, and the round and lower Ligament of the *Womb*.

The Figure of the *Peritonium* is Oval, and longish, by reason of the Belly, for *Figure* of it self it hath no Figure at all.

Its continuity is not pierced, it being an admirable piece of workmanship; for although Vessels pass into it, and out from it, yet all this is performed through the doubling of it, so that the internal Tunicle remains unpierced, which comprehends the Parts of the first Region, as the external doth the Parts of the second Region, which are placed within the Belly.

The Colour of the *Peritonium* is white, as the Colour of other Membranes is. *Color.*
It is firmly knit to the *Vesiculae* of the loyns, I mean the external Membrane, *Connexio.* the internal both no Connexion with them, but is disjoyned to receive the Reins, and redoubled to make the *Mesenterium*; also it gives a covering to the *Diaphragma*, and the Liver, and produceth the Ligament which holds it, and depends upon the Sword-like Cartilage.

Besides the general communion it hath with the principal Parts, by Veins, Arteries, and Nerves; It hath a particular communion with all the Parts contained; to which it gives Membranes, either thick or thin; and therefore it may be called the Mother of all the Membranes in the Belly. *Communio.*

It performs no action, but its use is great through out the Belly. *use.*

^a T. 2. f. 9. gg. ^b T. 6. f. 2. CC. EE. ^c T. 7. f. 4. II. K. f. 5. A. ^d T. 7. f. 2. SS. f. 4. FF.

The Medicinal Consideration.

Let us now bring this contemplation of the *Peritonium*, to a Physical use. By reason of its doubling, you shall perceive Serous and sharp Choleric Humors to get into those spaces, which make a bastard Collick, but have no foundation at all within the Guts, as a true Collick hath; but between the *Peritonium* and the Guts; whence the Disease is bitter, and usually lasting: of which see *Fernelius* in his *Pathology*.

Sometimes other Humors flowing from the Liver, or from the Reins, get within this Duplication, towards the Navel, or groyn, or *Os Sacrum*, and there impostumate, unless they were turned into Quittor before they fell into this Part. *Collick.*

Such Collical pains lie usually on the top of the Belly, and not deep; neither will they suffer the Belly to be handled never so gently. Sometimes they come up even to the *Diaphragma*, by reason of the continuation of the *Peritonium*, and then the danger is the greater.

Sometimes, by reason of those Productions of the *Peritonium* which reach the Stones, Serous Humors pass down to the Cods, and make a watry Rupture. *Ruptures.*

You must diligently observe the production of the *Peritonium* by the Groyn; which being dilated (for it is seldom broken) receiveth the Gut *Ilium*, or the Call, whence is bred that swelling in the Groyn, called *Entero-Cele*, or that called *Epi-plo-Cele*; or when both the Gut and the Call do fall down, that other called *Entero-Epi-plo-Cele*.

Chap. 14. The Division of the Parts of the Belly.

Parts first.

THE Parts of the Paunch included within the *Peritonæum*, I thus divide. They all pertain to the first Region, which are nourished by the branches of the *Vena Porta*; therefore the ^a *Omentum*, the *Hollow* ^b Part of the *Liver*, the ^c *Gall*, ^d *Stomach*, ^e *Spleen*, ^f *Sweet-bread*, ^g *Bowels*, ^h *Mesenterium*, and ⁱ *Vena Porta*, and the ^k *Celiac Artery*, make the *First Region* of the Body, contained within the *Abdomen*. The other Parts which are included within the doubling of the *Peritonæum*, are referred to the Second Region, which comprehends the ^l *Reins*, ^m *Vreters*, ⁿ *Bladder*, ^o *Genitals* in Men; and the ^p *Womb*, with the parts annexed, in Women.

Second.

It is extended even to the upper Part of the *Breast*, and ^q comprehends the *Diaphragma*, ^r *Mediastinum*, ^s the *Heart*, and ^t *Pericardium*, ^u *Lungs*, ^x *Trachea*, *Arteria*, ^y *Oesophagus*, ^z *Tongue*, ^a *Larynx*, with the Trunks of the *Vena Cava*, and great Artery, even from the Throat to the Groyn, according to *Fernelius*: but I extend it farther, even to the Limbs; whither so ever the greater Channels of the *Aorta* or *Cava*, the β *Axillars*, and γ *Crurals* pass.

^a T. 2. f. 10. E. ^b T. 4. f. 1. A. ^c f. 1. C. ^d T. 2. f. 10. C. ^e T. 4. f. 1. D. ^f f. 1. E. E. ^g T. 3. f. 1. and 4. ^h f. 1. A. A. ⁱ T. 4. f. 1. F. F. f. 6. A. A. ^k F. 5. K. ^l T. 5. f. 1. B. C. ^m f. 1. F. F. G. G. ⁿ f. 1. K. ^o T. 6. tota. ^p T. 7. tota. ^q T. 7. f. 1. II. f. 6. A. A. F. F. ^r f. 4. A. A. ^s t. 11. f. 2. B. f. 5. l. ^t f. 1. A. f. 2. A. ^u f. 1. B. B. f. 2. K. K. f. 7. F. F. ^x f. 7. E. f. 8. A. B. C. T. 13. f. 10. 9. ^y T. 3. f. 2. E. E. ^z T. 13. f. 14. A. ^a T. 13. f. 9. 10. ^b T. 12. f. 1. 4. B. B. ^c f. 1. 4. D. D.

Chap. 15. Of the Navel.

what it is.

THE Navel from the birth, even to extrem Age, is a knotty ^a *Coition* of the four *Navel* ^b *Vessels*; by which the Child is nourished in the *Womb*. That they should stick out on the out-side of the *Belly*, is unprofitable; therefore they are Cut off the ^c *Child* being born.

The continuation of the *Vessels* within the *Abdomen* remains, which grows dry by degrees, being deprived of its antient Office; and therefore it is to be considered under another Notion, in one that is grown up.

umbilical Vessels

We shall treat of the *Umbilical Vessels*, as they are found in the Carcass of a man grown up; they are like *Ligaments*, included in the doubling of the *Peritonæum*; that which outwardly appears is the middle both of the *Belly*, and *Body*.

The ^d *Umbilical Vein* passeth to the ^e *cleft* of the *Liver*, The *Umbilical* ^f *Arteries* are ^g two, and descend to the *Iliack* ^h *Arteries*, sometimes creeping along the sides of the *Bladder* to the ⁱ *Hypogastricks*, between the *Arteries* lies the ^k *Urachus* fixed to the sides of the *Bladder*, and this is the *Original* and *insertion* of the *Umbilical Vessels*. The *Urachus* is like a long and round *Ligament*, and its use is to hold up the *Bladder*.

use.

The *Umbilical Vein* pulls the *Liver* forward, left by its *weight* it should depress the *Parts* under it; The *Umbilical Artery* upholds the ^l *Bladder* that it fall not down, although it be included in the doubling of the *Peritonæum*.

^a T. 8. f. 2. D. D. ^b T. 8. f. 2. A. B. C. ^c T. 9. f. 2. P. ^d T. 2. f. 8. G. T. 4. f. 1. e. f. 6. A. A. T. 8. f. 2. A. ^e T. 4. f. 5. C. ^f T. 8. f. 2. B. B. f. 4. e. ^g T. 2. f. 10. ^h f. 4. A. ⁱ f. 4. Q. Q. vel. Q. Q. ^k T. 8. f. 2. C. T. 9. f. 2. O. ^l t. 2. f. 10. H. I.

The Medicinal Consideration.

To reduce that is said to Medicinal use; this shews that the Cutting of the Navel Vein is dangerous, that the place of the Navel is very perspirable, because it penetrates the containing Parts, neither is there any thing either within or without, that stops that passage, and therefore purging Medicines applyed to the Navel Purge, and sweet things applyed to the Navel of Women penetrate to the Womb. The Water in Dropsies many times breaks out at the Navel, and the affects thereof are grievous, not so much by reason of the sensibility of the Part, but the suddain hurting of those Parts whose Office it is to nourish the whole Body.

Therefore consider whether the Navel be the centre of the Belly or not, for otherwise, if the Parts below the Navel be longer than those above it, A multitude of Diseases are bred in the lower Part, because the Umbilical Vein being shorter doth not sufficiently pull back the Liver, which by its weight, compresseth the Stomach and Parts under it.

Chap. 16. Of the Omentum, or Call.

Before you proceed to the *Omentum* or *Call*, you must view how it covers all the Parts of the Belly, then their Scituation, which is of no small moment to the art of Physick.

The *Omentum*, or *Epiploon*, or *Call*, is a thin Membrane endewed with much Fat, neither is it single but double, and so disjoyned in some places, that you may thrust your hand between, this you may see in that Part which is stretched out above the Guts, but about the Stomach and Spleen near the *Diaphragma*, the space is not so evident, but it hath certain hiding places as the Poet *Lucan* saith, which not appearing was a bad Omen.

It was held to be an ill Omen also amongst the sooth-saiers if it were not extended over the Guts.

The portion of it which is subject to view, is naturally stretched out even to the Navel, sometimes to the groin and Cods in Women between the Neck of the Womb and the Bladder, the greater portion is hidden in the left *Hypocondrium*.

It may be divided into four Parts, the first is called *Intestinal* which is stretched out over the Guts; the Second *Hepatical*, which ariseth from the Cavity of the Liver, including the small Lobe of the Liver, and turns down to the deep Cavities thereof; the third is called *Lienal*, because it lies upon the Spleen, the fourth *Mesenterical*, being a production of the *Mesenterium* to the external Parts, and from it is its original to be fetched.

^a T. 2. f. 10. E. b e d. T. 3. f. 1. DD. ^b T. 2. f. 10. dd. ^c f. 10. b. ^d f. 10. c. ^e T. 3. f. 1. T. 4. f. 1.

The Medicinal Consideration.

The *Omentum* hath its Diseases, both *Similar*, *Organical*, and *Common*, for sometimes it is distempered and inflamed, and yet but seldom, it is oftner troubled with *Imposhumes* or *Aposhumes* which you will, because it receives the filth of the Liver and Spleen. Sometimes its mightily encreased with *Flegm* gathered together, and grows to a huge bigness; neither is this swelling easily allayed either by internal, or external Medicines. If it be soft, Sappuration is to be sought, which seldom succeeds as it should do, although you open the Part with a Caustick.

Sometimes a dropical Water is concluded in the Cavities of the *Omentum* according to the Judgment of *Hippocrates*, and this is worse then if it were within the *Abdomen*, because it is easier drunk up by the *Meserajck Veins*, or by the sponginess of the Spleen, the passages being first opened, and those Parts stirred up to it by some convenient Medicine.

Number.

Scituation.

Original.

Diseases.
Similar.

Organical.

Common.

The *Omentum* Falls down in the Groyn or Cods: and causeth those swellings which are commonly called Ruptures: the Belly being wounded, the *Omentum* breaks forth: and then a great portion of it may be tyed with a string near the Belly and so cut off, because it soon putrifies, neither is it safe to put it back again.

The first Concoction is made never the weaker by cuttings off Part of the *Omentum*, (though *Galen* thought otherwise) for the Concoction is made in the Stomach: and the *Omentum* doth not cover the Stomach, but is only knit to the bottom of it,

Chap. 17. Of the Guts.

Use.

THE Guts follow next according to the order of dissection, which are organical Parts, hollow, appointed to carry the Chyle and to receive the Excrements. The thin Guts are appointed for the Chyle, the thick for the Excrements.

Substance.
Fleshy.

Their substance is Membranous and full of strings, which may be divided into two proper Membranes, of which, the ^a Inner is Fleshy, the ^b outward Nervous. But the Inner is rugged, and as it were foulded that it may stay the Chyle in its wrinkles that so the Mesaraick Veins may draw it the better, which like Horse-leeches draw the thinner part of the Chyle from the Guts.

Nervous.

Besides the wrinkles, the inside of the Guts is bedewed, and as it were defended with a certain Flegmatick Slime, lest the Membrane should be hurt by the passage of Cholera.

Slimy.

Besides these two proper Membranes there is a ^c common one, added from the *Peritonium*, which it bestows upon all the Parts it contains.

Situation.

The Guts are placed in the *Abdomen* and fill its whole Cavity without any confusion, the *Hypochondria* excepted; and are disposed in various turnings by reason of the Connexion they have with the ^d *Mesenterium*.

Longitude.
General Divisions.

They are seven times as long as the Body, and something longer.

This Longitude is divided into ^e thin, and ^f thick, not according to Situation, but in respect of the Membranes: The thin which is taken from the inferior Orifice of the Stomach, is the first and suprem in order, it consists of thin Membranes, the thick, is the Inferior in order, but the superior and shorter in Situation, and more Capacious and hath thicker Membranes.

Special.

Again, the thin is distinguished into three Parts, or three Guts, of which the first is called ^g *Duodenum*, the second ^h *Jejunum*, the third ⁱ *Ilium*. The thick Gut is also divided into so many Parts or Guts: The first ^k *Cacum*: The second ^l *Colon*. The third ^m *Rectum*.

Cavity.

All the Guts are hollow, that they may give passage to Chyle and Excrements. They are ⁿ wrinkled round about within, all along their Longitude, even from the Stomach to the Fundament, that so they may stay the Chyle and Excrements of the first Concoction; but for expelling the Excrements, they have a kind of motion which presses downward by degrees. And thus much to what is common to all the Guts: It remains that we speak of them all severally.

1. Duodenum.

The first Gut is called ^o *Duodenum*, because in length it is twelve Fingers breadth.

The finding of this Gut is hard, for towards the back bone it must be sought for under the Sweet-bread with the beginning of the *Jejunum*; this position and Inter-texture is diligently to be noted, because oftentimes the cause of obstructions and vomitings is without any failing of the *Pylorus*: but the cholera flowing by the ^p Biliar Pore is hindered in his passage, and returning back into the Stomach causeth vomiting.

Biliar Pore.

In the very confines of the *Duodenum* and *Jejunum*, the passage of Cholera pierceth the Gut, and creeps downward a little way between the Membranes before it pierceth the Inner Membrane, near which the ^q Channel of the Sweet-bread is observed by *Virsungus*.

Where-

Where the Guts begin to be turned toward the left side, there the ¹ *Jejunum* begins, which is thought to be emptier than the *Ilium*, by reason of his nearness to the Liver, and its Multitude of Mesaraick Veins; It lies altogether in the Umbilical Region, and is in length about a Cubit, and an half.

The ² *Ilium* follows, which is more slender, but in length surpasses all the rest of the Guts. It occupies the *Ilium*, and *Hypogastrium*, and compasseth about the *Jejunum* it self with its inferior Part. In this Gut is that Disease which is called the twisting of the Guts, and the *Black passion*.

The fourth Gut in order, and the first of the thick Guts, is called ³ *Cacum* by Ancient Anatomists, and does retain this Name, although it is altogether unlike to the Ancient description of it. It is not large like a Sack, neither doth it perform the Office of a second Stomach to Concoct the Chyle, which was not perfected before; the Ingress and Egress, are by one hole. Now in its place, a Membranous Appendix is shewed, which is larger in a Child new born, than in a man grown up: and thence *Sylvius* took occasion to write, that many things were changed in our Bodies, both in regard of growth; and of the Guts, *Duodenum* and *Cacum*.

The Gut ⁴ *Colon* succeeds this, in which are many things worth our Consideration, to wit, its Largeness, Scituation, Use, Shuttters, two Ligaments, Its fringes of Fat, and Connexion.

Of all the Guts, none more large and Capacious, than this. It begins at the right Kidney near the ⁵ Appendix; and being turned upwards, lies under the Liver and Stomach, and passeth to the left *Hypochondrium*, where it is wreathed, and made narrower.

In its Obliquation descending, it touches the left Kidney; and a little below, being bowed like a Roman S. it ends in the top of the *Os Sacrum*.

In it, the Dunge and filth of the Guts is kept; as also the wind of the first Region.

Left it should be dilated too much by multitude of dung, and violence of wind, Nature hath strengthened this Gut with two strong Ligaments; which being stretched along its longitude, they make greater foldings, and wrinkles in this Gut, than in any other. Insomuch that they seem like Cels to retain the Dung: and because it wants the bond of the *Mesenterium*, and consequently that Humor which proceeds from the Fat of it; Nature hath placed about it, here and there, certain fringes of Fat to Moisten it.

That ⁶ Volve, or Snutter which Authors quarrel so much about, is not to be passed by, being fastned to the beginning of the *Colon*, like a Membranous Circle, which hinders the flowing back of the Dunge into the *Ilium*, and the ascending of a Glister to the same place. Therefore it opens toward the Inferior Parts, that it may let the Dung pass out, and hinder it from flowing back.

It is knit to the Membrane of the *Peritoneum*, by a Membranous tye, whatsoever *Lauremburgus* wrote, accusing *Riolanus* of Ignorance, or dul-sightedness.

The last of the Guts is called ⁷ right, because it passes straight from the top of the *Os Sacrum*, to the Fundament. This Gut, contrary to the Nature of others, besides the Internal fleshy Membrane, hath also an external ⁸ fleshy Musculous covering, like a sheath; that so it may the more forceably expel the Dung, which useth to clod in the extremity of the *Colon*, and right Gut. Therefore besides the compression of the Muscles of the *Abdomen*, and the Natural motion of the *Colon*, this same fleshy Sheath, crusheth the Dung, as it were with ones hand, that so it may pass out.

^a T.2. f. b. R. ^b f. 5. Q. ^c T.3. f. 5. PP. ^d f. 1. AA. ^e f. 4. from B. to I. ^f f. 4. from 1. to O. ^g f. 4. F. ^h f. 4. GG. ⁱ f. 4. HH. ^k T.2. f. 4. HH. ^l f. 4. K. ^m f. 4. M. ⁿ f. 6. R. ^o T.3. f. 4. F. ^p T.4. f. 5. HH. ^q f. 3. DD. ^r f. 3. C. f. 5. HH. ^s T.3. f. 4. GG. ^t f. 3. E. ^u f. 3. BB. ^v T.3. f. 4. H H. ^w f. 4. I. ^x f. 4. KK. ^y f. 1. CC. ^z f. 4. I.

2. Jejunum.

3. Ilium.

Thick Guts.

1. Cacum.

2. Colon.

Largest.

Scituation.

use.

Ligaments.

Fat.

Shuttters.

Connexion.

3. Right Gut.

The Medicinal Consideration.

General Diseases of the Guts. I pass now to the Diseases and Symptomes of the Guts. They suffer Diseases both *Similar Organical* and *Common*. For they are distempred by heat and cold, either with or without Humor. They are inflamed, wounded, Ulcerated, dried, bound, loosened, made smooth the wrinkles being taken away, as in fluxes and bloody fluxes. Sometimes they are so stopped that the Excrements are Vomited up.

Peculiar Diseases. Besides these the common Diseases, the Guts severally considered, have their peculiar Diseases.

Of the Duodenum. The *Duodenum* may be stopped by compression of the Sweet-bread, and then the food is Vomited up again two or three hours after it is eaten; because the passage is stopped.

Ilium. The *Ilium* is subject to the *Iliack passion*, which is an inflammation and not a twisting of that Gut; sometime it falls down into the groyn, and sometimes into the Cods, which causeth Ruptures in those places.

Jejunum. Sometimes the *Peritoneum* being loosed or broken near the Navel, the Disease called *Omphalocoele* commeth, in which the *Jejunum* slips down.

Colon. The *Colon* is subject to the Collick, which ariseth either through sharp Humors, or wind, or extrem cold Air. In it wormes are bred, which sometimes creep up into the Stomach and are vomited out; this Gut alone is subject to Ulcerations, which causeth Putrefaction: which many think, comes from the *Mesenterium*, and most unfortunately use purging Medicines and Glysters which increase the evil and no way help it: Because the extremity of the *Colon* which is joynd to the right Gut is more fleshy, painful Imposthumes are bred there, which suppurate and are sooner cured then they would be, if they came from the Mesentery.

Sometimes Melancholy hard swellings are bred there which cause difficulty in going to the stool and hasten death.

Right Gut. The right Gut hath its peculiar Diseases, *Tenasmus*, Inflammation, Imposthumes, which end in Ulcers and Fistulas, which are difficult to be cured and require the help of the Chirurgion.

The Peristaltick motion of the Guts is Sometimes so perverted, that the Dung flows upward, and Glysters are cast up at the Mouth. And so are suppositaries also, if you will believe some Practitioners, but then the shutter of the *Colon* must needs be broken.

Symptomes. All the Symptomes of the Guts are to be referred to the Excrements when they are excessive, as in fluxes, or deficient, as when men go not to stool unless they be provoked by Medicine, both which Symptomes impair the health.

Fluxes are called *Diarrhea*, which is either Chylous or humoral: humoral is either Cæliacal, or Mesenterical, or Intestinal. When it comes with Ulceration, Pain and Blood, it is called a Bloody Flux. If it come without pain, and be like the Water in which raw flesh has bin washt, it comes from the Liver, and is called *Hepatica*. If it come through smoothness of the Guts, it is called *Lienteria*: if it come with Quitter it is called Mesenterical. The causes of all these Diseases ye may find in all Practitioners, and therefore we will make no longer stay upon them.

The internal Tunicle of the Guts sometimes is severed and lost, which is thought to be turned into a long worm of two or three Cubits long, called *Tania*, of which you may read in *Spigelius Lib. de Lumbrico lato*.

Chap. 18. Of the Mesenterium.

What it is.

THe *Mesenterium* is the bond of the Guts, which keeps them in their places, that they pass not into confusion and be thereby deprived of their action & use.

It

It is a double Membrane, between which is Fat, and many^b *Glandulae*, or kernels, and a four-fold kind of^c Vessels. This is the structure of it,

its Structure.

It is seated in the midst of the Belly, because it sticks to the transverse processes of the *Vertebra* by Lygaments: thence is its original.

Situation.

It sticks so firmly to the^d Guts, that no division at all appears; between its two Membranes, innumerable^e Veins pass, which are called *Meseraick* or *Mesenterick*. Also an infinite number of^f Arteries from the *Cœliacal* Artery. Also it hath^g Nerves from the *Lumbals*, or Nerves of the Loines.

Vessels.

The fourth kind of Vessels, are called^h *Vena lactea*, by *Aseibus*, the first finder of them out; of which we need not doubt, seeing it is now a common received truth.

Vena Lactea.

This one thing troubles many, Namely, the diversity of their distribution: For in a beast full fed, that is opened alive, these milky Veins are noted scattered about the *Mesenterium*; but some pass to the Sweet-bread, others to the Liver, others to the Trunk of the *Vena Cava*, none of them to the Spleen; neither like other veins are they gathered into one Head; they seem rather to have their Root, and Foundation in the Sweet-bread, and from thence to be distributed this way, and that way.

These Milky Veins being granted, all difficulties which were formerly about the distribution of Chyle and blood by the same Channel, cease. For the Milky Veins carry the Chyle to the Liver, and the *Meseraick* Veins carry back the Blood to the Nourishing of the Guts. Therefore both these Channels may be stopped severally; which is to be noted of a Physitian, in curing of the Diseases of the Bowels.

use.

The *Mesenterium*, seeing it communicates with the Liver by theⁱ *Vena Porta*; with the Spleen by the^j *Cœliacal Arteries*; and the Splenic^k Vein; with the Guts by their Connexions, and hath a fatty Glandulous substance fit to receive Humors, and to retain all the impurities of the first Region; Physitians well call it the Nurse of Diseases; For from that, as from a Fountain, do all the Diseases of the Bowels proceed: and all Physitians in prescribing Purges, and Remedies, have a special eye to that.

^a T. 3. f. 1. AA. T. 4. f. 1. HH. ^b T. 3. f. 1. a a a a. ^c f. 1. BB. ^d T. 9. f. 1. MM. ^e T. 4. f. 1. a a a T. 9. f. 1. CCC. ^f f. 1. b b b b. ^g f. 8. n n. ^h z. 9. f. 1. a a a b b b. ⁱ T. 4. f. 1. FF. f. b. AAA. ^k f. 5. K. & c. 11.

The Medicinal Consideration.

The *Mesenterium* labours under Diseases, both Simple, and Compound; it is inflamed, and oftentimes suffers impostumes. It is Ulcerated, and by reason of its Vessels, often obstructed.

Diseases of the Mesenterium.

By reason of his fatty and Glandulous substance, it often swells to a great hard swelling, and is the Foundation of all Kings evil Swellings: which seldom come in great Number, but the Foundation is here.

It is subject to bastard Colicks, which proceed of sharp Cholera, and degenerate into Palsies in the inferior Limbs, and sometimes in the superior; and hence comes the *Morbus Ructuosus*, mentioned by *Hippocrates*, and *Morbus Siccatarius*. Of the Diseases of the *Mesenterium*, you may read *Daniel Sennertus*, and *Matthæus Martinus*, who treat expressly of the Diseases thereof. Although the *Meseraick*, and Milky Veins, which carry Chyle, are fastned to the Guts like Horse-Leeches, yet the matter is diversly drawn by those Channels, For the Liver draws Chyle by the Milky Veins from the Guts, but sends Blood by the *Meseraick* Veins to the Guts; therefore both of them may be diversly obstructed.

For the milky Veins may be obstructed either all along through the thickness of Chyle; or else in their Roots within the Liver.

How the Milky Veins are affected.

If the obstruction be in the whole passage all along, then there ariseth a Chylous Flux,

K

Flax, either white, or tawny in Colour. If in their Roots, either within, or near the Liver, the Chyle hath a light Tincture of Blood.

How the Mesenterick

If the Mesenterick Veins be stopped within the Liver, the Liver cannot disburthen it self of his Excrements, but they remain either in the Liver, or in the Mesenterick Veins, and make most terrible obstructions, by reason of the multitude of the veins, both within, and without the Liver.

The Milky Veins have no Trunk, but are separated when they enter the hollow Part of the Liver; and therefore they are not so easily obstructed. And therefore all Humorall Fluxes of the Belly flow from the Liver or from distempers of the Mesenterick veins. Thick Fluxes proceed from the Milky Veins, by reason of corrupted Chyle.

Cure.

The Cure of both sort of Fluxes is the same, Namely, by such Medicines as cut, and purge out thick Humors: but in Liquid Fluxes of the Mesenterick Veins, you must sometimes use strengthening Medicines. And sometimes bleeding and Vomiting is more proper for these Fluxes, than for those of the Milky Veins.

Cap. 19. Of the Sweet-bread, or Pancreas.

Substance.

The^a Sweet-bread is a body neither truly^b fleshy, nor truly Glandulous, but in a middle between both; Yet it is very Spongy, that so it may receive the Excrements of the spleen and Liver.

Situation.

It lies under the Stomach like a soft Cushion, and is stretched from the^c Liver to the^d Spleen; and if it have its Naturall confirmation, it is as broad as the Palm of the Hand.

Vessels.

It receives^e the^f Trunk of the *Vena Porta*; the Milky veins, and the^g Splenic vein, passeth to^h the Spleen through its Cavity.

A new Channel

Besides, *Virsungus* Discovered a newⁱ Channel in the Sweet-bread, passing a long the length of it; which is inserted into the^j Jejunum, near the^k passage of Choler: but for what end this was framed is yet uncertain, whether it be to cleanse the Excrements of the sweet-bread; or rather of the spleen, which are carried thither.

Its Use.

So *Fallopins* found the Channels in the Sweet-bread, no way to communicate with the Veins, but that being filled with Choler, they empty themselves into the Bowels; or whether rather, they carry a portion of Chyle to the Spleen, then this Office is void, and it must be to cleanse the Sweet-bread of the Excrements it receives, either from the Liver or Spleen; or to carry away the filth of the Chyle, which happily may remain there.

It is observed, that this Part increaseth, when the Spleen decreaseth; so that it may well be called the Spleens deputy. There is the seat of Hypochondriacal Melancholy, and it is the entertainer of many Diseases, as well as the *Mesenterium*; both of them breed Sickneses to the Body, if they be filled with evil, and filthy Humors.

^a T. 4. f. 1. E E. ^b f. 2. A A. f. 3. A A. ^c f. 1. A. ^d f. 1. D. ^e T. 4. f. 1. F F. ^f T. 9. f. 1. a a a. bbb. ^g f. 1. L. ^h f. 1. D. f. 3. E E. ⁱ f. 3. B B. ^k f. 3. D D.

Chap. 20. Of the Vena Porta.

Two Veins.
Porta.
and
Cava.

W^Within the Belly, are two notable Veins contained; both of them take their original from the Liver; The one is called^a *Porta*, which is subservient to the Places dedicated to nourishment, neither passeth it further. The other is called^b *Cava*, which nourisheth the whole Body, from the Crown of the Head to the sole of the Foot, and passeth out of the *Peritoneum*, and creeps along the

the Back and Loins, with the great ^e Artery: Some think it is produced from the Heart, and not from the Liver. The *Vena Porta* ariseth from the hollow Part of the Liver, which it filleth, and is called the Gate of the Liver, or the Vein which is seated at the Gates of the Liver.

The Trunk of the *Vena Porta* descending into the Belly, sends out a branch called *Gastro Epiploon*, which is distributed to the Stomach, and *Omentum*. The second ^d branch is called *Intestinal*, which is carried to the *Duodenum*: after that, it sends ^e two branches to the Gall, and the last ^f branch it sends to the right side of the Stomach.

These branches thus produced, the Trunk is divided into two famous branches; the ^g *Splenicall* and ^h *Mesenterical*. This again, is divided into four branches, of which, the greatest keeps the name *Mesenterical*: The second is called ⁱ *Hemorrhoides*, and passeth to the right Gut: The third is called *Cacais*, and passeth to the Gut *Cacum*, or else to the beginning of the *Colon*: and the fourth passeth to, and nourisheth the remainder of the *Colon*.

The splenicall branch, when it hath passed through the Sweet-bread, produceth four opposite Veins, above and below. The first is called ^k *Gastrica Major*, which ascends to the left side of the Stomach. Opposite to this is the right ^l *Epiploica*, which is distributed to the *Omentum*. The *Coronaria* succeeds this, and is distributed to the Stomach, and the left *Epiploica*, to the *Omentum*.

^a T. 4. f. 1. F. F. ^b T. 5. f. 2. F. T. 12. f. 1. C. ^c T. 5. f. 2. G. T. 12. f. 2. C. ^d T. 4. f. 6. m. ^e f. 6. d. d. ^f f. 6. B. ^g f. 6. g. g. ^h f. 6. C. D. ⁱ f. 6. I. I. ^k T. 4. f. 6. r. r. ^l f. 6. e.

Chap. 21. What is to be considered in the Vena Porta.

Many things come to be considered in the *Vena Porta*.

1. It makes the first Region of the Body, with those Parts which it nourisheth, and passeth with its Blood.

2. It contains a peculiar sort of blood, which is not circled, as the Blood of the *Vena Cava* is; and yet it may with the branches of the *Caeliacal Artery*, have a transflux, and transvasation.

3. That it carries only Blood, and not Chyle, which is done by the Milky Veins, as also the impurities of the Liver and Spleen, to the *Mesenterium*, Sweet-bread, and Guts.

4. That within the Liver, it hath either small, or no Communion at all by its Roots, with the Roots of the *Vena Cava*; and therefore each Vein carries its peculiar Blood. The blood of the *Vena Porta* is thick, and nourisheth the parts of the first Region. The blood of the *Vena Cava*, is subtle, fit for circulation, which nourisheth the parts of the second and third Region.

5. That the branches of the *Vena Porta* within the Liver, are larger than those of the *Vena Cava*, if that do arise from thence.

6. That in a Diseased body, it is usually filled with *Cach-Chymia*; which, whether it ought to be emptied by breathing a Vein, a man may well make a scruple, lest the Circulation of blood infect the whole Mass.

7. Whether the *Vena Porta*, after two or three Evacuations by the Arm, may not better be purged by the Hemorrhoids, or opening a Vein in one of the Feet?

8. That all impurities of the belly, are contained in this Vein, from whence come terrible obstructions of the Spleen, and *Mesenterium*.

9. That there are no Shutters found in this Vein, as there are in the branches of the *Vena Cava*.

10. That the *Vena Porta* hath ways, whereby it disburdens it self, as the Veins

of the Hemorrhoids; its reflux into the great Artery by the Cæliacal, and Vomiting of Blood against Nature, in Plethorick Bodies.

Cap. 22. Of the Cæliacal Artery.

Originall.

Motion.

Anastomosis.

This is a branch of the great Artery descending, and accompanies the branches of the *Vena Porta*: for look how many branches the *Vena Porta* is divided into, so many also, is the ^a Cæliacal Artery divided; which notwithstanding, hath Pulse from the Heart, and follows the motion thereof, as other Arteries do: but seeing his blood enjoys not the benefit of circulation, as other Arteries do, so that it seems like a separated Artery, Sometimes his motion is hindered, when there is an Inflammation in the *Abdomen*; the rest of the Arteries gently moving, as is often observed in Hypochondriack Melancholy, and other inflammations of the *Hypochondrium*.

Notwithstanding it hath Communion with the *Vena Porta* by mutual conjunction of their mouths; by which means there is a conflux of blood between them, whereby the vitall Spirit of the *Abdomen*, is preserved.

This Pulsation, or Palpitation, was known to *Hippocrates*, in *Lib. 7. Epid.* In that History of his, about the pulsation of the Bell, near the Navel; and in his Prognosticks he makes mention of the same; *If the Veins about the Midriff beat, they foreshew either trouble of minde, or Madness.*

Decline of the Splenical Artery.

The Cæliacal Artery in *Hippocrates* Book of the Diseases of Women, is called, the breathing place of the inferior Belly: See *Dureus* in *Coacis*, Page, 183.

The ^b Splenical Artery, is notable; which is not brought by the Sweet-bread, but creeps along the Longitude of the *Diaphragma*, near the back bone: it is as big as the Splenical Vein, but Ambiguous in his progress, and gives no branches to the Parts near it.

It is inserted into the Spleen by a double branch, as the Splenical Vein is; and therefore when the Cæliacal Artery is taken away, it is in vain to look for the Splenical; for there remains none, but two or three small Arteries, which pass to the Stomach.

From the Splenical Artery, near the Spleen, pass two small Arteries to the Stomach. From this faithful and true relation, you may easily know how malignant Vapours are carried from the Spleen and *Mesenterium*, to the Heart; whence in *Plantus*, he complained, that he had a Splenicke Heart, it leaped, and beat his Breast.

^a T. 12. f. 2. p. 9. r. ^b f. 2. r.

Chap. 23. Of the Stomach.

Membranes of the Stomach.

The Stomach is the Kitchen of the first Concoction; it consists of proper Membranes, and one ^a common, one which it receives from the *Peritonæum*. The ^b internall is rugged, and hairy, like a piece of Silk: The ^c External is fleshy, that it may receive the heat of the Bowels which lie upon it, to wit, of the Liver and Spleen which heat it. And that it may the more easily compress, and hold together the internal, it hath a threefold sort of strings, which strengthen it to that end: and also when it is slackned with store of Meat, they do contract it again, so soon as the digested Aliment is forced out of the Stomach.

Its Situation.

^a T. 12. f. 2. r. ^b T. 3. f. 4. C. C. ^c T. 3. f. 4. E.

Its Size.

It is ^b Scituate between the *Liver*, and the *Spleen*, as it were between two fires, bending a little towards the left *Hypochondrium*, if the Spleen hold its naturall bigness; otherwise, when the *Spleen* is bigger than ordinary, it thrusts the Stomach into the middle.

^b T. 2. f. 10. C.

The

The greatness of the *Stomach* cannot be exactly defined, because being empty, and exhault, if strong, it is so contracted, that it is no bigger than a mans Fist. Being stretched and widened with store of Belly Chear, it will contain six pints of Drink, with a Pound or two of Meat, as is daily seen in Gluttons, and Toffee-Pots.

There is but one *Stomach* in Mankind, which is sometimes divided according to the Longitude into two Cavities; which have their Ingress and Egress, like the *Stomachus*, and *Pylorus*. And such persons do vomit with great difficulty; and when they do, they cast up Excrementitious Humors without that broth which they took the same moment. Shall we say the separating faculty can work so quick, or rather that the broath is slipt down into the Lower division of the *Stomach* from whence it cannot easily returne, because of the narrowness of the upper Orifice.

If the *Stomach* be single and rightly shaped, it is of a longish spherical Figure, and is compared to the Belly of a Bag-Pipe, setting aside the *Oesophagus* and *Guts*.

The Egress of the *Stomach* is equal in height unto its Ingress; that is to say, the two Orifices thereof, are equal in height, least the Meat and Drink should slip through, before they be digested; and then being digested by the strength of the *Stomach* Contracting it self, the *Pylorus* is opened, and the *Chylus* sent into the *Gut*.

The Ingress, or upper Orifice of the *stomach*, is in a speciall manner termed *stomachus*, being the seat of Hunger and Thirst, because it is crowned with two Nerves, called *stomachici Nervi*; and is consequently of an Exquisite sense.

The lower Orifice, is called *Pylorus*; in which you shall observe a Valve, round in shape, and as visible and remarkeable as the Valve in the *Gut Colon*. This Valve is to hinder the *Chyle* from returning back again into the *stomach*.

Besides these two Orifices in the *stomach*, there is observable its Bottom, or Inferior Part, more filthy than the rest; because therein the Meat is boyled or digested.

The internall surface of the *stomach* is wirckled, and stored with fibres, that it may thereby retain what is taken in for nourishment.

^a T. 3. f. 2. H. f. 4. A. ^b f. 2. F. G. ^c f. 2. K. f. 4. B. ^d f. 2. III. ^e f. 4. E.

The Action of the *Stomach* is the *Collion* of Aliments; which though they be many, and of divers kinds; yet the *stomach*, by a propriety, or inbred faculty which it has, does dissolve, and as it were melt them, and turne them into a substance like Creame; which is called *Chylus*. How that is done, I have already examined in my *Anthropographia*; and in my Answer to Wallæus, a very learned Physician of Leyden.

The *Stomach* has Communion, by reason of neighbour-hood, with the *Liver*, the *Gall*, the *Spleen*, the *Sweet-bread*, the *Uppermost Guts*, upper Part of the *Mesentery*; and also by the veins which it has from the Trunk of the *Vena Porta*, and the *Splenical Branch*. It Communicates also with the *Heart* and *Lungs*, by the *Stomachicall Nerves*; of which some part is Communicated to the *Heart* and *Lungs*: it Communicates also with the *Brain*, by the *Stomachicall Nerves*, which proceed from the *sixth Conjugation*.

It does chiefly Sympathise with the *Kidneys*, when they are misaffected, either by want of Appetite, or by frequent Vomiting, by reason of a complication of the *Costal* and *Stomachicall Nerves*, disposed between the two *Kidneys*. From whence are derived Nerves, that are dispersed into all Parts of the Belly.

By reason of its Nervous substance, it has Communion with the whole Body; whence it is in the Disease *Cholera*, the Ancles are contracted; and there is Anxiety, and Unquietness of the whole Body, when the *Stomach* is disordered.

Number.

Figure.

Two

The upper.

The Lower.

Its Bottom.

Inner surface.

Action.
Dig. How
Caused.Communion
with other
parts.Great Sympathy
with the
Kidneys.Communion
with the whole
Body.

The

The Medicinal Consideration.

Stomach.
Di. Operi.Inflammation.
Applumation.
is cer.
Incision of its
Bottom.

Burning.

Bled by the
Gall.

Distended.

Strained.

widened and
flaccid.Changes po-
sure.

Obstructed.

Made smooth.

THe *Stomach* is afflicted with diverse Diseases, *Similar, Organick, and Common*. For it is troubled with a Simple, or Compound distemper, while it is over cooled, over heated, over-dried, or over-moistned: of which, *Galen* discourses accurately, in the seventh of his method.

Also, it is *Inflamed, Impoisonated, and Ulcerated*; and these three happen chiefly in the upper, or lower *Orifices*, because of their fleshlyness: sometimes they may happen in the bottom, which is wounded, and healed, yea, and can bear incision, that any Iron, or other hard thing which hurts the *Stomach* may be taken out, when it cannot otherwise be voided, either upward or downward: as we read in that story of a *Prussian*, who had swallowed a Knife.

Hippocrates observed a burning Heat about the *Stomach*, in his *Aphorismes*: which is dangerous, by reason of *Choler* shed between the Coats of the *Stomach*; or by reason of the neighbouring Parts burning, and Inflamed.

Sometimes the *Gall* touches those Parts of the *Stomach* which are next it, and scorches the same, as if it were burnt with a Fire brand red hot.

It is also troubled with Diseases of *Magnitude, Increased or Diminished*; Diseases in *Scituation, in Cavity, in Figure, and in Smoothness*.

The *Magnitude* of the stomach, *Augmented, and Widened*, as in *Gluttons*, does over much stretch the *Stomach*, and loosen its *Fibres*. So that afterwards, it cannot be sufficiently contracted to imbrace the *Meat* in such sort, as to turne the same into good *Chylus*: which is the Cause of crudity, and weakness in the *Stomach*.

And when the *Substance* thereof is so streightned, through dryness or swelling of the *Membranes*, that it cannot sufficiently widen it self to contain the *Meat*; then is it pained after *Eating*, though but a little *Meat* be taken.

But the *stomach* is more frequently Diseased by *Dilatation, and Exolation, or Flaggyness, and slappness*, both in persons otherwise in health, and such as are sick; while with Broaths and plenty of cold drink the *Tone* or contractive vigor of the *Stomach*, is so dissolved, that a looseness of the *Belly* is thereby caused: which is attributed to the Corruption of the *Meat* through an hot distemper of the *stomach*; or to the Obstruction of the *Mesaraick Veins*: which Symptome, notwithstanding, is often Caused by the over great *Laxity* of the *stomach*, which *Fernelius* calls *Morbum Materie* a Disease in the matter; and it must be Cured with strengthening and astringent things. This has been observed in the opening of dead Bodies, where the *Stomach* is found so extended, and so widened, that it would contain the Head of an Infant. And therefore it is very necessary for a *Practitioner* to observe the Diseases of the *Matter*, which are cured with drying and astringent things, both given in, and applied outwardly. This was the Doctrine of that sect of Antient Physicians, which were termed *Methodici*, who made *Laxity, and Astringion*, the chief things observable in all Diseases.

Sometime the *stomach* changes its naturall Scituation, and is drawn back towards the *Midriff*, which causes shortness of *Breath* after Meals. sometimes it hangs down as low as the *Navel*, as has been observed in Bodies dissected, which makes a bad life, and a bad *Concoction*.

It is obstructed when its upper, or lower *Orifice*, is troubled with some swelling, which hinders the coming in of *Nutrimment* into the *stomach*, and its going out after digestion.

It is also Diseased with *smoothness*, when the *Inner surface*, which naturally should be wrinkled, is become smooth, which Causes that symptome which is termed *Lienteria*, which is, when there is such looseness of the *Belly*, that the *Meat* comes away unchanged, just as it was Eaten.

℞ 1. 3. f. 2. F. 8. III. T. 3. f. 8. ▽

Divers Symptomes infect the *Stomach* in respect of its *Action* being hurt, and in regard of the disorder of such things as are evacuated therefrom. The *Action* of the *Stomach* is, *Appetite*, *Concoction* and *Chylification*. The *Appetite* is hurt, when it is *Abolished*, *Diminished*, or *Depraved*. It is *Abolished*, when there is no *Stomach* or *Appetite*, or when *Meat* is loathed, especially *flesh*, which is the worst. *Appetite* is often *Diminished* in *Diseases*, which is not so bad. But the *Depravation* of *Appetite* is worse.

Now it is *depraved*, when there is a *Dog-like* *Appetite* which cannot be satisfied; or when evil things are desired; which kind of *depraved Appetite*, *Pliny* terms *Malacia*; and *Galen*, calls it *Citta*; in Latin *Pica*, the *Mag-pie*.

Chylification *Abolished*, or *Diminished*, is called, *Apepsia*, *Inconcoction*; and by vulgar Physicians, *Corruptio Chyli*, a corruption of the *Chyle*. When *Meat* is long in *Digestion*, is called *Bradypepsia*, *slow Digestion*. When the *Meat* is corrupted, is called *Dyspepsia*, *ill digestion*.

To *Action hurt*, belong the *Feeling*, *Motion*, and *Pain* of the *Stomach*. There is *feeling* in the whole *Stomach*, but it is exquisite in the *upper Orifice*, by reason of certain *Nerves* of the *Six parts*, which are there interwoven with admirable workmanship.

Feeling, is *Abolished*, and *Diminished*, when there is need of *burging* and *thirsting*, and yet the *Stomach* perceives it not, but *refuses* both *Meat* and *drink*. This proceeds from a great *distemper* of *Heat*, or *Cold*; which causes *Morsification*, unless the *Patient* be *distracted*.

The sense of *feeling* is *depraved* in the *Pain* of the whole *Stomach*, or of the *upper Orifice* thereof, which draws the *Heart* and *noble Parts* to *Sympathize* therewith: wherefore this *pain* of the *Stomach*, is called *Cardiognos*, *Cardialgia* and the *aking* of the *Heart*, or *Heart-burning*; and causes that kind of *swoning*, which is called *Syncope Stomachia*, the *Stomach swoning*; and comes through the *Hearts* *Sympathizing* with the *Stomach*.

And to this *Pain* of the *Stomach*, belongs *Anxiety*, and *Unquiet tumblings* and *tossings*; which the *Greeks* term *Ripasmos*, or *Asse*; from whence the *Fever* *Assodes*, has its *Name*; in which the *sick* are full of *unquietness*.

The *motion* of the *Stomach*, is *Relaxation*, *Coarctation*; By the latter, it *shuts* it self upon the *Meat* to *digest* the same, and when that *motion* failes, there is nothing but *fluctuations*, and *risings*, both when a man is *full* and *fasting*.

The *motion* of the *Stomach* is *depraved* in *Hiccupings*, and *Belchings*. *Hiccuping* is more *troublesome* than *Belching*, and is an *ill sign* in *fevers*, whether it come by *fault* of the *Stomach* it self, or by its *Sympathizing* with some other part, especially the *Liver*. *Hippocrates* mentions a *Disease* called *Morbus Rulluosus*, the *Belching Disease*.

Disorders in point of *Excretion* are frequent in the *Stomach*; either upwards, in *Vomitings*, and *Spawlings*, or downwards, in the *Lienteria*, *Diarrhea*, and *Colica Affectio*.

Vomiting happens, either by reason of *obstruction* of the *upper*, or of the *lower Orifice*; if the *upper* be *obstructed*, the *Meat* is *stopped* in the *upper Orifice* a while, and presently after *Vomited*: if the *fault* be in the *lower*, the *Meat* is retained a longer time, and at last *Vomited* up.

A daily *Vomiting* up of *Choler*, without further trouble, is no *Disease*, nor *ill* *Symptome*; because it happens by reason that a *branch* of the *Choler* carrying *Vessel*, is carried into the *Stomach*; as *Galen* observes and proves by examples.

Vomiting of *Blood* is an *evil Symptome*, whether the *Blood* flow from the *Liver*, by the *Veins* which are branched from the *porta*, into the *Stomach*; or from the *Spleen* by the *Vas Breve*. Sometimes the *Patients* life is *Vomited* up this waies, according to that expression of a *Poet*.

Out of his Mouth, he shewes his Purple Soul.

Tab. 4. Fig. 8. let. b.

The

Of wind. The frequent breaking up of wind with Belching, may be reduced to this Symptome of Vomiting; and this may be that which is termed *Cholera Sicca*, known to *Hippocrates*, and declared with its signs, by *Ludovicus Duretus* in his Comment upon the Coick Prædictions of *Hippocrates*.

Of Cholery up and down. But there is a Malignant Symptome, called *Cholera humida*, which is a violent, and plentiful voiding of Cholery upwards and downward, which kills within four daies; because very much Evacuation suddenly caused, is dangerous. *Hip. 1.* Book of Aphorismes; and all excess is an Enemy to Nature, according to the same *Hippocrates*. It proceeds from an Inflammation of the Stomach, which is allayed by cooling and astringent Remedies, inwardly taken, and outwardly applied, but especially by the drinking of the Spaw waters, and other Medicinal Springs of the like Nature; and by Laudanum discreetly given. We must avoid the use of cordial, and Stomach Powders of an hot Nature, because they vex and fret the Stomach. The Physicians of *Paris* do let Blood, in a small Quantity, though the pulse be very weak, least the Stomach Heat being suffocated, a Gangrene should arise.

2. Spawling. Spawling, or Salivation, unless it be caused by anointing the Body with Quick-silver (which they call *Fluxing*) comes either from the Brain, or else (and that oftentimes) from the Splæen, whose superfluous serosity is received into the Stomach and voided at the Mouth by spitting and spawling.

Morbus Cardiacus. The *Cardiacus Morbus* belongs to the Diseases of the Stomach; of which, read *Trallianus Lib. 3. Chap. 5. 25.* And *Mercurialis in Variis Lectionibus*. Twas knowingly said of *Seneca* in his 15. Epistle; *Bibere et sudare Viti Cardiaci est*; drinking and sweating, is the Life of a Cardiacal Person. *Pliny* in his 23. Book, *Cap. 1.* of his Natural History, saies, that all Hope of Curing this Disease consists in the use of wine. Which he borrows from *Varro*, out of the 14. Chap. of the 13. Book. This *Morbus Cardiacus*, is an extreme Faintness of the Stomach, joynd with much sweating: it proceeds from an hot Distemper thereof.

Rumination. Among Diseases of the stomach Rumination ought to be reckoned, which is an inversion or turning of the stomach, as it were Inside out, which in some Living Creatures is no trouble, as in those that chew the Cud. Of this Disease see what *Horselius* saies in his Epistles.

Vomits wariely to be used. Out of this Anatomical and Pathological Discourse may be collected, what parts are purged through the Stomach by way of Vomit: whether it be safe to exagitate this Part by Violent Vomits: whether it be good to use a mans self to this kind of Evacuation; seeing no good Houewife makes a close-stool of her Pottage-Pot. The best way is, diligently to preserve the Stomach, and to Roborate its Tone or contractive Vigor, rather than to dissolve and slacken the same by Vomiting, unless Nature desire to disburthen her self that way, and the patient be easie to vomit, and such preparatives be premised as the Antients were wont to use.

Vomits not to be given to persons very weak. Wherefore they deal unskillfully, not to say wickedly, who after many other Medicines tried, do give vomits to such as are at Deaths dore, as the last help, which suffocate that little life which remains, and bring a speedy death. But some will say that Empericks and Mountebanks, do this with good success. I answer, if you should reckon up those patients who have taken them to their cost, you would find an hundred dead, for two robustious persons saved; who scaped by their good fortune, not by help of the vomiting Medicament: it is better to use vomits rather at the beginnings of diseases, while Cholery works and ferments in places near the stomach, than when the Pangs of Death have seized upon the Patient, 'Tis Manslaughter, to wrong People in their health. The discreeter sort of Empericks, when they are called to such Patients, are wont to find fault with what other Physicians have acted, and to declare the Patient dangerously sick, and thereupon, warily to give their *Aurum Potabile* or some such other Medicine as a cordial and restorer of strength, untill Nature being freed from all disturbance of Physick, begins to gather strength: and then they take opportunity to give a gentle Vomit which Purges serous

serous, or such like Excrements, up and down. In very many Diseases, Hippocrates saies, 'tis better to be quiet, than to do any thing; that is 'tis better to leave work to nature, than to give any Medicament. And if the Physician knew that he is the Servant and Assistant of Nature, he would cure more Patients than he does. See *Valefius* upon the 19. Text of Sect. 2. of the 6. Book of Hippocrates Epidemics.

Sluggishness of the Belly, and impurity of the Vessels, brings all into confusion. Hippocrates.

Chap. 24. Of the Liver.

THE Liver, which is the Instrument of making Blood, consists of a Substance proper to it self, fitted, and ordained to that end; for it is like congealed blood, and therefore red, and the same colour it imprints upon the blood; howbeit the Liver of some Fishes, is of another Colour, viz. green, black, yellow as Saffron; in which Creatures, the blood receives its red colour by passing through the substance of the Heart.

Substance of the Liver.

Its Colour.

But in Men, and other living Creatures, which have the two Veins distinct, called *Porta*, and *Cava*, the whole Mass of blood is wrought in the Liver; but one part thereof, less perfect than the rest, is by the *Vena Porta* distributed among those Parts which serve to nourish the body; another part being conveyed by the *Vena Cava*, is perfected in the Heart, of which is made the Arteriall blood, which is distributed to all the parts, and afterwards is transmitted into the Veins, that so in a Circular motion, it may pass again into the Heart, that by its flux, it may maintain the perpetuall motion of the Heart; as the Wheels of a Mill, are continually turned about by force of the wind, or water-fall.

Blood where, and how made.

Such blood is furnished to those parts, which having sense and motion, depend upon the Brain or Heart.

The Liver is ^ascituate in the right Hypochondrium, under the bastard, or short Ribs, and fills with its bulk, all that Cavity to the Sword-like Cartilage. Sometimes it is so enlarged, as to exceed those Naturall bounds, and then it rests upon the Stomach, reaching as far as the Spleen, & descends three or four fingers breadth below the bastard, or short Ribs; which happens, partly through relaxation of the bands wherewith it is bound to the Midriff, and short Ribs, partly through swelling of the Liver it self, over loaded with Nutriment.

Situation of the Liver.

Signs.

In Man-kind, there is one single Liver, which is not divided into Lobes, or Fingers, as in brut Beasts; yet there is a certain ^bCleft to be seen, where the Umbilical ^cVein creeps into the Liver: and many times two little Lobes, or Laps, are ^dseated under the greater ones; sometimes there is onely ^eone, which being hollowed, receives the Trunk of *Vena ^fPorta*, which is included in a Duplication of the *Omentum*, or Call, that the Excrements of the Liver might be derived thither.

Number.

Lobes, or Lips.

Although the Liver be one continued Substance, yet Anatomists divide the same into two Regions; the one superior, and exterior; the other inferior, and internall. The superior, or upper, is called the ^gGibbous, or banching part of the Liver: the inferior is called the ^hhollow part of the Liver. Into the upper Region, the *Vena ⁱCava* sprinkles its Roots: into the nether Region, the *Vena ^kPorta* sows abroad its Suckers.

Two Regions of the Liver.

Its Vessels.

Besides these Roots, there are observable, certain Branches of the Channell of choler, dispersed among the Roots of *Vena Porta*; and certain little twigs of the Milky Veins, which near the Trunk of *Porta*, do enter into the Cavity of the Liver.

^aT. 2. f. 10. I. D. T. 4. f. 1. A. B. ^bT. 4. f. 5. C. ^cf. 1. a. f. 5. E. T. 2. f. 10. G. ^dT. 4. f. 4. A. A. ^ef. 5. B. ^ff. 5. I. ^gf. 1. B. f. 4. A. A. ^hf. 1. A. f. A. A. ⁱf. 4. D. D. ^kf. 5. I. & c. ^lf. 15. H. ^mT. 9. f. 1. a a a a.

Diversity of the Regions, to be observed in practice.

It is the mind of Physicians, that both these Regions ought diligently to be observed, because in either of these Regions, the Morbifick matter may be contained, which is diversly to be purged, according as it possesses the one or other Region: for as much as the bunching part of the Liver, is purged by the Kidneys, through the *Vena Cava*, the hollow part is purged by the Guts, by means of the Branches of *Porta*, which are terminated in the Guts, conveying blood, and the evil humors of the Liver. I have seen Impostumes in the bunching part, when the hollow part has not been at all tainted: and on the other side, I have seen the hollow part impostumated, without any detriment to the bunching part.

Howbeit, inasmuch as I cannot see those two Regions separated so much as by a Membrane; I cannot believe that one part can be sick, and the other sound, unless the morbid humor be contained within the Pipes of the little Veins.

Whether the Root of Cava and Porta, are united in the Liver.

Many Anatomists do affirm, that the Roots of *Vena Cava*, and *Vena Porta*, do meet together, and are united one unto another by many Anastomosis: others deny that there is any such Conjunction; among which, I willingly acknowledg my self for one, and give my voice on their side: my Reasons I have else-where laid down, and Nature would have it so, that naturall, and vicious Humors might not be confusedly jumbled together in the Liver.

How blood is distributed from the Liver.

You shall observe, how the Vein which is taken for *Cava*, takes its rise out of the upper part of the Liver, and is inserted into the Trunk of *Cava*, near the midriff, that the *Cava* may forthwith pour out the blood which it hath received from the Liver, or rather transmit the same into the neighboring Heart, scituate only two or three fingers breadths off, and inclosed in the *Pericardium*, which cleaveth circularly to the Nervous Centre of the *Diaphragma*: whereby thou maiest perceive, that the greater part of the blood, goes into the right Ventricle of the Heart, that it may become Arteriall, by a double Circulation, Particular, and General. I call that the particular Circulation, which is made from the right Ventricle of the Heart through the midst of the Lungs, so as that the blood comes again into the left Ventricle of the Heart. The general Circulation, is that which is made through the Channels, or large Pipes of the *Cava* and the *Porta*, after that manner which is described in my Treatise of the Circulation of the Blood.

A double Circulation of the blood.

The Medicinal Consideration.

Diseases of the Liver in respect of Temper. Substance. Situation.

The Liver being affected contrary to Nature, is subject to any distemper, either with or without matter; and instead of good blood, it breeds that which is Choleric, Flegmatick, or Melancholick. It is altered, and corrupted in its substance, while it loses its Tone, and becomes flabby, and faint.

It changes its Scituation, when it is placed in the left side, and the Spleen on the right, which seldome happens: or when upon the slackning of those Ligaments wherewith it is fastened to the Midriff, and Sword-like Cartilage, it sinks below the short Ribs, as far as to the Navell.

Magnitude.

Its Magnitude is changed, when it is so over-charged with Humors that it swells again.

Shape.

Its Figure, or shape, is also changed, if we feel it to be round. Oftentimes its passages are stoppt namely the Roots of the *Cava*, and *Porta*; or the Roots of the Gall-Bladder are stoppt, though the other be open.

Communion with other parts.

It has Communion in regard of Neighborhood, with many parts which it touches, but especially with the Stomach, which it often harms, being inflamed, or impostumated: and sometimes it exulcerates the same, and makes a hole therein, to empty its self that way of its Quittor. With its hollow part, it touches the Guts, which are offended in Diseases of the Liver; and also the *Peritoneum* it self, by reason of the Coat which it imparts, and the Midriff, by reason of the firme Connexion they have with the Liver, are drawn to sympathize in its Diseases.

Affions.

The Action of the Liver, with its Sanguification, or blood-making, is hurt by the fore-recited Diseases: whereupon divers Diseases, and divers Pains do arise.

Wherefore

Wherefore the Similary Diseases of the Liver are all Distempers, and the Laxity thereof, from which some are termed *Hepatici*, who having a looseness do void Excrementitious Blood, like the Water in which Raw flesh has been wash'd, or Excrementitious Humors of bad and divers Colours.

Its Similar Diseases.

Its Organick Disease is obstruction. Its Disease common to the Similar and Organick Parts, is an Ulcer and a wound. Its Compound Disease is all sort of Tumors, whence comes the Term of inflammation of the Liver: also a Scirrhus and a purulent impostume, which is frequent enough.

Its Organick, Common and Compound Diseases.

Its Symptoms are, Action hurt, and that manifold: and first of all its attraction of Chyle being abolished, breeds a looseness of the Belly, in which Chyle is voided. Its Retention abolished, breeds the Liver looseness called *Diarrhea Hepatica*. But the Principall Action of the Liver, viz. Sanguification or Blood-boiling is abolished in the Dropsie, is diminished in *Atrophia*, and is depraved in *Cachexia*.

Its Symptoms.

The Dropsie is defined to be, a frustration of Sanguification in the Liver, when instead of blood or naturall spirit, it produces nothing but water and wind, which are emptied forth into the Belly, whence come the *Ascites* and *Tympanites*, that is the Bottle-bellied, and the Drum-bellied Dropsie; or else they are convey'd into the Habit of the body, whence comes the Dropsie *Anasarca* and *Empneumatosis*, viz. The Bloat-fac'd, Puf-Cheeked Dropsie. Sometimes a Dropsie is caused through fault of the Spleen and other Parts, but not without the Liver be hurt, and likewise the heart, by means of the *Circulation* of the blood.

Dropsie.

Atrophia (or falling away of flesh) is an hindrance of the bodies nourishment, by reason of the badness of the blood which the Liver Makes.

Atrophy.

Cachexia is a depraved kind of Nourishment, by reason of bad Sanguification. Before these, is wont to march a simple accident, viz. Badness of Colour in the Skin, either blewish, white, or Yellow, by reason of Serosity or Cholera shed into the Habit of the whole Body, even as far as the face, by which we discern the evil dispositions of the Liver.

Cachexy.

Chap. 25. Of the Bladder of Gall.

Now follows the *Folliculus Felleus*, or *Cystis Biliaria*, The Bladder which is ordained to contain that Excrementitious Cholera which flows from the Liver.

Its Name.

Its substance is Membranous, being distinguished into two Coates.

Substance. Situation.

It is placed under the Liver, and affixed to the greater Lobe or lap thereof, and as it were overwhelmed therein.

The bottom of the Gall-Bladder respects the inferior Parts, its Neck, the superior parts, and a pipe derived from the Gall-Bladder called *Canalis Cysticus*, is carried obliquely till it meet the *Canalis Hepaticus*. There is a *Sinus*, or bedding near the Orifice of the Bladder,

Bottom. Neck. Sinus.

Its Magnitude varies according to the plenty or Scarcity of Cholera, It is onely one. It has been found sometime double, but that was contrary to the intention of nature. It's divided into the bottom, which is the lower Part, and into the Neck which is the upper Part.

Signs. Number.

It has an oblong shape resembling a large Pear, broad at the bottom and straiter towards the Neck.

Shape.

It is hollow that it may receive Cholera, and retain it till a convenient time of emptying the same; it has certain pipes or Channels to carry Cholera: the one broader and longer, drawn out from the Liver to the beginning of the *Intestinum Jejunum*, that is the Hungry Gut, or Gut termed *Jejunum*, by which the thicker Cholera passes directly away; the other Pipe is smaller and shorter, which is drawn Cross-waies, from the Neck of the bladder, to the foresaid passage. The former I call *Meatum Hepaticum*, the Liver Caannel; the latter I call *Cysticum*.

Passages of Cholera.

Meatus Hepaticus.

Meatus Cysticus. *Meatum*, the Bladder passage, by reason of its Rife and orifice. For the *Meatus Cysticus* carries the thinner Choler into the *Meatus Hepaticus*, which a porous Membrane, full of little holes, rooted in the Liver, had suckt therefrom.

Two sorts of Choler in the Liver. And therefore we must observe, that there are two sorts of Choler in the Liver, and two Channels to purge them away at divers times; which is a Consideration of great moment in the Cure of Diseases.

Communication. The Gall Bladder communicates with the Stomach by touching the same, which it heats so, as sometimes to burne the same, when the Gall is inflamed in its Bladder. Sometimes it sticks to the Gut Colon which passes along hard by, which it often Colours Yellow, and provokes it to expell the Excrements.

Its Vessels. This Expurgation of Choler, being liable to be stopt, does vex the Body with many Inconveniencies.

There is seldome observed a third channel of Choler, which goes into the Stomach, unless some part creep from the *Meatus Hepaticus* unto the *Pylorus*. It has manifest Veins from the *Porta* called *Vena Cystica*. Its Arteries and Nerves are not so visible.

^a T. 4. f. 1. C. f. 5. F. ^b f. 5. H. H. f. 3. c. ^c f. 3. D. ^d T. 4. f. 8. b. ^e

The Medicinal Consideration.

Diseases of the Gall bladder.

THE Gall-Bladder is subject to few Diseases. The most common are, when its Cavity or its Channels are obstructed. When its Cavity is full of little stones or filled with one great one, by reason of thick Choler changed into a Stony substance. Its Passages are stopped in the Liver, or in the Gut. Also it is broken, through violent motion in Vomiting; and sometime it is so distended with Choler, when the passages are stopped that should Exacuate the same, that it has been seen as big as both a mans fists.

Its Symptoms.

Sometimes, when it is empty of Choler, it dries up, so that nothing therefore remains saving the *ductus Hepaticus*. If we beleive *Fernelius*, there could be no other Cause found of the death of some persons, than that their Gall-bladder had no choler in it: if so, the evil and venomous Quality of the suppressed Choler was so great, as to infect the heart, or to weaken and corrupt some noble part.

Their Signs.

The Symptoms of this Part are more manifest; which do consist in its Action hurt, or in the undue proportion or quantity of the Excrementitious Choler. The Action of the Gall-bladder is attraction of Choler, which is either diminished, or abolished. The under proportions or quantity of the Choler is, when either too little or too much is voided forth.

Their Original.

Which Symptoms chiefly appear in those parts which Sympathise with the gall-bladder, as in the Stomach, when Choler is vomited up; in the whole body, when Choler is shed abroad through the Veins into the habit of the Body, and deforms the Skin; or when it takes its Course into the Guts and causes a dysentery, or a choleric looseness.

Diversity of Choler proved.

But the originall of these Symptoms is to be charged upon the Liver, being ill disposed.

By the different sorts of Jaundice.

And *Democritus* had good Reasons to search diligently into the seat and Nature of Choler, when he made dissection of divers living Creatures, that he might be more able rightly to cure the Diseases of Body and Mind.

When I see in an extream Yellow Jaundice, the whole Skin infected with choler, and that the Urins die cloaths Yellow, the stools being in the mean time whitish; And when I see in another sort of Jaundice, both the Urins and stools Yellow; this confirms to me, that there are two sorts of Choler, and several wayes for the expurgation of each of them. In the Yellowest sort of Jaundice, in which the stools are whitish, the *Meatus Hepaticus* or Liver passage of Choler is stopped in the cavity of the Liver. In the other sort of Jaundice when the stools are Yellow, it shews that a quantity of choler passes away by the Urin and Guts, and the obstruction

fruition is not so great nor so stubborn, as in the Yellowest sort of Jaundice, and therefore it is to be hoped the Cure will be more speedy.

Chap. 26. Of the Spleen.

THe Spleen is a Bowel placed right against the Liver, as its Lieutenant, and a kind of Bastard-Liver, that when the Liver is Diseas'd, it may assist the same in Sanguification or Blood making.

The Spleen
describ'd.

It is of a ^a Substance spongy, soft, sprinkled all over with very many Vessels like *Fibres* or threads; yet it is altogether unlike the substance of the Liver. It is infolded in a Membrane ^b proper to it self, seeing it receives none from the *Peritoneum*.

Its Substance.

Its Colour is black and blew and obscurely Reddish.

Colour

Its greatness is uncertain and not determinable, because it grows greater or less, according to the abundance, or defect of Humors which flow thither, and are collected therein. So that there is none of the Bowels which does so easily grow bigger and lesser, as the Spleen.

Greatness.

In respect of Number, it is wont to be single; Sometimes it has been observed to be double and threefold.

Number.

Consider in the spleen its upper Part, which is termed the Head, and its neither Part which is called the Taile.

Parts.

Tis ^a placed in the left *Hypochondrium*, under the short Ribbs, oppos'd as it were to weigh against the Liver, that the Body might remaine equally Ballanced.

Situation.

When it keeps its Naturall Constitution, its Temper is hot and moist, enclining to dryness.

Temper.

It is of an oblong shape, like a Tongue, in Brutes; but in Mankind, it is more like the sole of a Mans Foot, In the fore Part towards the Stomach, it is ^b hollowed that it might receive the ^c splenicall Veins and Arteries; on the back part towards the Ribbs, its ^d bunching.

Shape.

Its knit into the Stomach by two or three Veins remarkable enough, which do make that so famous ^e *Vas breve*, so called by reason of the shortness of the way. Through those Veins it disburthens it self into the Stomach: by the Veins and Arteries Splenicall, it purges it self into the Guts and Kidneys.

Connexion.

It's fastened to the bastard Ribbs by Membranous *Fibres* sufficiently strong: sometimes its fastened to the Stomach, and is knit at its point to the Midriff or *Diaphragma*.

It Communicates with the Heart, by a remarkable peculiar and Admirable Artery which it hath, which by a short way carries thither, the Vapours or ill Juices thereof.

The Action of the Spleen is much doubted and contraverted among Physitians and Anatomists: so many Men, so many Minds: *Hippocrates* did believe that it drew superfluous serosity out of the Stomach: which Opinion *Aristotle* followed, though others draw to it an attraction of Chyle, either out of the Pancreas and Mesentery, or out of the Stomach.

Action contraverted, divers Opinions thereof.

Galen will have it employed in Purging away Melancholy, which it draws from the Liver.

Others are of Opinion that it prepares Blood for the Heart that it may become Arteriall, whether it be of the thicker parts of the Chyle, or of the dregs of the Blood carried thither.

Others say it prepares a superfluous wheyish matter, being the Excrement of its own digestion, which it sends back again into the Stomach, to ferment the Meats when they are turned into Chyle.

The Arabian Physitians acknowledg such an Humor, but they assign its office to be the provoking of Appetite. *Galen* thought that it did help to strengthen the Stomach.

In

In so great dissent of Authors what shall we resolve upon? every one brings probable reasons for his Opinion. *Hofmannus* conceives he has so sufficiently established his Opinion, that no wise man can contradict him. Shall I venter my Opinion among so many learned Champions?

The Authors
Opinion.

I conceive that the Spleen does attract slimy Blood to nourish it self, and that it sheds a special kind of fermentative Serosity through the Splenick Arteries into the Stomach; and because its *Parenchyma* or substance is of a Spongy and soaking Nature, it does by the Veins attract and suck out the superfluous humidity of the Stomach, that the Coction may be the better.

Howbeit, I deny not but that it may by Accident supply the Office of the Liver, when the same hath lost its faculty of Sanguification; but Blood cannot be made so good and perfect in the Spleen as in the Liver, seeing it is but a Bastard Liver, and consequently makes but bastard Blood and impure, because not Clarified.

Hofmans Opin-
ion of the
Spleens Sanguif-
ication exami-
ned.

Hofman makes himself Ridiculous, while he eagerly contends in a little Book which he has put forth, and up and down in his other writings, that the muddy part of the Chylus, is carried by the Mesaraick Arteries unto the Spleen; where it is turned into blood, with which, the neighbouring Parts are nourished: and that the Excrements of this Blood are voided by Urins, Stool, and Sweat. That good Old Man is to learn, that the thicker Parts of the Chyle are not sucked out, but separated and sent away into the greater Guts; and that the Mesaraick Arteries cannot do as he saies, because they contain Arteriall Blood: neither do they reach any of them to the Spleen, because it has a peculiar Artery, which *Arantius* first described, and which I my self have often shown.

Again he ought to have rejected the Milky Veins of *Afellins*, which he allows of; seeing none of them reach unto the Spleen.

Furthermore, that same bastard and impure Blood, bred of muddy Blood by a bastard Liver, will be unfit to nourish the neighbouring Parts which serve for Coction, though they appear filthy, for they need to be nourished with pure Blood for their preservation.

The Choleric, Melancholick and Wheyish Excrements of the said Blood, cannot be Purged away but by Veins and Arteries; the Arteries are already taken up with carrying the muddy Parts of the Chyle. They must therefore of necessity be carried by the Splenick Vein into the liver, that they may be voided through the Guts or by the Kidneys, which would breed very great confusion in the Liver.

If *Hofman* had considered, that the substance of the Spleen is unlike the substance of the Liver, its bigness different, its number uncertain, Colour divers, Situation variable, because sometimes it sinks down to the *Hypogastrium*; more often ascends towards the Midrif, sometimes descends upon the left Kidney, the Ligaments being slackned: and lastly, its shape, quite contrary to that of the Liver, and sometimes there is no Spleen at all: also that the structure of the Vessels of the Spleen, is altogether unlike that of the Vessels of the Liver; he would never have so stiffly affirmed, that the Spleen made a peculiar kind of Blood out of the *Chylus*.

Nature does in none of the Bowels more sport her self, than in her shaping of the Spleen so variously and unconstantly. But the Structure of those Bowels which are necessary to the maintenance of life, is alwaies, one and the same and Uniform.

Furthermore you may know that the substance of the Liver and Spleen are unlike, by boyling the one and the other: for the substance of the Liver is firme, solid and Reddish; that of the Spleen is Spungy, soft, and black and blew in Colour: The substance of the Liver of Animals boyled, as of an Ox, a Sheep, a Goat, is eaten with content: the substance of the Spleen is not Mans meat, neither will other Creatures eat it, unless they be very hungry. But if the Office of the Spleen and Liver were the same in Brutes as well as in Men, they should have both alike substance and breed the same Blood.

Where

Where will you find a place to cleanse away Choler in the Spleen, as there it is in the Liver? If the Spleen draw the more thick Part of the Chyle, it ought to have larger Veins, but they are exceeding small, like unto threds. Wherefore *Hofman* does foolishly to enquire the *Diots* or *Cause why it is so*, before he knows the *Hoti*, that it is so, which ought to go before, and be diligently enquired into, when the naturall Action of Parts is sought after, because the naturall Constitution is Compounded and accommodated thereunto. What cannot an ingenious wit imagine? But all such speculations are ridiculous and void, unless they are approved by the Eye, and confirmed by diligent Section and Inspection of Bodies. See *Aristotle* in the third book of his *Politicks*, at the beginning of the 8. Chapter, who will there instruct thee.

If *Hofman* had known out of *Aristotle*, that such living Creatures as drink, have a Spleen, Reins and Bladder, he had more truly expounded that passage of *Aristotle* out of *Hippocrates*, of the true sence whereof he glories. The Spleen draws out of the Belly superfluous humidities, it self being constituted of blood.

¶ ^a T. 4. f. 7. C. ¶ ^b f. 7. B. B. ¶ ^a T. 4. f. 1. D. ¶ ^b T. 4. f. 8. A. A. A. ¶ ^c T. 4. f. 1. I. I. f. 8. B. and C. ¶ ^d T. 4. f. 7. A. ¶ ^e T. 4. f. 6. b. ¶

The Medicinal Consideration.

The Substance of the Spleen is liable to all kinds of Distempers, and to divers swellings, especially that kind of hard swelling which is termed *Scirrhus*. Sometimes it is inflamed, and then the substance thereof is perceived to pant, by reason of the Multitude of Arteries, of which it is full. It seldome impostumates. Its Coat does oftentimes grow thick and becomes Cartilaginous.

It often grows great by abundance of Humors, and grows small again, sometime of it self, and sometime by use of Medicines. It is better that the Spleen be small, than great.

A double or triple Spleen is not good, because it is a fault in the Conformation.

The Scituation of the Spleen is sometimes changed, when its Ligaments being slackned, its weight bears it downwards, or they being broke, it falls into the *Hypogastrium* or parts beneath the Navel; and then it deceiveth unskillfull and heedless Physicians, who in women take it for a Mole, or for a *Scirrhus* Tumor of the womb, and in Men for a sort of Glandulous Tumor which lies hid in the Mesentery. In four Patients it has been my hap to see the Spleen on this manner fallen down into the Belly.

Sometimes one or other of the Kidneys is seen to fall down in the same manner; but it is easie to know the one from the other. when the Kidney is fallen, the swelling is round: when the spleen is fallen the Tumor is oblong and an emptiness is perceived on the left side under the short Ribbs. And if the Tumor be movable, as it is at first, the Spleen or Kidney is easily reduced unto its Naturall place: otherwise, after the space of six moneths; it sticks so fast to the *Peritoneum* before, to the bottom of the bladder, to the Guts, and in women to the womb, that it must of necessity putrifie in that place; which it will the sooner do, if either you give the patient Emolient Medicines inwardly or apply them outwardly. If you would prolong the patients life, you must often let blood, and beare up the Tumor with a truss or Swathe-band.

What if the Spleen fall from its naturall place, shall we sear and burn it with a red hot Iron? when it slips into the Belly shall we take that course with it? It is a ticklish and dangerous piece of work, notwithstanding Old Farriers or Horse Doctors have written, that the Spleen has been by that means consumed in Horses; and in some poor slaves on whom they durst Experiment so cruel a Remedy.

Much more dangerous it is by opening the left Hypochondrium to take away the Spleen; neither can its thick superfluous Humors be safely dissolved by beating the

Diseases of the Spleen in Substance.

Magnitude.

Number.

Scituation.

Difference of the Spleen and Kidney when fallen.

The Cure of both.

same, I should by such a practice fear a contusion, after which an incurable sup-
puration of the whole substance would undoubtedly follow.

Figure.

There is none of the Bowels which in Diseases does more change its shape. Some-
time its long, sometime foursquare, sometimes round, according as it finds room to
dilate it self in.

Commuions.

When it rests upon the stomach, it does much hurt and disturbe the action there-
of; and if it be fastened to the Midrif, it opresses the same, or if it reach thither in
its Bulk, it hinders the free *Motions* thereof.

Obstruited,
what Diseases
it Causes.

Upon the Spleen obstruited depend the black Jaundice, Hypochondriacal Me-
lancholy, the ill Colours of Virgins and other Women, The Scurvy, or *Hippocrates*
his great Spleens, out of which flowes a Malignant Wheyish Humor, which being
spread into divers Parts of the Body, does in the Mouth cause *Stomacace* or *Oscedo*
a soreness with looseness of the Teeth &c. In the Thighs *Scelotyrbæ* a soreness with
spots, and wandring pains through the whole body, which are either fixed and a-
biding in certain Parts, which wee call Rheumatismes, and the Germans refer them
to the Scurvy, as may be seen in such German Authors as have written of the scurvy,
especially in the Treatise of *Engalenus*. And therefore after universall Remedies,
they use other appropriate Scorbuticks, which are destined to the Cure of that
Disease.

Chap. 27. Of the Vena Cava and Aorta, Within the Lower Belly.

Liver is not the
Original of
Vena Cava.]

The Trunk of the *Vena Cava* is commonly reported to arise out of the Liver,
and to be divided into the superior and inferior Trunk, as if they were sepa-
rated, as it is in the flock of the *Aorta* springing out of the Heart: but Ocular in-
spection does demonstrate, that the Trunk of *Vena Cava* is separated from the Li-
ver, which creeps beneath, and that near the top of the Liver by the Midrif it re-
ceives a branch which grows out of the *c* Substance of the Liver, which carries blood
into the trunk of the *Cava*, that it may be carryed unto the Heart with other blood
which ascends by Circulation.

Wherefore that same Trunk of the *Vena Cava*, is extended all along without
Interruption from the *d* Jugulum or Neck: even to the *e* *Os sacrum*. There I
make account is the Cistern of Blood, because a great part of the blood is contained
therein.

Vena Cava
divided into
Trunks.

The trunk of *Vena Cava*, in regard of the Liver, which by a branch supplies it
with Blood, may be divided into the *f* upper and lower *a* Trunk. The inferior
produces the *Vena h* *Adeposa*, which is dispersed into the fatty Membrane of the
Kidney; and then the *i* emulgent, which is distributed into the Kidney: after that
the *k* Spermatick Vein, whose right-side branch springs from the Trunk of *Cava*,
and its left from the Emulgent; finally, it sends three or four branches called *l*
Lumbar into the Loins, which are spread abroad unto the Marrow of the Back.

Distribution of
the inferior
Trunk.

When the Trunk is come to the top of *Os Sacrum* it is divided into two Chan-
nels or Pipes, which from their Situation are termed *m* *Canales Iliaci*, the Iliack
Pipes. From these on either hand are produced other Veins, especially the *a* *Sa-
cra*, *b* *Hypogastrica*, *Amplissima* *c* *Epigastrica*, and *d* *Pudenda*. In Women, the
Hypogastrica is longer than in men, and Nourishes more Parts, and holds the
Menstruall blood, till the time come that it must be voided. Wherefore blood is
contained in greater plenty about the Genitals of Women, than of Men.

The *Epigastrica* is observed to be two-fold in Women; the one ascends into
the *Musculus Rectus*, the other opposite thereunto, descends as low as the
womb.

Seat of Fea-
vers continual
and Intermit-
tent.

In this Trunk of *Vena Cava*, *Fernelius* after *Galen*, placed the seat of continuall
Feavers, supposing the Blood rested quietly therein: but seeing the blood is in
perpetuall motion, I make the seat of continuall feavers to be in the Trunk of the
Vena Cava, and in those great Pipes carryed along through the Limbs; as the se-
minary

seminary of intermittent Feavers or Agues, is in the *Vena Porta*, or in the Bowels, which are nourished thereby.

Seeing the Veins are the vessels and cisterns to contain the blood, they have a thin coat, saving that the Trunk of *Vena Cava* has a thicker and stronger coat than ordinary, to avoid breaking, in case the blood should work or boyl therein, which by means of the tenderness of the Coat, can sweat and breath thorough.

Tis a Question, whether the Veins have *Fibres* or no? some say yea, and some no. But seeing the Blood is thrust forward by the spirits and Heat, it has a natural ascent unto the Heart, and therefore it needs no *Fibres* to draw it, and if any were necessary, the right ones would suffice, but the circular ones are interposed for strength, and some threds are observed in the Coat of a Vein, not to draw, but to strengthen the Coat. Wherefore the Contentions about the *Fibres* of Veins are but vain Janglings; neither are we in Blood-letting so carefully and scrupulously to observe the rectitude of the *Fibres*, as the Scituation of the Part affected.

Hippocrates in his Book de *Merbo Sacro*, does Elegantly call the Veins *Spiracula Corporis*, the Wind-doors or Breathing places of the Body; because when they are opened, a Fuliginous or sooty Spirit Issues out with the Blood, and the Air is likewise by them received in, to cool the Body.

In Antient times, and the dayes of *Tore*, it was a Part of Sooth-saying, to view the blood which flowed from their sacrifices, which if it appeared pure and laudable, it was a token of happy and joyfull success; if bad and corrupted, it was an ill sign, according to *Lucan*.

Nec Crur emicuit solitus, sed Vulnere Largo

Effluxit nigrum rutilo pro sanguine Virns.

That is,

No usual Blood did spring from the large Wound,
But black and Venemous, for Red and found.

The Medicinall Consideration

Seeing the Veins are the Cisterns of blood, it comes here to be considered how the blood ought to be qualified in sound bodies, that so we may be able to judge of that which is corrupt. Now in bodies, that are healthy the blood is Red, *Fibrous*, and has a small quantity of Wheyish water mingled with it.

Whether the *Fibres* are made of an earthy and flegmatick matter which is drawn out into threds within the Channels or greater Veins, and is made smaller in the lesser Veins, many doubt, supposing the four Humors to be contained in the Mass of blood. Some admit of blood, but severed from the other Humors, which in the first Region are separated from the blood. Others distinguish the Alimentaty Humors from the Excrementitious: the former are confused and mingled with the Blood, the latter are to be seen collected in several Parts, as *Choler* in the Gall-bladder; *Melancholy* in the Spleen; and *Flegm* is diffused through all the parts of the Region of the belly, notwithstanding *Hippocrates* acknowledged two fountains of *Flegm*, the Head and the Stomach.

Now the Quality or temper of blood is hot and moist. Its Quantity cannot be defined. The Arabian Physitians, especially *Avicenna*, do write, that in a Sanguine body well constituted, there are twenty four pounds of blood, so that a Man may bleed twenty pounds and live: but if he bleed more, Death follows inevitably. That which preserves our life, is likewise the occasion of Death: for as good Blood in a moderate quantity preserves our life, so the same being vitiated, or too much in quantity, is the Cause of Sicknes and Death it self.

When blood offends in quality, it is termed *Cachymia*, when in quantity, it's called *Plethora*. Sometimes the blood is corrupted, and not the Serum or Wheyish Water, Sometime the serum is corrupt, and the blood remains sound. Now the serum or Wheyish Water being corrupted, is the worst Humor in the Body,

M

greivously

why Cava has a thick Coat.

whether Veins have Fibres.

why the Veins are called the Bodies Wind-Doors.

The condition of good Blood.

How the Fibres in the Blood are bred.

The natural Temper of the Blood.

Quantity of the Blood.

Cachymia & Plethora, what they are.

grievously infecting, weakening, and destroying such parts as are therewith diseased.

Some Practitioners do make it a Question, whether in the Veins, every Humor has its own proper Serum or not. I believe that there is but one kind of Serum, which according to the severall degrees of its Corruption and Tincture, appears sometimes yellow and Choleric, sometimes green and livid, or black and blue; sometimes Melancholick, and sometimes Milky. Aristotle counts the Blood corrupted, when it is changed into Serum. Sometimes the Putrefaction of Blood is so great, that the whole Mass is turned into a rotten putrefied Serum, When the corruption of blood, is yet greater, sometimes Worms are bred therein, which I have seen come away in the opening of a Vein. Such a Worm being bred in the Veins, may sometimes flow into the right Ear of the Heart, and grow great, and at length gnaw, and eat upon the Heart, as has been often observed in the Dissection of dead Bodies.

The Veins have in them, a Retentive Faculty, whereby they hold fast the blood within themselves: which Faculty being perished, they suffer the blood to leak out through all the parts of the Body, yea, even to sweat out, as I have seen in some Patients. But more often it flows out Immediately by the Nostrils, Mouth, Lungs, Guts, Bladder, by the Womb, and by vomiting.

I have divers times seen in malignant burning Feavers, that the blood has been congealed within the Veins, like unto the pith of an Elder stick; which has been noted by Fernelius in his *Physiologia*.

Aretaeus writes, That the *Vena Cava* is sometimes inflamed, and thereupon comes to break, which I have seen my self to happen. The trunk of *Vena Cava* cannot be dilated, so long as the blood circulates freely. Neither is it subject to swellings, termed *Varices*, which are wont to happen onely in the Veins of the Thighs and Legs.

Of the Diseases of this Vein, and of the Blood contained therein, there is a two-fold Cure; Purgation, and Blood-letting: but blood-letting is more necessary of the two in a *Plethora*, either *ad vasa*, or *ad vires*: or in a Plethorick *Cacochymia*, or in a very great and putrid *Cacochymia*, that a portion of the extremely corrupted blood may be taken away.

Blood-letting takes away such obstructions as are caused by blood, but not those that are caused by Humors congealed in some part of the body: and therefore that same *Euroia* so often mentioned, that freeness of passage caused by blood-letting, must be understood of the motion, and free passage of the blood through the Veins, and not of the removal of an humor that is gathered together, and wedged fast into any part of the Body.

If blood-letting cannot be put in practice, the Question is, whether Purgation alone, may supply its place, according to Galens Opinion, in his Book, *de Sanitate tuenda*; or spare eating, exercising the body, frictions, sweating; I suppose, where there is no Fever, the blood may be diminished by the means aforesaid, and also by such Medicaments as draw the Serum out of the Veins; for so the Veins being emptied, the rest of the body may be extenuated; and this is observed, and put in practice in such Nations where the People are afraid of blood-letting. Howbeit, to open a vein twice or thrice, is a more speedy, and safe Remedy.

Forasmuch as Sylvius, and Carolus Stephannus, have written, that there is a valve within the Liver, by the Trunk of the *Vena Cava*, which hinders the blood from returning back: Conringius saies, that it is to be found in Oxen. This favours that Opinion of the bloods being carried from the Liver unto the Heart. It seems to me, that Nature has placed that valve, that the filth of the mass of blood should not flow back into the Liver, and obstruct the same: which filth, either she carries by some way out of the *Cava* into the *Porta*; or else she sends it forth into the habit of the Body.

Corruption of the Serum.

Worms bred in the blood.

Heart eaten by worms bred in the blood.

Retentive faculty of the Veins being lost, what follows.

Blood congealed.

Vena Cava inflamed.

Cure of the Diseases of Vena Cava, and the blood, two-fold.

Purgation. Blood-letting.

If blood may be lessened by other waies beside blood-letting.

A Valve in Vena Cava.

Its use.

^a T. 12. f. 1. ABC. ^b T. 12. f. 4. A. ^c f. 1. r. r. ^d f. 1. B. ^e T. 12. f. 1. D. ^f f. 1. B. ^g T. 12. f. 1. C D. ^h T. 5. f. 2. g. ⁱ T. 12. f. 1. x x. ^k f. 1. x x. ^l f. 1. A A A. ^m f. 1. D D.

Of the Aorta descending.

The descending ^a Trunk of the *Aorta*, sends forth so many branches, as the inferior trunk of the *Vena Cava* produces; but it sends withal, a remarkable Artery, called *Lienalis Arteria*, undivided, by an indirect Course unto the Spleen.

Distribution of the Aorta descending.
Arteria Lienalis.
Its use.

That same Artery, is large, and wide as a Goose Quill, does furnish the Spleen with Arterial blood, that thereby the thick, and slimy blood, might be attenuated, and made fit to nourish the Stomach, and its neighbouring bowels, and that it might afford a fermenting Juice to the Stomach, to help its Chylification, by that same permixion of both sorts of blood. Peradventure likewise, when the Liver is vitiated, and extremely obstructed, Arterial blood may be brought unto it, by the Splenic Vein, as it were a Natural *Tartarium Vitriolatum*, to open its Obstructions.

Then it produces the ^b Celiac Branch, which is divided into as many twigs as the *Vena Porta* is, and has Communion therewith, by a mutual Anastomosis of the Vessels, that is to say, by a mutual conjunction of their mouths.

This same Arterial blood, is not circulated, yet may it have a reflux into the Trunk of the *Aorta*, to disburthen the parts of superfluous blood; which returning back into the *Aorta*, may conveniently be evacuated, by opening a Vein in the Foot.

The Trunk of the *Aorta* is made of a Membrane, six times thicker than a Vein; and therefore it is not subject to that kind of Tumor, called *Aneurisma*, which the other smaller Arteries are subject unto, by reason of dilatation of their Coat, or its Rupture, or apertion, when in the Arm, an Artery is opened instead of a Vein.

Thickness of the Membrane of the Aorta.

The *Aorta*, and *Vena Cava*, do constitute that Region, in which the matter of continual Feavers is contained; but the blood does not remain quiet in that place, seeing it is perpetually moved round by Circulation: wherefore these two vessels the *Vena Cava* and *Aorta*, are ordained both to contain, and circulate the blood, and may be termed the Circulatory vessels.

The Circulatory Vessels.

^a T. 12. f. 4. C. ^b T. 12. f. 4. p.

Of the Nerves of the Lower Belly.

Betweene the two Kidneys, at the Base of the Mesentery, we must search diligently for that same ^a Intertexture of Nerves observed by *Fallopins*, which is woven together of the ^b Stomachick and ^c Costal nerves, concurring on both sides to form this Contexture; from whence are derived all the ^d Nerves, which are distributed unto the parts of the lower belly.

Contexture of the mesenteric Nerves.

When this Contexture of Nerves is full of evil Humors, Convulsions happen with the Cholick pains, both in Men and women, though the brain be no wayes misaffected.

What diseases arise therefrom.

Chap. 28. Of the Kidneys.

The Kidneys, which are the Instruments of separating, and drawing out the wheyish Excrement, do consist of a fleshy substance, solid and proper to themselves, so that the like is not to be found in the whole Body.

Substance of the Kidneys.

They have a very thin ^e Membrane, or skinny Coat, which sticks close to their flesh; but they have another Coat which is loose, covered with Fat, which is called *Membrana adiposa*, wraps, and infolds the Kidneys, and is produced from the *Peritoncum*.

Their Temper is hot and dry, that they may be the better disposed to attract the serous Humidities.

Their Temper.

They are ^a situate in the Loyns, between a duplication of the *Peritoncum* which is no other than the *Membrana Adiposa*, and they seem to be placed without the Cavity of the Belly. The Reins are said to begin at the last bastard Rib.

Situation.

- Grains.* They have in length the breadth of four or five fingers; their thickness is two fingers, and they are much about three fingers broad.
- Number.* They are two in Number: sometimes, though rarely, there is but one, and then it is commonly as big as two, and lies upon the back, the Channels of the *Aorta* and *Cava* being a little removed to afford a place for the single Kidney.
- Shape.* They are shaped like those Beans we call Kidney-beans.
- Colour.* Their Colour is Reddish.
- Vessels.* You shall observe in their hollow side, the Emulgent Vessels, and the Ureter springing forth of that hollowed side. Their Vessels are the Emulgent ^c Veins and ^d Arteries, proceeding from the Trunk of the ^e *Cava*, and ^f *Aorta*.
- Kidneys, how shaped in Children.* And this is the outward Conformation of the Kidneys in a grown man or woman: in Children it is otherwise till they are a year old, because the external face of the *Nova* being like a thick bunch of Grapes, does neatly resemble the Kidneys of a Calf: and upon the Kidneys, is placed the *Glandula* ^h *Renalis*, which is shaped like the Kidney, and in Children, dries up by little and little, till it become flat, being separate from the Kidneys by a portion of the *Membrana adiposa*, though it be found not far off in either side.
- Its internal structure admirable.* The internal Structure of the Kidney, is admirable: which that you may conveniently view, and search into, you must cut it artificially on the hollowed side; and then there will present it self to your view, the enwidened ^a substance of the Ureter, which forms the *Pelvis*, or Basin; into which, from the upper part, as it were from an House-top, the wheyish Humor rains down drop after drop, through nine little fleshy Teats, called *Caruncula* ^b *Papillares*, which are acuminated without, and are enclused, and thrust into ^c nine Pipes, made of the substance of the Ureter dilated. Therefore that covering, through which the wheyish Excrement drops, may be called the *Cribrum Rennis*, or Kidney-sieve.
- The Basis.* In those papillary Caruncles, or fleshy Teats aforesaid, the *Serum*, or wheyish Excrement, is separated from the blood; which blood spends it self to nourish the Kidneys, or flows back again into the Emulgent Veins.
- The Teats.*
- The sieve.*

^a T. 3. f. 8. A. ^b f. 8. iii. ^c f. 8. B. B. Q. r. ^d T. 3. f. 8. l. w. n. ^e T. 5. f. 2. E. ^f f. 2. A. A. ^g T. 5. f. 1. B. C. ^h f. 1. F. G. f. 2. K. K. ⁱ f. 2. H. I. f. 5. B. ^j f. 2. a. a. b. f. 5. C. ^k f. 2. F. ^l f. 2. G. ^m T. 9. f. 2. B. D. ⁿ f. 2. A. & C. T. 5. f. 1. A. A. f. 2. B. B. f. 3. & 4. A. A. ^o T. 5. f. 5. A. A. ^p T. 5. f. 6. E. E. ^q T. 5. f. 6. D. D.

The Medicinall Consideration.

Infirmities of the Kidneys are.

Distempers. Imposthume. Ulcer.

Laxity, how caused.

Diabetes. Ischuria.

The Similar Constitution of the Kidneys, contrary to Nature, consists in the Depravation of their *Temper*, and of their *Substance*. A distemper either single, or with matter, causes a Laxity or looseness in the substance of the Kidneys, whence springs *Atonia*, or want of their wonted vigor to act by. By means of an hot distemper, they come to be inflamed, whence follows an Imposthume, and at last an Ulcer, as well in the internal, as external parts: for oftentimes a morbifick matter, is collected within the *Membrana adiposa*, which breeds Imposthumes which compress the Kidneys.

Laxity proceeds from a cold and moist distemper, or from an exceeding hot one, which corrupts the Naturall temper of the part; whence comes *Atonia*, or an impotency to contract it self; and from thence comes *Diabetes*, which is the Pissing sickness; or *Ischuria*, which is a total suppression of Urine, not onely in one kidney, but in both, by reason of Fraternity, and Co-partnership, by reason of an afflux of a malignant air from one to the other; or by reason of a reflux of corrupt and filthy blood. Sometimes want of Appetite to meat, is a fore-runner of this disease, by reason the Stomach sympathizing with the Kidneys. Observe diligently when

when the Stomach is ill, if there be no Disease in the Kidney; for if there be, that's the cause of the Stomach's disorder.

The Number of the Kidneys is seldom changed, and if there be but one, it cannot be known that there is more; neither can that one performe as much as two: and therefore those that have but one Kidney, enjoy not their health so well as they that have both.

Although the Kidneys seem fast fixed unto the Loyns by the fat, as it were with glue; yet do they sometimes fall out of their place, and lean forward, sometime slip into the belly, not without detriment to the Patients life and health: this is a truth not to be questioned. Which comes to pass chiefly, not only by melting the fat in which they are wrapped up, but also by their weight, when they are grown so great, by reason of some tumor or stone contained in their Cavities, that they can no longer be kept in their place by such staves as were wont to hold them. Being fallen into the belly, they stay there a while, and at last they putrifie, and impostumate.

Falling down
of the Kidneys.

Being in their natural Scituation, if they prove greater, or more weighty than ordinary, they cause a kind of numbness in the thigh, by compressing the Muscle *Psoa*, and the Nerves, which descend into the thighs, which are conveyed through the fleshy parts of the Muscle *Psoa*.

Their swelling.

If the inner Passage of the Kidneys be stopped moderately, either by an Humor, or by a stone, then the parties Urines are thin; or if the Obstruction be total, the Urine is wholly suppressed.

Stoppage.

If the inner Substance of the Kidney be exulcerated, the Patient makes Urine with Matter, or Quittor in it.

ulcer.

If a Vein be opened, or broken, bloody urines are made: and because the Kidneys communicate with the Stomach by the Stomachical Nerves, the Stomach does sympathize with them, being sick, and enclining to vomiting.

Vein opened, or
broken.

The Action of the Kidney, is to attract *Serum*, and to separate and expell the same: these things it cannot do unless it be sound and perfect; and therefore all the Diseases aforesaid, may pervert the same Action. The flesh of the Kidneys is dull of feeling, but the inward Membrane is very sensible.

Allion Hurts.

Stones are often bred in the Cavity of the Kidneys, either in the pipes, where they grow like Coral, or in the Basin, where a round stone is formed. If the Stone encrease so much as to cause a suppuration in the Kidney, towards the Loyns, by a deep issue made in this part, the Quittor may be purged forth, and the stone extracted; otherwise, unless Nature do go before us, and shew us the way, it were a wicked thing to attempt an Incision of the Kidney, by reason of the thickness, and profundity of the flesh in those parts.

Stones bred in
the Kidneys.

When curable by
Incision.

The Kidneys do sometimes consume away, and cause an universal Consumption of the whole body; which comes either from putrefaction of the Kidneys, or through over much ejection of Seed or Sperm.

Consumption of
the Kidneys.

In new married Couples, and in such as are more wantonly disposed than ordinary, this Consumption of the Kidneys happens; which would make some man affirm; that the matter of Seed, comes from the Kidneys, and that they carry a great stroak in the matter of Carnal Imbracements.

who most sub-
ject thereto.

Observe, That oftentimes through weakness of the Kidneys, which cannot attract the wheyish Excrement, a dropsie is caused without any fault of the Liver. Neither can the most effectual Diureticks open those passages. And therefore our chief Care must be to purge those, and the neighbouring parts, and by Fomentations, to restore the lost Faculty of the Kidneys.

Dropsie from
the Kidneys.
weakness.

How to be
cured.

Whether or no, may we force in a sharp pointed Iron, to one of the Kidneys, that a passage may be made for the *Serum*, which is damned up within the greater Veins, in case we cannot purge the same away with Hydragogues, or Water Purgers?

Chap. 29. Of the Ureters.

- The Ureters** are Channels or Conduit Pipes ordained to convey the Urine to the bladder.
- Their Description.** They consist of a single Membranous substance, which being inclosed in a duplication of the *Peritoneum*, therefore Anatomists have said, that they borrow another Coat of the *Peritoneum*.
- Substance.** They are as long as the Space between the Kidney and the bladder.
- Length.** Resting upon the ^a Muscle ^b *Psoa*, they are obliquely carried towards the *Ossa Ilium*, and rising up unto the bladder in the bottom thereof, they slip between the two ^c Coats almost as far as the ^d Orifice, where they pierce the bladder. They have no Valves placed in their Extremities, to hinder the going back of the Urine: but two Membranes meeting together, do exactly shut the passage.
- Situation.** Naturally they are as thick as Goose-quills, but in such as have the stone and use to void little ones from the Kidney, the hollownes of the Ureters is so widened, that they have been seen as thick as a Mans Finger in the dissection of dead Bodies.
- Usefulness.** The Original of the Ureters is rather from the bladder than from the Kidneys, because they are of a Membranous substance. Within the Cavity of the kidneys they are divided into nine Pipes, which are fitted to the little fleshy Teates called *Carunculae Papillares*, that they may distil the *Serum* into the *Basin* or large Cavity of the Ureters, within the Kidneys.
- Original.** They are thought to have Nerves whereby they feel; but being of a Membranous Nature, their extrem pain in the passage of a Stone, proceeds from the stretching of the Membrane.
- Nerves.** Seeing therefore they are ordained to pass the Urine unto the Bladder, they are offended with such things as pass through them, whether it be sharp Urine, or purulent matter, or a little Stone, or a thick and clammy Humor, by which they are obstructed. So that the most usual Diseases of the Ureters is Obstruction.
- Obstructions.** And if within the duplication of the Bladder, either of them be obstructed, there is bred a Stone, which grows by little and little, which is not moveable, but remains fastned to the Bladder, which when those that cut out the Stone endeavour to pull away, they tear the Bladder. Neither do I think there was any other difference of the Bladder in these, in whom a double Cavity was observed, and a Stone lying close in the one of them.
- Stone.** ^a T. 5. f. 1. P. P. G. G. ^b T. 10. f. 100. ^c f. 7. P. P. ^d T. 10. f. 7. D. ^e T. 6. f. 6. c. c.

Chap. 30. Of the Piss-Bladder:

- The Piss-Bladder**, is the Receptacle of Urine; being framed of a Membranous substance consisting of two ^a Coates. The ^b third which they attribute thereunto, is a Duplication of the *Peritoneum*, within which it lies hid, hanging like a Bottle with its bottom upwards, and with this Partition it is severed from the Guts and other Parts, only in mankind, left with the weight of the Guts bearing thereupon, it should be forced out of its place.
- Its Substance.** Its naturall size is small when empty, because it is widened and contracted according to the quantity of the Urine, The efficient Cause of its Contraction, is the second and external Membrane, which is altogether fleshy, which *Fabricius ab Aqua Pendente* took to be Muscous, and after him *Spigelius*, who calls it *Musculum Descensorem Vesicae*. He might better have called it Expulsores, the Expulsive muscle of the Bladder.
- Coates.**
- Magnitude.**

Its shape represents a bottle with the bottom upwards, whose bottom is in the lower Part of the *Hypogastrium*, and its Neck lies hid beneath, under the Bones of the *Pabis*.

The Pifs-bladder is but one in Number, yet severed sometimes into two Cavities, after the manner before expressed.

It is perforated with three holes near the Neck. The first and greatest, is that out of which the Urine passes; the other two, being those by which the Urine comes into the Bladder, are the Ends of the Ureters.

Its Orifice is shut by the Muscle Sphincter, which is formed of the substance of the bladder contracted. There is another Muscle called *Externus Splenicus*, as broad as two Fingers, which is placed about the Neck of the bladder and the Glandules or Kernels resting thereupon termed *Prostata*. The power of shutting and opening the bladder depends upon this Muscle.

The Pifs-bladder has veins and Arteries from the *Hypogastrical* vessels; it has Nerves in its Neck, from the *Os Sacrum*, and in its body from a Nerve of the six Pair. Which is diligently to be considered in Diseases of the bladder causing stoppage of Urine, which proceed from a fall caught upon the Loines or *Os Sacrum*.

The Medicinal Consideration.

The Pifs-bladder is subject to an infinite number of Diseases. In its substance it is subject to all kind of Distempers, especially hot and cold: it suffers Inflammation, Tumors, Ulcers, and Palsie both in the Neck and whole body thereof. Of which we shall discourse particularly.

Its temper is perverted, when the bladder naturally cold and dry, comes to wax hot, and falls into an inflammation.

Its Scituation is changed, when that part of the *Peritonaeum* in which it is included is relaxed, whereby it slips a little downe, which causes a difficulty in pissing unless the lower Part of the belly be lifted up with the Hand. Sometimes by the weight of many little Stones it comes to have an hollow nook, by the side of the streight Gut near its Neck, and then the stones do nestle in that corner, so that they cannot be perceived by putting in a Catheter: but the best way to feel them, is by putting ones Finger into the Fundament.

Its greatness or wideness cannot certainly be defined unless it were empty, howbeit it is enlarged and widened according to the quantity of Urine. But if it be so much enlarged as to exceed the natural measure, then the *Fibres* of the Coats being broken or too much slackned, the party cannot make water, because the fleshy Membrane is deprived of that motion, by which the Urine ought to be expelled. And in this Case the Water cannot be voided otherwise than by putting in of a catheter, which sometimes for a moneth or two, must be done twice a day, unill the Membrane have recovered its antient tone or contractive vigour.

Sometimes the bladder is so contracted and straitned, by reason of a painful exulceration in its inner Part, and then grows thicker and as it were Cartilaginous; which hinders its distention: and in this Case, the Patient must often make water with pain.

The Neck of the bladder comprehending its Orifice or the Channel of Urine, has also its Diseases. It is frequently inflamed, swelled, Ulcerated, obstructed, and is weakened by the Palsie, when it can neither be contracted nor relaxed, seeing it is thicker and more fleshy than the bottom of the bladder. It is easily inflamed, and *Fernelius* was of Opinion that no other part of the bladder is subject to inflammation: from whence proceeds an Ulcer, which is not so hard to Cure; as that which happens within the body of the bladder, because injections and convenient Candles may be conveyed thereunto.

It is frequently obstructed by the Stone lying hid in the bladder, or by a

Shape.

Number.

Holes.

Muscles.

Vessels.

Diseases of the Bladder.

In its Temper.

Scituation.

Wideness.

Diseases of the Neck of the Bladder.

How obstructed.

fungous body which grows therein. Yea and sometimes beyond the Neck, within the bladder, fungous or Spungy carnosities do arise, which do much trouble the bladder and fill the same. They arise often from a flux of blood, or a swelling Vein, which being opened causes an incurable Issue of Blood, which soon causes a Gangrene by reason of Clotters of Blood remaining there.

Spungy *Carnosities* do grow without the Neck within the Ureter, which are termed *Hyposphacetes*, which are easily Eaten away with Medicinal wax Candles, made and fitted for that purpose.

Oftentimes they happen in the passages of the Uria after a venemous *Gonorrhoea* not well Cured.

Also the Neck of the bladder is obstructed by another Externall Cause, Namely by swelling of the Kernels termed *Prostata*, which rest upon the bladder. But the Urine is often stopped by a Palsie in the Neck of the bladder, so that the *Sphincter* Muscles cannot contract nor dilate themselves.

To open the Bladder and to search out the Diseases which are bred within or without the same, a wonderful new Instrument has been invented, which I call the Key of the bladder; its commonly termed a catheter, and is used by such as cut Men for the Stone, being different from the Antient common catheter. So long as this Instrument can easily be put in, so long there is great Hopes in Diseases of the Bladder; but when it will not Penetrate, all Hope is gone.

In such a case, either the bladder is perforated in the bottom of the belly by the *Os Pubis*, to let out the Urine, or the *Perineum* is opened. But when a catheter with grates in it, upon which the Section is wont to be made, cannot be thrust in, to depreis the Neck of the bladder which lies hid under the *Os Pubis*, a small Knife is thrust deep in as far as the bladder sideways, untill the Urine comes away: for so I have often freed many from imminent Perill.

In Persons far in years, who are grievously troubled to make water by reason of a great stone, which cannot be taken out without manifest danger of Death, to give them some releife in their Misery, the *Perineum* is cut in the same manner, as is used to take out the stone, and the hole is kept open with a little Pipe, so long as the Patient can be kept alive, the little Pipe is stopped with a Tent, and a sponge is applied to receive the droppings of the Urine, if any be, untill such time as the patient must needs make water, and then the stopple is taken out, and afterwards put in again, and thus the cruel pain and continual provocation to piss, is mitigated in such as have the stone.

Also by this means Ulcers of the bladder may be cleansed and dried, if there be no Stone or frett upon the Ulcer.

Zecchius brags in his counsels, that he invented this way of giving ease to Aged persons vexed with the Stone; but the Physitians of *Paris* did use this Palliative cure long before *Zecchius* was born, it having been practised this hundred years.

If a stone in the bladder be little, and stick to the Neck of the bladder, or in the beginning of the Ureter, it may be drawn forth by a string and continuall sucking of the yard, or it may be drawn out by an incision made in the Ureter.

If the stone be great it cannot be taken out but by cutting of the bladder, the Infection being made upon the *Perineum*, as our stone-cutters are wont to do: for the way used by the Antients as it is described by *Celsus* is difficult and dangerous.

And I believe that kind of operation used in *Egypt*, when they would take out the Stone, is as difficult, which is by blowing up the bladder with a paire of bellows. For this operation described by *Prosper Alpinus*, is so absurd, that I doubt the truth of the story, because it is exceeding cruel and painfull by reason of the extream stretching of the bladder, which cannot endure distention, neither in its Neck, nor in the Ureter.

That way which *Fabricius Hildanus* goes to take out the stone, is also absurd and dangerous. The way used by the Operators of *Paris* and by some Italians of

The Key of the Bladder, an Instrument so called.

Bladder perforated. Perineum opened. Urine let out with a Knife.

Ease for old Men that have the Stone.

Ulcers of the Bladder cleansed. *Zecchius* his vain brag.

The stone sucked out.

Cut out of the Bladder.

The Egyptian Operation naught.

And that of *Hildanus* is naught.

the Nurſion Family, is the only ſafe and eaſie way, by reaſon of the Inſtruments and of the Induſtrious Dexterity of the Artiſts; wherefore I wiſh other Nations had ſuch Operators.

The French and Italian way the beſt to take out the Stone.

^a T. 5. f. 1. FF. GG. ^b T. 10. f. 1. OO. ^c f. 7. FF. ^d T. 10. f. 7. D. ^e T. 6. f. 6. cc
^a T. 5. f. 7. B. and C. ^b f. 7. A A. ^c f. 7. BB. ^d f. 7. B. ^e f. 7. E E.
^f f. 7. D. ^g T. 6. f. 6. cc.
^a T. 6. f. 5. FF. ^b T. 12. f. 1. and 4. ζζ. ^c T. 3. f. 8. o. T. 18. f. 5. o. ^d T. 8. f. 8. AB.

Chap. 31. Of the Genital Parts of a Man, and firſt of the Yard.

I Proceed to the Genitals of a Man, among which, the Yard, which is affociated with the Piſs-bladder, becauſe it caſts out Urine through the pipe of the Ureter, ought in the firſt place to be explained.

A Mans Yard

It is made up onely of Skin for thinneſs ſake, of two hollow Ligaments, of the Urethra, the Glans or Nut, certain Muſcles, Membranous bands, Nerves, Arteries and Veins.

Its Parts.

The Skin is by it ſelf, has no ſcarf-skin, and is terminated at the Root of the Nut, Being looſe, it is there doubled in manner of an Head-ftall, that it may inſold the Nut or Head of the Yard and make the Fore-skin, which the Jews and Mahometans do cut off, out of a Religious Ceremony. Such Circumciſed Perſons cannot give that delight to Women in their carnal Embraces, as thoſe can who have the Fore-skin entire. And therefore their Women are better pleaſed with the carnal ſociety of Chriſtians.

Scin.

Fore-skin.

The Fore-skin is tied to the Nut by a little band which is termed *Franulum*, the Bridle: it is extended in the neather Part unto the Orifice of the Nut, in young Men that have not had to do with a narrow-board Virgin.

The bridle.

The Skin being removed, there appears a Membrane which cloſly girds in the Ligaments of the Yard, which may be a production of the *Paniculis Carnofus*.

The Membrane.

This being taken away, the Veſſels are ſeen which run along the back of the yard viz. Nerves, Veins and Arteries. The Nerves come from the *Os Sacrum*; the Veins and Arteries are portions of thoſe termed *Pudenda*, which are ſpred out into the external Parts.

The Veſſels.

Then follow the Muſcles of the yard, two of which are erectors, and two are Ejaculators. The Erectors do ariſe from the Tuberous Part of the Huckle-bone, and are ſide long faſtened to the Ligaments of the yard; the Ejaculators ſpringing out of the Tranſverſe Ligament placed betweene the Huckle-bones, and from a portion of the Sphincter Muſcle, are ſpread along the Urethra, to preſs the Drops of Water or Seed which happen to reſt there towards the Orifice of the Bladder.

The Muſcles.

Theſe Muſcles being taken away, three Bodies come to view which form the yard, viz. The two Ligaments and the Urethra.

The 2 hollow Ligaments being diſjoyned beneath in the *Perineum*, do ariſe from the Protuberancies of the Huckle-bone, and have in their progreſs, the Urethra interjeected. Near the *Os Pubis*, being joyned together they make a Pendulous Body terminated with the Nut, which is called *Peis*, the Yard.

The hollow Ligaments.

In thoſe Ligaments we muſt obſerve the internal ſubſtance which is like the Pith of Elder, being Spungy, blackiſh and bedewed with black Blood, that it may encreaſe and decreaſe in the Carnal Conjunction, for the Ereccion of the Yard depends upon theſe Ligaments.

Their intervall Subſtance.

The Urethra or Piſs-pipe, is a Channel of Spongy ſubſtance, that it may ſwell and fall with the aforeſaid Ligaments in the Carnal Conjunction; and therefore it is

The urethra or Piſs-pipe.

- no continuation of the neck of the bladder, but is only fastened thereunto.
- Its Obliquation in the Perinaeum.* Observe diligently, the Obliquation, or Reflection of the *Urethra* in the *Perinaeum*, and how the situation of the Orifice of the bladder lies hid under the bones of the *Pubes*.
- Impolluted hard to cure.* In the *Perinaeum*, divers Tumors are raised: but such as adhere to the *urethra* and impostumate, are dangerous, often degenerating into *Fistulae*, because the *Urethra* will very hardly heal, and grow together. If it be eaten by a venomous and pocky Ulcer, it is not easily cured, and restored, unless by an exact Sudorifick Diet, or by fluxing with Mercurial Medicaments.
- The Nut of the Yard.* *Balanus*, & the Nut of the Yard, is an hollowed Kernel, wider in the middle, than the largeness of the external Orifice comes to.

^a T. 6. f. 5. M. ^b f. 2. C. ^c f. 1. d. f. 5. L. ^d f. 5. L. ^e f. 5. M. ^f f. 7. A. ^g T. 13. f. 8. o. T. 18. f. 5. o. ^h T. 12. f. 1. n. n. f. 4. ⁱ T. 6. f. 1. a. f. 5. H. H. ^k f. 5. K. K. ^l f. 1. b. b. f. 5. II. ^m T. 6. f. 5. K. K. ⁿ f. 5. G. G. ^o f. 1. c. ^p f. 7. B. ^q f. 5. G. G. ^r f. 5. M. f. 7. C. ^s f. 5. infra. M.

The Medicinal Consideration.

- Diseases of the whole Yard are, Priapismus.* The Action of the whole Yard, viz. Voluntary erection, and stiffness, being ordained for carnal Conjunction, if it be unvoluntary, and painful, it is a Disease which is called *Priapismus*.
- It is caused by an inflamed disposition of the Ligaments of the Yard, and also of the *Urethra*, or Piss-pipe, which is affected by reason of vicinity, and communication in the same Action.
- Want of Erection.* Weakness, and defect of Erection, is an imbecillity of the whole Yard without pain: It arises from a weakness, or a paralytick disposition of the Muscles, or Nerves of the Yard.
- Crookedness.* Sometimes the whole Yard is bowed, and crooked to one side or another; or bended upwards or downwards; which proceeds from a Convulsion of one of the Muscles, or from a repletion, and induration of the Nervous Ligaments of the Yard. Sometimes the Tumor called *Ganglion*, in the hollow Ligaments, is a cause of this Contention, or crookedness of the Yard: of which Infirmary, *Hollerius* in his Comment upon the 63. Aphorism, of Book 5. and *Caspar Arantius* in Chap. 50. of his Book of Tumors, have treated.
- Inflammation, Tumors, and ulcers.* Furthermore, The whole yard is subject to Inflammation, Tumors, and Ulcers.
- The Yard is but one in Number, for two had been needless: if we find two, it is Morstuous: and they are both useless; or one is but the rudiment of a Yard, or some fleshy Excrecence.
- Too long.* The just, and fitting length of the Yard, ought to be six or eight fingers breadth, if it be longer, 'tis inconvenient, and hurts the Woman in Carnal Conjunction, and must be shortned by a ring of wool put about it.
- If we beleeve *Galen*, the extraordinary length of the Yard hinders Generation, because the Seed loseth its vertue in so long a passage; which I do not beleeve.
- Too short.* If the Yard be too short, it causes little, or no titillation, and is unfruitfull. *Fallopianus* in his Book de *Decoracione*, teaches us how to make the Yard longer. *Martial* mentions one that had so large a Yard, that when it stood erected, he could smell to it with his Nose.
- Of the Fore-skin.* The Fore-skin has its Diseases; sometimes it is too short, and sometimes too long, and is incommodious. The Jews have it cut off, for which cause they are termed *Apelle*, that is, skin-less. If it cover the Nut of the Yard so close that it cannot be put back, the Disease is termed *Phymosis*; if it be depressed to the root of the Nut, and cannot be drawn upwards, tis termed *Paraphymosis*.

Both

Both these Diseases, if they proceed from fervency of Carnal Conjunction, whereby the Nut of the Yard remains swelled, if it be for a long time together, fomented with extream cold water, its swelling will abate, and then the Fore-skin may freely be drawn up or down, An admirable Secret.

It is exulcerated with pocky Pustles; which being cured, if they leave any hardness behind them, it is a suspicious Argument that the venom of the Whores Pox, does yet lie lurking in the Body. Seeing the Fore-skin is double, when it is cut, both the internal, and external Membrane, must be equally cut.

Exulcerated.

The band of the Fore-skin termed *Frenulum*, if it be more thick than ordinary, and goes into the hole of the Nut, and makes the same crooked, it makes men such as *Galen* calls *Hypospadicos*; so that they cannot ingender, because they do not cast their Seed directly into the Womb, unless it be cut.

Thickness of the Frenulum.

The Nut is subject to divers Tumors, and Ulcers, both internal and external. In its middle, where 'tis hollowed, it is often exulcerated, by reason of a sharp matter abiding there, and often putrefying. But in the Whore-masters Pox, it is full of Warts, and deformed; which warts may be eaten off, and eradicated with powder of Savin; but they grow again, if the internal Cause be not removed, by Medicines accommodated to cure the Pox.

ulcers of the Nut.

Deformation with warts.

The *Urethra*, or Piss-pipe, which lies along under the two Ligaments of the Yard, has its Diseases. It is obstructed by the stone, which is taken out by Incision thereof. It is inflamed, by reason of its Spongy, and blackish substance, like the hollow Ligament of the Yard. It oftentimes burns, and is pained by reason of the acrimony of the Urine; it is inflamed by the sharpness of a putrid Humor, which passes through the same, as in the virulent *Gonorrhoea*, and then it swells, and makes the Yard crooked, and stretches it with the *Tenigo* like a Rope; which disease they terme *Gonorrhoea Chordata*, the Corded, or Rope-stretched running of the Reins.

The urethra obstructed.

Inflamed.

It is Ulcerated by the Acrimony of Quittor, and putulent Matter; and sometimes the Ulcer being not well cured, there grows up a spongy superfluous flesh, which is termed *Carpofitas*; which must be diminished, or eaten away, with corrosive Candles; otherwise it swells so as to shut up that passage, and stop the Urine, not without pain to the Patient.

Ulcerated.

To the *Urethra*, and Cods, belongs that disposition which makes men termed *Hermaphrodites*, when the Testicles are hidden within the *Septum* of the *Peritoneum*, and the Cod is empty, or open in its middle part, by reason of the *Urethra* being there perforated, seeing the sides of the Cod are like the Lips of the Womb, and the Yard is very small. These things have deceived unskillful Midwives, and made them judg Children soborn to be Females.

Hermaphrodites.

Sometime the *Urethra* is perforated above the Cod, or neer the Nut of the Yard, when it is then shut up, and solid, which hinders the right ejaculation of the seed, unless the *Urethra* be opened, and a little pipe be put in, to make a passage. But when the Parties grow into years, the heat of the body being augmented, also by violent exercises, and by plucking the same oftentimes, the Yard comes to be augmented, and the Stones which lay hid in the Groyns, do fall into the Cod, unless it be perforated as aforesaid; or the Stones remain in the Groyns; and often deceive Physitians, making them to think the Persons are bursten.

Such Persons having been accounted Women, do at last become Men. Howbeit, there never was any Woman turned into a man, unless she abused her *Clytoris*, being prolonged, or some superfluous Flesh have grown out of her Womb, which may have the form and stiffness of a Mans Yard, but is no way compounded as a true Yard. And therefore women are rather delighted with the mutual rubbing of their bodies one against another, and by the lying of the one upon the other, than by the vain titillation, and unprofitable intrusion of those Parts.

A woman is never changed into a man.

Chap. 32. Of the Groyns.

Things to be
observed.
Cruial vessels.
Process of Pe-
ritoneum.
Muscle Cre-
master.

Kernels.

Spermatick
Vessels.

Descent of the
Gut Ileum.

Buboes.

Invisible
gelding.

BEfore we proceed unto the Stones, we are to take notice of the Groyns; in which are to be seen, the Carnal ^a vein, and ^b Artery, which the ^c Nerves descending into the Thigh, whereupon does rest the Production of the ^d Peritoneum, drawn through the holes of the oblique Tendons, and transverse Muscles.

Over this is spread the Muscle ^e Cremaster, being carried athwart through the Groyn into the Cod, and so unto the Testicle, which it encloses with two Coats; the one whereof is called ^f Erythrois, and the other ^g Elythrois.

Above the bending of the Groyn, you may see those Glandules, or Kernels, which lie close to the process of the Peritoneum: below the Groyn, near the vessels, you may see other Glandules, or Kernels, bordering upon the vessels.

Within the Process are contained, ^h Vas Spermaticum, the Spermatick Vessel, which carries matter to make seed of, unto the Testicle; and another ⁱ Spermatick Vessel returning from above, and carrying the Seed from the Testicle, to the Seed-bladders. In the Groyn, within the process of the Peritoneum, descends the Gut ^l Ileum, the inward Coat of the Peritoneum being relaxed.

If it descend into the Cod, the said Coat is broken, and the descent of the Gut is to be observed through the holes of the tendons, which are interchangeably disposed, lest in reducing the Gut by Chyrurgical Operation, it come to be placed among the Combinations of Nerves; for the hole of the last Tendon ought to be cut in sunder, that the Gut may be reduced into the Cavity of the Belly; in which work, many of the skilfullest Chyrurgeons have erred, to the loss of their Patients Lives.

Note that among the Kernels above the Groyn, do arise the whore-pock buboes or Swellings: among the Glandules, or Kernels, below the Groyn, pestilential swellings do arise; ordinary swellings do arise a little higher.

Here you shall consider whether it be safe to use that prick, Or thread of Gold Lead about the Production of the Peritoneum; that the process within the Rupture called *Oschocole*, is broken, may be drawn together: or a caustick to produce an Eschar, may be applied above the Groyn, to produce a Callous, or hard substance, which may stop the passage of the falling Gut. But care must be taken that the Caustick pierce not to the Vessels which lie beneath, *viz.* The veins and Arteries, which being touched, the Patient dies for it.

The Seminal vessels may be seared, and so a man become invisibly gelded, because the Stones wanting their nourishment, do consume, and lose their vigor. But I see on every side, great difficulties in these kind of Operations, which I judg to be dangerous; and therefore I conceive the best way is, to let them alone.

^a T. 24. f. 4. AA. ^b f. 5. AA. ^c T. 18. f. 5. KLMN. ^d T. 2. f. 9. EE
^e T. 6. f. 2. DD. ^f T. 6. f. 2. ^g f. 2. CC EE. ^h T. 6. f. 1. A. f. 3. and
4. AA. ⁱ f. 1. W. f. 3. CC E. f. 3. CC D. f. 5. CC. ^k f. 5. and 6. EE. ^l
F. 3. f. 4. HH.

Chap. 33. Of the Fundament.

Order of Section.

Its Name.

AT the same time, when the Cod is dissected, in the order of Anatomy, by reason of Neighbor-hood, the Fundament is to be dissected, and demonstrated.

The Fundament therefore, called *Anus*, and *Podex*, is the outermost end of the ² *Intestinum rectum*, or streight Gut, which is shut, and pursed together by a ^b round Muscle, called *Sphincter*.

It is two-fold; the one is skinny, and narrow, the other is broader, and more fleshy; which adheres to a transverse Ligament, which is placed between the Protuberances

tubercles of the Huckle-bone, and the extremity of the *Coccyx*, or Crupper-bone.

The Fundament has four Muscles, called *Levators*; two of which are broad, and two narrow: The broad do arise from the ^c *Os Sacrum*, and *Os Ilium*, and are inserted into the larger Sphincter: As for the other two, the former arises from the transverse Ligament, the hindermost from the Crupper-bone, whereinto they are terminated.

These four Muscles do relieve, and raise up the Fundament when it pouches forwards, and is ready to fall out in the expelling of Excrements which are more hard and solid than ordinary. The Circular Muscles do shut, and contract the Fundament, lest our Excrements should come away against our wills: for by means of these Muscles, we may take our own time, and regulate this kind of Evacuation according to our own pleasures.

^a T. 3. f. 7. M. ^b T. 3. f. 7. O. ^c T. 3. f. 7. N N.

The Medicinal Consideration.

The Fundament is liable to very many Diseases. It is sometimes possessed with an hot distemper, with a troublesome, and almost intollerable itching, which causes a continual desire of going to stool, which is called *Tenesmus*.

In the Expulsion of the Dung, sometimes the Fundament falls out, which is reduced into its place with extream trouble and difficulty.

Sometimes it is palsied, and the Excrements come away whether the Patient will or no; and sometimes it is so straitened, that a man can hardly void his Excrements.

Within, and without it swells, the mouths of the Veins being swollen and knobbed, which are called *Hemorrhoids*, both internal, and external.

Sometime 'tis inflamed, but it is more often impostumated; from whence proceeds an hollow Ulcer, termed *Fistula Ani*.

It is made rough with Warts, which are called, *Condylomata*, or *Marisca*. It is exulcerated with small Clifts, which are called *Rhagades*. It may safely be cut, according to *Hippocrates*, after any fashion, without hurting the Sphincter. Finally, 'tis troubled with all kinds of Diseases.

Sometime it has a Scirrhus Tumor, which shuts up the passage of the Excrements, and causes a difficulty in pissing, by reason of the neer neighborhood of the Arse-Gut, and the Neck of the Bladder; which Parts do communicate their Infirmities one to the other.

It is sometimes found closed up in new-born Infants, and it is cut open: but if the Gut be found solid, having no Cavity, there is no way but Death.

Chap. 34. Of the Cod, and Stones.

VVE are now come unto the ^a Cod, which is the case of the Stones. It consists of two skins, the outermost being ^b Cuticular, and grown with hair in such as are of ripe years; it has the *Epidermis*, or Scarf-skin upon it. Under the hairy Skin, there is a fleshy Membrane which is called *Dartos*; it is a Continuation of the *Membrana Carnosa* of the Belly, stretched down unto the Cod, by help whereof, the Cod is widened, or contracted into wrinkles. For the Stones sake it is by a Membranous Portion divided into two Cavities, which receive the two Stones.

The Cod has veins and Arteries from the Privy Parts, and Nerves from the ^c *Os Sacrum*.

A Stone, or Testicle, is a Glandulous, or Kernellish Body, ordained to make Seed. It is compounded of many parts, of which, the first are three proper membranes, for each Stone has two common ones, *viz.* the *Cutis*, and *Dartos*. The first of the three proper Membranes, is called *Erythroides*, which has its Originall from

Muscles.

Their use.

Its diseases.

Tenesmus.

Falling out.

Palsie.

Hemorrhoids.

Inflammation.

Warts.

Clifts.

Scirrhus.

Tumor.

Closed up.

The Cods.

Their Coats.

Cavities.

Vessels.

The Stones.

Their Coats.

from an expansion, or widening of the Muscle Cremaster, which holds up the Stone.

The Second is the ^f Production of the *Peritoneum*, which infolds the Testicle.

The third immediately infolds the substance of the Testicle, and is called ^g *Nervosa*, the nervous Membrane.

Substance.

Epididymis.
Sperm Carrier.

Ejaculator.

Situation.

Figure.
Action.

The Membranes being taken away, the substance of the Testicle comes in sight, which is ^b glandulous, white, pretty firm; and upon the same, overthwart, is placed a small body like a Silk-worm, which is called ^e *Epididymis*; to the one end whereof their cleaves *Vas Spermaticum* ^b *deferens*, the carrying Spermick Vessel, which enters into the substance of the Testicle, and empties the Seminal matter thereinto: From the other end of the *Epididymis*, arises the *Vas* ^c *Ejaculatorium*, the Ejaculatory Vessel, which in its beginning, is ^d full of turnings and windings, as is the Body of the *Epididymis*, and finely cleaves unto the Testicle by its ends, being loofe, and separate in its middle.

The Testicles are excluded from the Cavity of the Belly, being placed in the Cods. They are about the bigness of a Pigeons, or a young Pullets Egg. They are of an Oval shape, and their work, is to elaborate the Seed.

The Medicinall Consideration.

Diseases of the
Cods.]

Oscrocele.

Hydrocele.
Circoccele.

Sarcoccele.

Pneumatoccele.

Inflammation.

Rhagosis.

Diseases of the
Stones in their
Scituation.

Number.

Colour.

Greatness.

The natural Constitution of the Cod, and Stones, being explained, let us now examine the Preternatural disorder thereof. The Cod is apt to be swelled with divers fluxions, which flow either immediately into it, or into the Stones.

If the Gut fall into the Cod, or into the Cal, it makes that kind of Rupture which is called *Oscrocele*.

If water or wind flow from the Cavity of the belly, into the Cod, they make those Ruptures which are termed *Hydrocele*, and *Pneumatoccele*.

If in the Spermatick Vessels, both Deferent, and Jaculatory, where they are full of turnings and windings near the Stones, thick blood be intercepted, it breeds a tumor, which is called *Circoccele*.

If Spongy flesh breed, and grow to the Membrane called *Dartos*, it is termed *Sarcoccele*.

If the Testicle adhere to the said spongy flesh, it has the same name.

If the stone swell, and exceed its natural bulk, it causes a swelling in the Cod.

If wind or water insinuate themselves into the Membranes of the Testicles, they produce those Tumors which are called *Hydrocele*, and *Pneumatoccele Testicularum*, which are familiar to Children.

Moreover, The Cod is inflamed, overmuch widened, or contracted; both which dispositions, are inconvenient, and hinder some to Life and Generation.

The Laxity thereof, is termed *Rhagosis*; Howbeit; it is naturally more lax on the left side, whether by reason of the weight of the left Testicle, or by reason of the weakness, and coldness of the left side.

The stones are faulty in point of Scituation, while they lie out of sight in the belly, or when they are in the Groyns. By reason of the former Scituation, in questions of Divorce, men are pronounced impotent, though strong otherwise, because the stones are not in their Natural place.

By reason of ill Confirmation in the Womb, they are faulty in point of number, when there is but one, or when there are three, as in those who are called *Triorchetes*, who are by some thought to be very lecherous; which fault goes in some Families from Father to Son, and therefore it is a Disease.

They are faulty in shape, when they are uneven, by reason of the swelling, relaxation, or divulsion of the *Epididymis*.

If there be a fault in the Colour, there is a fault in the Substance, which ought to be pretty solid; when it is over-flaggy, and soft, it is faulty. If the stones exceed the greatness of an Hens Egg, they are never the better, because they are liable to fluxions: and being swollen, or altered in their temper, they cannot rightly performe

from their Office: if they are small as Hazel Nuts, they have no power to engender.

Now the Action of the Testicles is to elaborate the Seed by their inbred virtue. *Their Action.* implanted in them to that end; wherefore they receive the seminal matter, and when it is sufficiently prepared, that is to say when it is impregnated with the Generative Spirit, they transmit the same into the Jaculatory Vessels, and the Jaculatory Vessels carry it into the Seminary Bladders.

^a T. 6. f. 1. xx. ^b f. 2. A A. ^c f. 2. B B. ^d f. 3. ^e D. ^f f. 2. D D. ^g f. 2. C C. E E. ^h f. 2. F F. ⁱ f. 2. G. ^j

^k T. 6. f. 2. I I. f. 3. and 4. B B. ^l f. 1. T T. f. 3. and 4. A A. ^m f. 1. W. f. 3. E. f. 4. D D. ⁿ f. 1. c. c. f. 3. and 4. c c c.

Chap. 35. Of the Vessels which carry the true Seed, of the Seed-Bladders and the Prostatae or Auxiliaries.

IT remains now that we speak of the Vessels which carry the Seed to the Bladder, and of the ^a Prostatae or Assistants. That same ^b carrying Vessel which is called *Ejaculatorium*, and takes its original from the Epididymis, is in its Rule *Ejaculatory Vessels.* very full of ^c windings and wrinkled.

Those Wrinkles being smoothed out do make the Vessel twice as long as before. *Why wrinkled.* Tho' the Wrinkles are made to retain the most subtle Spirit of Generation, which breaks forth violently in the act of Generation with a thin subtle and spirituous matter, which is mixed with that same other Excrementitious Seminal matter, which is contained in the little ^d Seed-Bladders, so that they flow both together into the ^e Urethra or Piss-pipe. *How the Seed is voided.*

And as in the Act of Generation that same most thin and pure Spirit leaps forcibly with the matter out of the Testicles: so by help of the ^f Muscles of the Yard, the Seminal matter which is contained in the little bladders is also cast forth.

For I make account that there is a three-fold Seminal matter, one most pure, *Matter of the Seed threefold.* which is made and kept in the Stone; the other is superfluous and Excrementitious, yet of use for the forming of the Conception, which is thrust away by the Stones and slides leisurely into the little Seed-Bladders: for it is not probable that the most pure Seminal matter, and the Spirit which is the Author of Generation, should be contained amidst the Nastyness of the Dung and Urine.

The third Seminal matter, is an Oily substance, which leisurely dropping out, does moisten the ^a urethra or Piss-pipe in Men and the ^b Sheath of the Womb in Women; also it comes away by itself when the Yard is distended through lust, and in strong imaginations of the matters tending to Generation, and sometimes at the sight of a beautiful Woman.

It is a Question whether this Oily substance do flow out of the little Seed-Bladders or from the ^c Glandules of the Prostatae, which contain in them a Seminal matter, which is sent forth through small pores beneath the Knob of the Urethra.

The Matter which is contained in the little Bladders, is forcibly cast out by way of Ejaculation or Squinting, through the holes which are near the foresaid knobby wart of the Urethra.

Before the little Bladders be removed, you shall observe, how they are covered round about and hidden under a Multitude of little Veins scattered round about them. Whether they be Veins or Arteries, what they serve for is not yet certainly known. Whether to supply matter to those Parts, *viz.* The Seed-bladders, that it may be thence transmitted to the Prostatae to be further Elaborated? *Whence the Texture of Veins among the Seed-Bladders.*

Touching this wonderful Intertexture of Vessels, we can as yet determine nothing.

In the Prostatae and in the Seed-Bladders, is the seat of the venomous *Gonorrhoea*: *The seat of a virulent Gonorrhoea.* which if it be unseasonably stopped, the venom is communicated to the whole body,

or flows back into the stones and causes a Tumor in them; or if it extend so far as the *Perineum*, unless it be naturally repelled, it causes an Imposthume and eats into the *Urethra* or *Pis-pispe*.

What Vein to
be opened in the
Cure thereof.

You shall do well to consider whether it be safe in a virulent *Gonorrhœa*, to open a vein in the Arm, if the arder in these places be light and without a Feaver? In my opinion it is better to take blood from the Foot, because the *Saphena* takes its rise near the Groin, and bestows two branches upon these Parts, and therefore large bleeding in the Foot, when the Buboës break out, does powerfully Revell.

Few or none except *Julianus Palmarius* a Physician of *Paris*, and *Fallopina* an Italian, are for blood-letting in the Arm in such Cases, for it is held unsafe, for fear of the Whores-Pox, by reflux of the venomous Humor into the Bowels and habit of the Body.

^a T. 6. f. 5. F F. f. 6. G. G. ^b T. 6. f. 1. W. f. 3. E. f. 4. D. ^c f. 3. and 4. c c. f. 5. C. ^d T. 6. f. 5. and 6. E E. ^e f. 5. K K. ^f f. 1. a. b. f. 5. H H. II. ^g T. 6. f. 5. K K. ^h T. 7. f. 2. j. ⁱ T. 6. f. 6. f. 5. F F. f. 6. G. G. ^k

The Medicinal Consideration.

Diseases of
these Parts are,
Distempers.

The Diseases of those Seed-vessels, Seed-Bladders and of the *Auxiliary Glands* or *Prostata*, are, an hot or cold Distemper, which cause a corruption of the Seminal matter, either from an internall or an external Cause.

Laxity whence
Gonorrhœa.

Also the Laxity of those Parts causes an involuntary shedding of the Seed, which is called a simple or single *Gonorrhœa*; or when it is with pain and inflammation, being caused by infection of a Pocky Whore it is called *Gonorrhœa Virulenta*, the venomous *Gonorrhœa*.

The Oily substance how
needful.

The flux of Seed which happens to some in their sleep is called *Oxyurigmis*, it comes from the abundance of hot and Spirituous Seed.

The Oily substance is exceeding needful, for in men through want of the said Humor, either the sharpness of Urine hurts the *urethra* or *Pis-pipe*, or it cannot freely pass, neither can the seed be forcibly cast out, as *Galen* hints, and I have known in many; who were cured with a liberal moistening Diet, a bath to sit in, and Oyl of sweet Almonds, Squirted into the *urethra* with a syringe. With the same Humor the Womens sheath is moistened in such as are lascivall, and it drops away by it self without the Ejaculation of Seed.

Action hurt,
whence Barren-
ness.

The Action of the Yard, is not to transmit the Urine, but to Ejaculate or Squirt the Seed into the Womb of the Woman. If it cannot perform that Office it causes Barrenness, which depends either upon the Yard, by reason of the Ligaments which cannot be blown up so as to raise the Yard; or because of the weakness or Palsie of the Muscles of the Yard; or upon the Stones being colder then they ought to be, or being too Flaggy, or less, or greater than is usual; or upon the ill shaping of the Spermatick Vessels, as in case the Arteries be wanting; or upon the defect or faultiness of the matter. If the Man be sickly or the Woman have not her health, the Cause of Barrenness is attributed to an evil disposition of the whole Body: which makes that fitting and convenient matter to make Seed of, Cannot be from thence supplied to the genital Parts.

Neither is fruitfulness and Conception to be expected, unless the Man and Woman be restored to perfect health; and unless the fault of the *Genitals* (if there be any) be amended,

Chap. 36. Of the Genital Parts of a Woman, and first of the Externall.

External Ge-
nital Parts.

THe genital parts of a woman are divided into the external and internal. The internal prepare Seed, or somewhat like seed, and afford place for the Conception. The

The External Parts are visible and must be viewed before we come to Section. Let us therefore stay a while in the porch, before we pass into that sacred Cave or Closet of the Womb.

That outward Part which is adorned with Hair is called *Pubis* the *Share*: that *Passage* which is shut with two Valves or folding Doors (whence the name *Nympha*) is called in Latin *Cunnius*, in English the *Cunny*, or *Water-Gate*. The *Valves* are termed *Labra Cunni*, the *Lips* of the *Cunny*, or the *Doors* of the *Water-Gate*. These *Lips*, being drawn aside, the *Nympha* come in sight, which are pretty firm Membranous excrescences, broader towards the top. At the top of the *Nymphes* we meet with a little fleshy Knob covered with a thin Skin, which is called *Clitoris*. The *Nympha* being drawn asunder, the *Carunculae Myrsiformes* [that is small portions of flesh like Myrtle-berries] come to be seen, whereof two are lateral, seated on each side, the third lies beneath toward the Fundament, and the fourth is always placed at the extremity of the *Urethra* or *Piss-pipe*.

In *Virgins*, the *Lips* are, straiter than in other *Females*, and when their *Thighs* are opened wide, they appear stretched or bent. The inferior Membrane of the *Nymphes* is also in *Virgins* bent and stretched out; but in their defloration and by frequent carnal conjunction, it is depressed: those Connexions are wholly Obliterated in *Women* which have brought forth *Children*.

And these *Parts* may be seen in those which are living. And if you shall thrust your *Finger* into a *Womans* sheath or *Scabbard* [that is the *Neck* of her *Womb*] you will feel it wrinkled, and if you carry your *Finger* higher, you will find the *Orifice* of the *Womb*, for so far a long *Finger* is able to reach. All that space is called *Collum Uteri*, the *Neck* of the *Womb* or the *Sheath* of the *Mans Yard*, because it receives the *Yard* like a sheath or *Scabbard*, in the *Act* of *Generation*.

In *Virgins*, after the *Nymphes* we meet with a Membrane or thin Skin drawn before the *Orifice*, pierced through with a very little hole. This Membrane is called *Hymen*. If this be found, we find no *Caruncula Myrsiformes*, if this be not found, those *Myrtle* formed small portions of flesh, are so swelled, that they fill the whole *Orifice* or passage into the *Womb*, so that you can scarce put in your little *Finger*, without paining the party: so great is the narrowness of this passage, by reason of the foresaid *Caruncles* or *Myrtle-Shap'd* fleshy *Excrescences*, being united together by certain Membranes.

It is to be observed, that those *Myrtle-Shap'd* little bits of flesh, are wholly obliterated in *Child-birth* & not to be seen, until the external *Orifice* of the *Womb* begin to contract it self again and to grow strait; which argues that they are nothing but plaits or *Foldings-in* of this *Orifice*; which are unfolded and stretched or smoothed in the time of *Travail*, that the *Child* may more freely come forth; even as the *Neck* of the *Womb* is very thick, that it may be the more easily widened in the *Birth*. Hence I conjecture and conclude, that these *Carunculae* may more fitly be termed *Carnostates* and *Plicaturae Orificii externi*, certain fleshy-nesses and foldings of the external *Orifice* of the *Womb*.

These things being thus observed, we must proceed to dissection, that the structure of these *Parts* may be discovered. The *Lips* of the *Womb* are made up of the *Cunicula* or *Scarf-Skin* and the *Skin* on which the *Hairs* grow, and they have underneath *Fat* and a fleshy Membrane which seems to be of the Nature of a *Muscle*. It seems to be spread in that place, that it may serve to draw the *Lips* together; but inasmuch as it reaches into the *Clitoris*, it do's in some sort resemble the *Muscles* of a *Mans Yard*. Yet those in the *Clitoris* are different from the other.

Those who have their *Privity* plump and *Pappy*, and the *Lips* thereof thick, the motion of their *Muscles* is very small and hard to be discerned.

The *Nympha* in young *Women* is soft, but as they grow in *Years* and by frequent *Copulation*, it is hardened and becomes almost like a *Gristle*. It is a production of the *Skin* of the *Lips*, or by *Nature* so made and there placed, to direct the stream of the *Urine*.

Pubis.

Cunnius.

I conceive the Term Cunnius derived from the Greek Con not a beard, does properly signify the Hair about the Female Privity and not the Orifice it self, but only by a Metonymy of the Adject for the Subject. Caruncula Myrsiformis.

Neck of the Womb.

Hymen.

Lips of the Womb.

The Nympha.

Clitoris

The Clitoris. ^b *Clitoris* being the seat of Lasciviousness and Lust in Women that delight in mutual constrictions, is termed *Tensipo*, or the *Womans Yard*. It is made up of two Nervous Ligaments, not at all hollow as those of the Mans Yard; they proceed from the Tubercles or bunching Part of the Huckle-bone, and when they are come so far as where the bones of the *Pubes* are joynd together, they receive another body placed between them, which is white, and being joynd together they make up the *Clitoris*, which imitates a Mans Yard, as the Breits of Men have a resemblance to Womens Dugs.

The Ligaments of the *Clitoris* have Muscles fastened unto them, as in Men proceeding from the same place as those in men, and they are covered with Skin, and that Skin in the extremity or end thereof is folded back, like a Mans Fore-skin. Not without cause therefore is this Part called the *Womans Yard* or *Prick*.

The Wombs Ligaments. The round Ligaments of the Womb do reach unto this part: whence it comes to pass that the *Clitoris* being rubbed with the hand, the ends of those Ligaments are likewise chafed and heated, and the Tickling is extended as far as the Womb and *Tasticles*, whence they arise and through which they have passage.

Those Ligaments of the Womb are somewhat hollow, as far as to the Groines, whence it comes to passe that a virulent matter being from the Genitals expelled hither, does breed *Puckie Bubbles* or Swellings, and other Tumors which are not at all Malignant.

The *Sheath* is compounded or made up of two Coates: the one is internal and Membranous, the other is external and altogether fleshy, like a Muscle, that it may open and contract it self, and in the Act of Generation Squeeze and Milk the mans Yard. But the inner Coat is wrinkled, like the Roof of an Oxes Mouth.

^a T. 7. f. 5. FF. ^b f. 5. BB. ^c f. 5. CC. ^d f. 4. II. K. f. 5. A. ^e f. 5. D. EE.

^a T. 7. f. 2. F. ^b T. 7. f. 3. EE. ^c T. 7. f. 3. D. ^d T. 7. f. 2. F. f. 3. EE.

^a T. 7. f. 7. A. ^b T. 7. f. 5. BB. 1. ^c T. 7. f. 5. CC. ^d T. 7. f. 4. II. K. f. 5. A. ^e T. 7. f. 2. SS. f. 3. and 4. FF.

^a T. 7. f. 2. F. f. 3. EE. ^b T. 7. f. 3. EE. ^c T. 7. f. 3. EE. ^d T. 7. f. 3. EE. ^e T. 7. f. 3. EE.

The Medicinal Consideration.

Common Diseases of these Parts.
Closure.

Having diligently surveyed these parts, you shall now consider the Diseases which are wont to happen upon them. And in the first place the external Orifice or passage into the Womb, is sometimes naturally shut up, the Lips being closed together. This often happens in Girls newly borne. But this closure is more frequently found to be in the Nymphs; or instead of the *Myrtle-shap'd Carnosities*; we meet with the *Hymen* fleshy and unboared. Sometime after hard labour in Child-birth, these Parts being torne do grow to one another. This natural growing together of those Parts in Children must be separated, and so it must in Women when it comes by accident.

I have seen some Women conceive notwithstanding this growing together, there being a little hole left for the Seed to enter at, being esgetly attracted by the hungry Womb. When the time of their delivery was come, by reason of much moisture flowing unto those Parts, this closure did of it self open. Maids and Women that are thus closed up, are termed in Greek *Anaca* imperforated persons, such as are unboared or unbroached.

Looseness.

Sometimes the wideness and openness of these Parts is so great that it proves loathsome and hurtfull to Women, Namely such as have undergone hard Labor in Child-birth; so that it is needfull to straiten the same with Medicaments.

Sometimes in women that never had Children, by reason of over frequent carnal Conjunctions, these parts are so opened and widened, that they seek to Physitians, that they may recover their former straitness, and so bring their *Hogs*

to a better Market. Howbeit, *Virginity lost* cannot be repaired, it may be counterfeited by Art, but it is not the Part of an honest Phyſitian to teach thoſe Arts: it belongs only to Adulterers and Bawds, or ſuch as get their living by prostitution of the Bodies of young Women.

Furthermore, the *Lips* have their peculiar Diſeaſes, they are *Inflamed, Swelled, Peculiar Diſeaſes* *Ulcerated* from a common or extraordinary Cauſe, *viz.* The *Whores-Pocks*. Also *ſets of the Lips*, they are ſubject on their inner ſide to *Warts, Puſhes* termed *Thymi*, reſembling the Color of Flowers of Time, and certain ſmal Tumors called *Condylomata* reſembling the Joints of a Mans Finger.

The *Nympha* in ſome Women, yea and in ſome Nations do grow to ſuch a filthy greatneſs, that they hang without the Lips, and then they muſt be cut. They are made tuſſ with *Puſtles* or *Puſhes*, but more often deſiled and made ugly with the aforeſaid *Thymi, Warts* and *Ulcers* ſpringing from the *Whoremaſters Pocks*. *Of the Nympha.*

The *Clitoris* is ſometimes exceeding long, reſembling a Mans Yard: it is then termed *Cercopiſ, Candaris*, the Long-Tail Diſeaſe; ſo that ſome Women do abuſe that Part one with another when it is longer and thicker than ordinary. Such are thoſe which are termed *Hermaphrodites* or *Rubbers*: for it was never known, neither is it poſſible, that a Woman ſhould be turned or transformed into a Man. *Of the Clitoris.*

But a Man being at his Birth reputed for a Woman, as aforeſaid, by the coming forth of his Genital Parts, may be turned into a Man, that is to ſay, be acknowledged for ſuch.

Sometimes within the *Sheath* there hangs a fleſhy *Excrescence* which reaches as far as the *Lips* and farther, very deformed and troubleſome, and ſomewhat like a Mans Yard. It is rooted near the inner Orifice of the Womb, or it riſes from the ſides of the ſheath, far within. It muſt be cut up by the Roots, or elſe it will grow again, being a great trouble to married Women, becauſe it hinders the entrance of a Mans Yard, in the carnal Embracement. *Of the Sheath.*

Near the *Caruncles* or *Carnofities* before mentioned, there appears within, a *Vein*, two or three, which are pretty full, and drop Blood out like the *Hæmorrhoids*, and are ſometimes exulcerated, and may degenerate into Malignant Ulcers, unleſs they be well looked to. *Of the Caruncles.*

Within the *Sheath*, in the upper Part, in the very Orifice of the Womb, a Malignant Scirrhouſ Tumor is bred, which at laſt degenerates into a Cancerous Ulcer. A ſad and miſerable Diſeaſe, if it ariſe through fault of the Womb and other Parts of the Body. If the ſaid Ulcer proceed from the *Whoremaſters-Pocks*, as oftentimes it falls out, it is curable, provided the aforeſaid Orifice be not wholly eaten up, and that the Ulcer have not crept into the inner Parts of the Womb. That may be perceived not only by the Inſtrument called *Speculum Matricis*, with which we look into the Womb, but alſo by putting up of a bodys Finger. *An ulcer*

Chap. 37. Of the internal Parts of a Woman which ſerve for Generation.

THE external Parts being diligently viewed and accurately diſſected, the Parts of the *Fundament* come next to be cut up: and then the *Symphisis* or growing together of the bones of the *Pubis* being diſcovered, the Griſtle placed between the bones, muſt be cut aſunder with a very ſharp Pen-Knife, that the Thighs may be more eaſily diſplayed, and that their may be room enough made to handle the internal Parts. *The way of ſhowing theſe Parts.*

The internal Parts may be divided into thoſe which make up or belong unto the Body of the Womb, and thoſe which prepare the Seminal matter. We muſt begin with the latter. *Internal Parts twofold.*

The *Vaſa Spermatica deferentia*, that is, the *a* carrying Spermatick Veſſels, are made up, like thoſe in Men, of the *Spermatick Veins* and the *Spermatick Arteries*.

^c Artery. They have the same Rise in Women as in Men. Herein only they differ, that they are not so straitly united, nor with so many turnings, as to make a broad ^d Paraffata, which is not in Women.

They are divided into three Parts, whereof one is carryed into the Stones; the other to the Bottom of the Womb: and the third creeps along to the beginning of the Sheath.

^a T. 7. f. 1. a b. ^b T. 7. f. 2. I M. ^c T. 7. f. 2. K L. ^d T. 6. f. 3. and 4. A A. T. 7. f. 2. c c.

Testicles.

The Testicles in ^a Women are otherwise framed than in Men: they have no Epididymis; have but one Coat; their substance is soft, made up of little Bladders, wherein is contained a Wheyish substance, which is wont to spint out upon the face of the dissector, if he take not heed.

Such a structure of the Testicles in women and such a conformation of their Spermatick Vessels, made Aristotle to doubt and others of his followers, whether the Female Sex were Prolifick and afforded Seed to the making of the infant, as well as the Male, is Galen after Hippocrates, maintains they do.

From the Body of the Testicle the same Spermatick ^b Vessels preparatory are carryed to the bottom of the ^c Womb, and to the ^d Horns or Trumpets of the Womb, which Vessels are far different from those in Men.

Horns of the womb.
Its Ligaments.

These things thus observed, let us take a View of the Body of the Womb with the external Parts thereof. Out of it there arises in its upper Part, the Hornes and four Ligaments, two broad and ^e Membranous, which are productions of the Peritonæum. They are stretched out in Virgins and Women that have not bore Children, resembling the displaid wings of Bats or Flutter-Mice. They hold the Womb that it fall not down.

The other two Ligaments are round and somewhat ^f longish, which arise from the bottome of the Womb near the Horns. In their Rise they are hollow, and in their progress as far as the *Ossa Pubis*, we find them hollowed.

When they are come as far as the Clitoris, they are cloven and spread forth in the shape of a Goose-foot through all the fore part of the Thigh. I was the first that made discovery of that same Cavity and of the formerly unknown use of these Ligaments. According to the Opinion of the Ancient and latter Anatomists, they keep the Womb from ascending upwards; but without these Ligaments the Womb cannot ascend, unless it should pluck away the Sheath and the Privities, which are continuations of the body of the Womb.

^a T. 7. f. 2. o. f. 4. A C. ^b f. 2. d d. f. 4. b b. ^c f. 2. R. f. 4. E. f. 3. A. ^d f. 2. Q. Q. f. 4. D D. ^e f. 2. P P. ^f f. 2. S S. f. 3. and 4. F F.

The Horn ^a of the Womb being fistulous or hollowish, is observed in the lower Part thereof to be torn and jagged, as if the Rats had gnaw'd it: it contains within it, a certain hard and round texture, which resembles the substance of the Jaculatory Vessels in Men, and white Seed is there preserved and found.

The womb's Substance.
Coat.

Having observed these things, you shall proceed to the body of the Womb; the Substance whereof is fleshy and Spungy, and as thick as a mans Finger. It is Cloathed with a Membranous Coat, whether it be proper or received from the Peritonæum.

Temper.
Situation.

The Womb is of an hot and moist Complexion: it is Scituated in the lower ^b Part of the Belly, beneath the Navel, just in the middle between the ^c *Incestinum Rectum* or Arse-Gut and the ^d *Piss-Bladder*.

Greatness.

In Virgins until they have their Courses it is little and hard, after they have had their Confes, it grows softer: in Women which have had Children it is greater and thicker.

Shape.

It is shaped like a smal Gourd, a Pear or a Cupping-Glass.

Number.

It is one in number and no more, yet sometimes divided into two Cavities by a Partition in the middle, which is the Cause that some Women bring forth two or three Children at a Birth.

The

The Cavity of the ^e Womb in Virgins and in those which have never conceived, is so small as to contain only a pease or a very little bean; In such as have born Children, it is larger. Cavity.

The Action of the Womb is conception, or attracting the Seed, and reducing the same into Act, by causing the same to ferment and proceed to formation. And although this be that for which the Womb was ordained, yet it is by accident the *Sluce* or *Outlet* of Superfluous Humors in the Body, which do either continually flow unto this place, as in the *Whites*, or at certain seasons, as the *Menstruous Blood*, which being more than the Woman needs for her Nourishment, is ordained to nourish the Child in the womb, and when it is born, it drops out of the Dug in the form of Milk. Action.

^a T. 7. f. 2. Q. Q. f. 4. D. D. ^b T. 7. f. 1. d. ^c T. 7. f. 1. e. ^d T. 7. f. 1. e
^e T. 7. f. 3. B. B.

The Medicinal Consideration.

By our knowledge of the Natural Constitution of the *Genital Parts* of Women we come more certainly to understand their departure from the said natural Constitution by several sorts of Infirmities. Disorders of the

The Spermatick Vessels are liable to obstructions, whereby the usual Flux of Humors is stopped, which is very harmful to women. Spermatick Vessels.

They swell together with the Stones, and become as big as a mans Fist, by a collection of Humors resembling Tallow or suet. Stones.

This is known by a swelling in the bottom of the Belly at the sides.

The Trumper or Horn of the Womb is widened and moved by Seed, which being there corrupted, seeks its passage out. But wonderful it is that the mans Seed should come thither, and that as Histories report, a Child should be conceived there. 'Tis very strange that a Child should be formed out of the Cavity of the Womb; and it favours the Opinion of *Paracelsus* and *Amatus Lusitanus*, that a Child may be made in a Glafs of a Mans Seed and menstrual blood, placed in Horses Dang, unless both of them, the one being an Athiest the other a Jew, were known to be Impostors. Trumper.

The Womb is the Root, Seed plot and foundation of very near all womens Diseases, being either bred in the womb, or occasioned thereby. Womb it self.

If it be troubled with an hot distemper and inflamed, it causes intollerable burnings, the Feaver *Synochos* and the burning Feaver, very troublesome Itchings? and finally it brings exulcerations, the Cancer and Gangrana. Distemper.

If it be stung with fervent Lust, it becomes enraged, causes Uterine fury and Madness; will not let the Patients rest, but invites them to shake and agitate their Loins, that they may be disburthened of their Seed; and at last, they become shameles and ask men to lie with them.

Sometime it is drawn out of its place towards the sides, and is carryed this way and that way, as far as the Ligaments and Connexions of the Womb will give leave; and it will rise directly to the Liver, Stomach and Midriff, that it may be moistened and fanned; it Causes Choaking and Stranglings, and raises terrible and violent motions and Convulsions in the Body. Motion depraved.

In a word, the Womb is a furious Live-wight in a Live-wight, punishing Poor Women with many Sorrows.

Although *Hippocrates* hath written and *Fernelius* confirm'd the same, that the womb like a Globe dos rowle it self in the Cavity of the Belly; yet are they rather the Horns of the womb, which are receptacles of Seed Spirituous and hot or patri-fied, which being swelled do move themselves this way and that way, till they have shed their Seed into the Cavity of the Belly: which Seed being disperfed, brings very cruel pains and stretches the Belly, untill the force of the Spirits be Evaporated: hence comes that same swelling of the Belly and stifling about the Midriff.

Sometimes

Suffocation. Sometimes malignant Vapors ascending from the Womb by the Veins^a and Arteries, unto the Lungs and Kernels of the Throat, may cause choaking and stifling; and the malignant vapor of the seed being so pernicious, is violently darted into the Brain, and all parts of the Body, from the Womb, as from a Beast that spits poyson.

Cancerous Scirrhus. The Womb is but little when empty; but when it is filled with evil Humors, it swells above measure; and it has been seen to equal the head of a new-born Child, which is an incurable Infirmity, because it is a Cancerous *Scirrhus*, which is the worse for being tampered with by Medicines.

^a *T. 7. f. 2. VV. XX. §*

Dropsie. Sometimes the Orifice of the Womb being closed, and firmly sealed up, Water flows out of the Belly into the Cavity thereof, and coming to a quantity, it brings the Dropsie of the Womb. Sometimes evil Humors are collected there, and by the force of Nature, do afterwards break forth. This often happens to Virgins, and others, from the suppression of their Courses, the internal Orifice being stopped, as said be fore,

Whither seed suppressed hurteth women? The Womb is watered with a two-fold Humor, Seed, and Menstrual Blood; the suppression of both which does many wayes afflict Woman-kind, and the evacuation thereof, does them much good in many respects. Howbeit, we do not read in *Hippocrates* any where, that the retention of their Seed, is hurtfull unto Women: he writes indeed, that the womb being drye, does ascend to the superior parts to receive moisture (which *Galen* laughs at) and that it desires to receive the Mans Seed to moisten it self; and that therefore marriagable Virgins that are troubled with fits of the Mother, should be married, and have the carnal society of Men. And therefore he makes the retention, or over-great flux of the Courses, the only general cause of Womens Diseases, and eiais that women cannot be in health, unless they play the Women, that is, void their Menstrual Blood. In case therefore, that a Woman, or a Virgin have their Courses stopt, whether or no may we hope by blood-letting, three or four times repeated from the Arm or Foot, to draw the blood unto the Womb? I remember the story of a Woman in a Consumption, because of the stoppage of her courses, from whom *Galen* drew blood in a large quantity.

1 The efficiency of matter. That we may know to resolve this question, three things are to be noted; The Matter, the Place, and the Expulsive Faculty. The matter is Blood, which remains over, and above what was necessary to nourish a woman for a months time, which was ordained to conceive a Child, and to nourish it being born: wherefore we must consider, whether the woman abound with blood, so that she has what to spare, and void forth; for if she want blood, by reason of some fore-going disease, or because she eats little, we are not to expect that she should have her courses.

2 Fitness of the place. The place through which it ought to flow, is the womb, with the Hypogastrick and Spermatick Veins: for these Vessels do contain the superfluous blood, untill the due time appointed for this purgation, and they send it forth either by the Cavity of the Womb, or by the Spermatick Vessels, into the neck thereof. But if so be the Womb shall be dry, or hard, and the Spermatick vessels and veins obstructed, we cannot hope to procure the Courses to flow, by often blood-letting. And the Expulsive Faculty is not seated in the Genital Parts, which receive this blood, but depends upon the general strength of Nature, which thrusts this superfluous blood out of doors.

3 Strength of the faculty. These three things ought therefore to concur, that a woman may have her Courses, Matter, Place, and the Expulsive Faculty; and Medicaments ought to have a respect thereunto. A vein is to be opened in the Foot, rather than in the Arm; Cupping-glasses must be applied without Scarrification to the inner part of the Thighs, above the vessels: Convenient Purges must be given, with Apozemes that move Urine, attenuate, and open the mouths of the veins. Pills of Steel, Mirrh, and Aloes, must sometimes be given, and Baths made to sit in: or a vaporary must be used sometimes of blood-warm Water alone, and sometimes boyled with Hysterical and

Medicaments, and other means to accomplish the Cure.

and opening Herbs, the steam whereof, the Patient must receive into her Womb. Also Fomentations must be applied to the *O: Sacrum*, and the lower part of the Belly, and good Diet appointed, not heating, but attenuating and opening.

The Action of the Womb, is Conception; if it be abolished, the Patient is barren: Which barrenness, depends either upon the distemper of the womb, or upon the ill shape thereof, or the hardness of the inner Orifice, or the distortion thereof, or from fault of the Stones, and Spermatick Vessels, in which somewhat is wanting, either in point of structure, or of matter: and if a woman be sickly, she cannot make good Seed fitting to cause a Conception, til she recover the soundness of her health, and til the faults of her womb (if not incurable) shall be amended.

Symptoms in the Actions hurt. Sterilitic.

But forasmuch as the Womb is ordained, not only for Conception, but to evacuate the Superfluity of Natural Humors in the Body, such as are superfluous Seed, and Menstrual blood: if they be totally, or in part suppressed, the woman cannot be in Health, nor if they flow too much. Hence comes the *Gonorrhœa simplex* [simple running of the Reins] or the Feminine Flux, either of blood, or Humors, when only Humors come away: which last, if it be malignant, and the Humor be sharp, exulcerating, and of evil colour, it is dangerous, and comes sometimes from an outward, venomous, and contagious cause; and therefore women ought discreetly to be questioned touching that matter, that they may be brought to acknowledge their Disease, and not deceive the Physitian under a pretence that they have the ordinary whites, to their own hurt, unless they acknowledg themselves faulty, or lay it upon their Husbands, whom it is better to accuse, if they be in any measure suspected, than to call the womans Chastity in question.

Suppression of blood or seed.

Over-great flux thereof.

Because we are treating of the Action of the Womb, which is Conception, I will speak a little touching the same, and shew, How a woman is disposed during Conception: What is the fruit, or work of Conception, *viz.* how the Infant comes out of the womb, and how the woman is constituted in the time of her Travel, and what happens unto her after her Travel, until she be well, and upon her Legs again.

Touching other Diseases, whereunto she is subject, I will speak nothing, because they differ not from such of the same kind as she is troubled with, when she is not with Child.

Wherefore, as the Abolition, or taking away of the Action of the womb, is Barrenness; so the Action thereof being depraved, brings forth a Mole, or a false Conception, or an Efflux of the Seed, after eight daies, or Abortion.

Mole, Abortion, &c.

If the Conception be true, and legitimate, a Child is thereby begotten: for the Mans Seed being squirted into the ^a Sheath, is sucked, and retained by the ^b womb; and then the ^c internal Orifice being shut by its heat, and inbred vertue, it stirs up the forming Faculty of the Seed, and sets it on working: Whereupon, of both Seeds mingled, the Child is framed; which is begun by a certain point, or little speck; which upon the third day is perceived to pant, in Eggs that a Hen sits upon. Afterward, certain Skins are formed, within which, the foundations, or first threds of the Vessels, and all parts, are drawn out of the Seed, and the woof, or super-structure, is produced out of the Menstrual blood, which comes upon it: and then the *Placenta* is made, being a Mass, or lump of Flesh, termed also the ^d Womb-Liver, which being glued to the sides of the Womb, interposes it self between the ^e Navel-strings of the Child, and the Vessels of the Mothers womb, which before were joyned together.

The Childs Conception.

Right shaping.

The Placenta or Womb-Liver.

Now the Conformation of the Infant, is different in the parts thereof; but the said difference, do's more manifestly appear in the Vessels of the ^f Heart, which are united by a double Anastomosis, or Union of the mouths of the said Vessels, as I have described them, in my History of the Child in the Womb,

Some sickly Women, while they go with Child, have their health better than ordinary; but the Child fares the worse for it, because it sucks up the impurities of the Mothers blood. Others are worse at that time, because the impurity of the mass of blood, is carried into divers parts; and if it stick in the Stomach, it causes either strange longings, or frequent vomiting; in some, all the while they are big, in o-

Why some childing women are sickly, others not.

thers

thers, to the middle of the time of their Belly-bearing.

If a Woman, during the whole time of her Conception, can make the Child partake of her passions, it will partake both of her Health and Sickness.

^a T. 7. f. 2. Y. ^b f. 2. K. f. 3. A. A. ^c f. 3. D. ^d T. 8. f. 3. A. A. ^e f. 2. ABC D G. ^f T. 9. f. 4. D. ^g

whether a big-bellied woman may be let blood? Affir.

Whether or no, may we let blood, or purge a sick woman that is with Child? Blood may be taken away at any time, especially in the first months, in which the Child being small, needs little blood to nourish it; but in other months also, blood is taken away, if the greatness of the Disease require it, to save both Mother and Child.

And if any ill happen after blood-letting in such a Case, it must be attributed rather to the violence of the Disease, than to the blood-letting, or any other Remedy applied.

whether in the disease Cholera she may bleed? Neg.

But if a Woman with Child, be taken with the disease Cholera [a violent purging upwards and downwards of corrupt Humors] when she is in her seventh or eighth month; whether in such a case, is it safe to let her blood? If it be suspected as hurtful in such women as are not with Child, lest their strength being by much Evacuation weakened, should be more perished, and decayed, much less is it to be allowed in such as are big-bellied, who have suffered plentiful, and immoderate Evacuation out of their Veins; because it inclines the Patient to miscarry, while it defends the Child of its nutriment, and impoverishes the mother; so to go about to Cure a Woman with Child, is a dangerous, and unheard of Practice. For if all Practitioners dis-allow the same in Men, and Women not with Child, both Greeks, Arabians, and Latines, both Antient and Modern; much more is it to be dis-liked in a woman seven or eight months gone with Child. If it be done in a small quantity, it is to no purpose; what can the taking away of one little Porringer of blood do, to resist the furious agitation of Humors, and to extinguish a Fever, seeing the blood is wont to come very slowly away, drop by drop, and the best first.

I say no more, lest I should seem with affectation to handle this Question, which shall be more accurately discussed in another place. He that desires to be acquainted with the Cure of Womens Diseases, let him read Hippocrates his fifth Book of that Subject.

whether in big-bellied women, the womb grows thinner? Neg.

It is worthy Observation, That the greater the Child grows in the Womb, the more do's the Womb, and the Placenta, or Womb-Cake, or Womb-Liver increase; so that near the time of Travel, it is as thick as a mans Thumb, contrary to the Nature of other Bodies, which by how much the more they are distended, by so much the thinner they grow. If the thickness of the Womb be less, either those Women are lean, or have little blood, or had a flux of blood a little before their Child-birth; and such do void little or no blood by way of the Child-bed Pur-gations.

The posture, and accommodation of the child in the womb.

Now the Child in the Womb, lies round like a Foot-ball, floats in Water, being compassed with two ^a Membranes, the one called ^b Amnion, the other ^c Chorion, has the ^d Placenta, or Womb-Liver fastened to the sides of the Womb, as a Mattress, or Bed to rest upon, in which the Mothers womb is purified, and in which the Umbilical, or Naval-Vessels are rooted, viz. ^e a Vein and two ^f Arteries, which carry blood to the Liver and Heart.

The *Vena Porta* has blood proper thereunto; and the *Cava* has also blood of its own, which must go unto the Heart to be circulated.

The Child in the Womb, is nourished by the ^g Navel; it breaths a little, its Heart ^h moves, and exercises its vital Faculty, it feels, and is moved, and has been heard also to cry.

The Natural Birth.

At last, when it finds it self perfect, whether in the seventh, or in the ninth month, which is the ordinary time for a Child to be born, being impatient to be any longer there imprisoned, it breaks its bands, and prison doors, and seeking to come out,

out, makes its own way, with the Head ³ foremost; and such an Egress is termed a Natural, and right fashion'd Birth.

Before that Nature begins to work, she moistens the waies before the Birth, with a Clammy, and gluish Humor. The internal Orifice of the womb, and the whole Sheath, which in the last moneths, do by little and little grow thick, are moistened with the same clammy, glutinous Humor, that they may easily be enlarged to such a wideness as shall be necessary for the going out of the Infant.

*what preceds
the part.*

^a T. 8. f. 1. C C C C. ^b f. 2. E E. ^c f. 2. F E. f. 3. B B. ^d f. 3. A A. ^e f. 2. A. ^f f. 2. B B. ^g f. 2. D D. ^h T. 9. f. 3. B. T. 1. f. 4. ⁱ f. 8. f. 1. D. ^j

That the Child be rightly born, it ought to come out with its Head first, and its Face towards the Mothers Breech, the Membranes being first broken, and the water, run out: After the Child, the Secundine, or After-birth, must come forth, *viz.* the *Placenta Carneæ*, or Womb-Liver, whole, and untorn. When the Child is come forth, the Navel is tied ^a a Thumbs breadth from the Skin, and after it is tied it is cut off, leaving only another Thumbs breadth.

what follows.

^a T. 9. f. 2. P. ^j

The Infant being wiped and clenfed, with its Head gently pressed together, and closed, is delivered unto the Nurse. The Midwife takes care of the Mother, who is carefull of her privy parts, being pained, and to recover her languishing strength.

If the birth prove hard and painful, a Fever is raised, and the privy parts are swelled, by labouring and endeavouring in vain to bring forth the Child. Sometimes her strength fails her, and otherwhiles Convulsions do arise. Then is blood drawn from the Arm, and the Foot, and the Genital Parts are fomented with Emollient, and laxative Fomentations, and are anointed within with opening Oyls, and fresh Butter. The Patient is put into a bath of luke-warm water, and sharp Clysters are given, to provoke the womb to excretion: and the inferior parts are provoked by Aperitive, and provoking Potions to open themselves.

*Helps to further
hard labour.*

Finally: when all will not do, and the woman has passed over two or three daies, in these torments, if she appear like to die, and ready to faint away, if tokens of a Gangrene in the Privities do appear, although we are not sure that the Infant is dead, it is drawn out with an Hook, that the Mothers life may be saved; it is better that one die, than two, and the life of the Mother is to be preferred before the life of the Child. The Mother ought not to die to save the Child. and therefore the *Cæsarean Section* [ripping the Child out of the Mothers Belly] ought not to be practised.

*Drawing the
Infant out by an
Hook.*

'Twas Elegantly said by *Tertullian* in his Book *de Anima. cap. 25. Necessaria crudelitate trucidatur Infans matricidæ ni moriturus; i. e.* It is a necessary kind of Cruelty, to kill that Child, which otherwise would kill its own Mother.

When the Infant has broke prison, and escaped, if the *Placenta*, or After-birth do not follow, the Midwife must thrust her hand into the Cavity of the Womb, and pull it away gently, lest the bottom of the womb be drawn down.

If in a Woman dead presently after her delivery, you view the privy Parts, you shall observe the Caruncles obliterated and defaced, the Nymphs much diminished, so that only some Rudiments of them are to be seen, and the inmost Orifice so wide, that it will receive a mans four fingers bended together.

The widening of those Parts to let out the Infant, and the straitening of them again, a while after, is an admirable work of Nature.

The wideness and thickness of the womb, are diminished by little and little, by the coming away of the Loches, or Child-bed Purgations, which is nothing but that blood squeezed out, which had been shut up between the Spongy sides of the womb. But if the largeness of the womb be not diminished, nor the Blood evacuated, it pro-

*Admirable
power of Na-
ture.
Child-bed
Purgations
what they are.*

trefies, and causes an Inflammation, and the womb continues stretched, and hard, as if the Child were yet within it, and at length a Gangrene arises, which brings unavoidable death after it.

But if the whole *Placenta* be not drawn forth, it is no necessary cause of Death; and the place from whence it was pulled by force, for a while appears rough and uneven, till the whole womb be dried, and reduced unto its natural Figure: all which ought diligently to be observed, especially in Child-bed women that are sick.

Child bed
Purgations re-
tain'd how to
be evacuated.

The largeness and hardness of the Body of the womb continuing with a Fever, is a very dangerous, and doubtful Disease; and a great Question it is towards the Cure, whether we should open a vein in the Arm, or in the Foot. *Fernelius* confidently lets blood in the Arm: *Pereda* a Spaniard, tells us, That we should not regard from whence the blood comes, but into what part it is collected, and bids us open the Vein which is next that part.

Cortesi in his Miscellanies, has sited this Question, and favours the Opinion of *Fernelius*: howbeit, more profitable it is, and more secure, to take blood out of the Foot liberally, respect being had to the Patients strength, not neglecting cooling Clysters, Epithems, Fomentations, and Pessaries, made to provoke the womb to cast forth that putrid, and death-causing blood; and the rather to avoid the Calumny, and prating of ill-tongu'd Gossips, by whom Remedies are defamed, which have been the means to save many peoples lives.

Diseases pro-
per to Infants.

The Infant has no Diseases proper to it self, saving Teeth-breeding, Small Pox, and Meazles. *Hippocrates* under the name of Tooth-breeding, comprehends all Childrens Diseases, because chiefly when they breed their Teeth, Infants are so sick that many times they are taken away by death.

Teeth-sickness.

Many Diseases are raised by the pain of the Childrens Tooth-breeding. There are two times in which the Tooth-sickness does vex, and endanger the lives of Children, *viz.* When the teeth first sprout, and when they break out of the Gums.

Meazles.

The Meazles, and small Pox, are new Diseases, unknown to the Antient Physicians, which are thought to be contracted, and bred in the Mothers womb, by the Mothers corrupt, and Menstrual blood; the fault whereof, Nature is wont to purge out, and scum away by those Eruptions. I say no more, lest I should seem to go beyond the bounds of an Anatomical Discourse. Neither is it my Design to deliver an exact Pathology, or Description of Diseases; but only to hint at such Diseases as are known by knowing the Natural Constitution of the parts of the whole Body.

Small Pox.

Chap. 37. Of the Pains of the Loins.

There is nothing which we more frequently meet with in *Hippocrates*, and in the Practice of Physick, than Pains of the Loins, whether they be primary, or secondary; that is to say, Attendants of other Diseases; which are oftentimes neglected by Physicians as Symptomatical, unless they be very stubborn, and solitary without a Fever. The Causes of which pains, are not accurately enough declared, neither is their Cure sufficiently explained by all Practitioners.

A muster of
such parts
as are in the
Loins.

This knot I shall endeavour to untie, and illustrate. The parts therefore of the lower Belly, being demonstrated, and the Guts taken away, we shall see the Loins covered with Muscles, both within and without, and fleshy portions of the midriff reaching down to the *Os Sacrum*, and the Trunk of the *Vena Cava* descending, also the *Aorta*, and the two *Kidneys*. And if you shall call to mind the cleaving of the Mesentery to the Loins, and shall observe the Lumbar, or Loin Veins, produced from the Trunk of the *Vena Cava*, and the Arteries proceeding from the *Aorta*, both convey'd into the holes of the *Vertebra's* as far as the marrow of the Back. All these things being diligently viewed, and considered, will give great light to our Consultation.

Galen complains in his Commentary upon Text 7. of the Second Book of Protheticks; and upon Text 8. of the third book of the same Work, of the Obscurity of the pains of the Loins, because of the Ignorance of those Parts which compound and

and work upon the Loins; yet some causes he assigns of those pains, and *Ludovicus Durens* that same sublime Interpreter of *Hippocrates* has added others, but they have not assigned all. I will therefore do my endeavour to clear this point.

And in the first place, it is fit to take notice, that this pain is by the Greeks called in one word *Osphalgia*: the Latines term it *Lumbago*, and he that is made weak by pain in his Loins, is called *Elumbis vel Elumbatus*, disloined or unloined. In the French 'tis termed *Erne* as it were a *Rene* from the Kidney, which lies in the Loins; and when the pain arises from a Convulsion of the Fibres, the common people say their Kidneys are torn in sunder.

The Name with its Etymology.

If this pain of the Loins be eased with Clysters, the Humors being emptied which were shut up in the Guts or Mesentery, the Common People say, that their Reins or Kidneys are well dis-burthened.

^aT. 10. f. 1. T. 14. all the Tab's. ^bT. 10. f. 7. HH. ^cT. 12. f. 1. r. ^dT. 12. f. 4. C. ^eT. 5. f. 5. BC. ^fT. 12. f. 1. a. a. ^gT. 12. f. 4. C. ^hT. 5. f. 5 BC. ⁱT. 12. f. 1. a. a. ^kT. 12. f. 4. a. a.

Now that our enquiry touching pains of the Loins may be clear and Methodical, it is necessary in the first place to distinguish the parts constituting the Loins, which are pained, and the bordering Parts which as efficient Causes do give occasion to those pains, not neglecting the more remote Parts. Then we shall enquire into the common internal and external Causes of those pains, and to sum up all in a word, we shall consider the Parts which send the Humour, and the parts which receive the same.

The Authors Method.

The parts therefore which make up the Loins and are the subject of the pains, are these. The ^aSkin with the ^bfleshy Membrane, the ^cMuscles which are spread upon the five ^dVertebrae, both without and within with the ^e*Os Sacrum*. Within the ^fCavities of the Vertebrae, the Marrow of the Back with its Membranes, and a numerous company of ^gbranches of Nerves, and the Membranous Ligaments, which knit the Vertebra's one unto another. Also we must observe how the ^hMarrow of the back is in the Loins parted into an innumerable company of ⁱthreads like an Horse-Tail, and that the whole Back-bone is moved in the Loins, by an Articulation of the first Vertebra of the Loins, with the last Vertebra of the Back.

Parts which constitute the Loins, and are the subjects of pains.

^aT. 1. f. 2. BB. ^bf. 2. DD. ^cT. 10. and 14. &c. ^dT. 2. f. 1. ^ef. 5. and 6. ^ff. 2. a. ^gT. 18. f. 5. 11. 14. ^hf. 5. A. ⁱf. 5. o.

They are deceived who think that by the word Loins, *Hippocrates* understands only the parts included viz. The ^kNerves, the ^aMuscles of the Loins, the Spinal ^bMarrow with its Membranes, and the ^cKidneys: for besides all these *Hippocrates* comprehends under the term Loins, the ^dgreat vein and ^eArtery, and the ^fSpermatick Vessels, and the ^gVessels of the Kidneys, the ^hBladder, the ⁱWomb, the ^kHemorrhoides, and the thick ^lGuts. But I would fain see the places which severally demonstrate those Parts.

^kT. 18. f. 5. 11. o. T. 3. f. 8. o. p. &c. ^aT. 10. f. 2. T. 14. ^bT. 18. f. 5. A. ^cT. 5. f. 1. BC. f. 2. CD. ^df. 1. D. f. 2. F. ^ef. 1. E. f. 2. G. ^ff. 1. HI. f. 2. LL. NN. ^gf. 2. HI. a. a. b. b. &c. ^hf. 7. FF. T. 12. f. 1. and 4. ⁱ&c. ^lT. 7. f. 1. XXVV. ^kT. 4. f. 6. 11. ^lT. 3. f. 4. IKM.

Now the neighbouring Parts, which are able to hurt the Loins, by reason of their nearness, or heavyness, or by disburthening their Humors into them, are the Mesentery ^m which is kn it unto the Loins, the lower Part of the ⁿGut Colon, the two ^oKidneys which touch upon and cleave unto the Loins, by their ^pfatty Membrane, the Trunks of ^q*Vena Cava* and ^r*Aorta* which are spread along in the Loins, and the Vessels springing out of them, which are propagated into the Muscles of the Loins and the back-bone. Of which sort are the veins and Arteries of the ^sLoins,

Parts bordering upon the Loins, which are the special causes of their pains.

also the Haemorrhoid^x Veins, which pass down all along the Loins into the Fundament; as also the ^aSpermatick Vessels which swell with Spermatick Humor, which in their progress do send branches unto the Loins. In Women, the ^xWomb with its ^yLigaments and ^zTesticles may hurt the Loins, but especially in a Woman with Child, by reason of the weight of the womb and Child. ^aThe Veins and Arteries of the *Iliaca* branches, which are spread abroad through the *Os Sacrum*, may vex the Loins.

^m f. L A A. & c. ⁿ f. 4. K. ^o T. 5. f. 1. B C & f. 2. C. D. ^p f. 2. A A. ^q f. 1. D. f. 2. F. ^r f. 1. E. f. 2. G. ^s T. 12. f. 1. and 4. a a a ^t T. 4. f. 6. ^u T. 6. f. 1. 2. & c. ^v T. 7. f. 1. d. f. 2. R T. & c. ^y f. 2. Q Q. S S. ^z f. 2. o. o. f. 4. A A. ^a T. 12. f. 1. and 4. D D.

Remote parts.

The remote Parts which hurt the Loins, are, the ^aLiver by the *Vena* ^b*Porta*, and ^cMesentery, and the ^dHead whiles it disburthens its self of its Superfluities into the ^eMarrow of the Back, according to *Hippocrates* in his Book *de Glandulis*. The Humor descends through the Cavity of the Spinal Marrow, as far as the Loines, and it cannot easily go farther, by reason that the Marrow of the Back is there divided into a ^fMillion of Threads.

² T. 4. f. 1. A B. ^b f. 1. F F. f. 6. the whole ^c f. 1. G H. ^d T. 17. and 18. ^e T. 18. f. 5. A. ^f f. 5. o.

Common causes of Pains.

We must also observe the common Causes of the Pains, which are frequently found in Pains of the Loins, as internal *Rheumatismes* or Fluxes of Humors, and external by the Veins, or an Humor between the Skin, which flows from the Head betwixt the Muscles and Fleshy Membrane.

Oftentimes the branches of the *Vena Cava* and *Aorta* do carry a Part of boiling and Superfluous Blood, out of the greater Channels into the Loins, which they Disease either in the Muscly Parts, or in the Membranous Parts, or in the marrow of the Back; which is the cause that a Palsie follows the Colick, or an Anthritis degenerates into the Colick, and the Colick is changed into the Sciatica. Also, outward Impostumes of the Kidneys, and passions of the Gut *Colon*, being either distended or exulcerated, are Communicated to the Loins, within and without in the Loins may arise Tumors, Impostumes, and Ulcers, yea, and the Loins are distorted by flux of Rheum, or some swelling. Their fibres are distended by the Cramp. Many times pains of the Loins are stirred up by external Causes, as a fall on the Back, or a Blow with a thick Stick, or some other massie thing.

External Causes.

Certain places in *Hippocrates* expounded.

These things being premised and well understood, it is ealie to explain very obscure places in *Hippocrates*, touching pains of the Loins, which you shall find in the Commentaries of *Duretus* upon the Colick Prognosticks of *Hippocrates*, and others collected together in the Commentaries of *Marinellus* upon *Hippocrates*, in the word *Lumli*.

There are two kinds of Loins Symptoms: for some are in the Loins, and others spring from the Loins: both of them are by *Hippocrates* judged to be very stubborn and hard to deal with.

In his Colicks he hath pronounced absolutely and without exception, Such as have pains in their Loins are in a very bad condition. And in the same Book, Diseases which arise from pain of the Back, are hard to cure. And how will you understand those places, unless by a clear knowledge of the Parts sending and Parts receiving as I declared before.

Certain it is, if in the beginning of Diseases there be pain in the Loines, with heavyness and a Feavre, Blood very hot or in great plenty is contained within the greater Vessels, which being more inflamed, if not timely prevented, may be carried into the Head or into the Lungs, from whence grievous Diseases may follow. In other places he does particularly explain the Causes of Lung pains.

If

If I should recite those places, I should fill twenty Leaves and upwards, wherefore I will take in my Sails and dispatch all in a word. Pains of the Loins in acute Malignant Fevers or other Fevers in the beginning are dangerous: for they signify a great Tumult in the Blood, and irritation of Humor within the greater vessels, which is much to be feared if a speedy course be not taken to prevent what may follow, by a plentiful blood letting especially in the Feet, to hinder the recourse of the blood to the upper parts of the Chest or Head, where it is wont to produce divers terrible and deadly symptoms.

Danger of these pains in Fevers.

We ought therefore to be very fearful of pains in the Loins which persevere in Fevers, although Blood have been often let, because in the Region of the Belly, Humors lie extreant deep, which may take their course suddenly to some of the nobler Parts, if they be not diligently purged forth.

And therefore to cure such like pains of the Loins, Hippocrates was wont to open the veins of the Ham or Foot: which is confirmed by him, in his Coicks: the pains of the Loins proceed from abundance of blood there, and blood-lettings that are caused by pains of the Loins are large and plentyful. These things declare the necessity of blood-letting, when the Loins are pained with a Fever.

Their Cure.

Purging must not be omitted that the vault of the lower Belly being loaded with Excrements may be emptied and clesed; out of Aphor. 20. Book 4. Though Hippocrates has written that such as complain of pains in their Loins, are looser bellyed than ordinary; that saying does not take away the necessity of Purging in these cases.

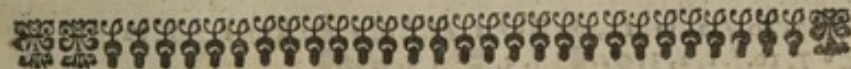
Bleeding at the Hemorrhoid veins is good both for the Kidneys and for pains of the Loins; and therefore the Hemorrhoids are to be provoked.

A lasting pain of the Loins without Heat or any Inflammatory disposition, unless it can be dissolved with Fomentations, after purging and blood-letting often repeated, the Humor must be drawn out with Cupping-Glasses and Scarification, and by Application of vesicatories, or making Issues on each side of the Back-bone, also with a bath of fresh water qualified with Herbs, or by sitting in natural Baths, or having their water Pumped from on high upon the parts affected. For the pains of the Loins are more vehement and stubborn if the serous matter be contained within the Muscles as far as the Vertebras: and they are yet worse and harder to be cured, if they come to the Marrow of the Back.

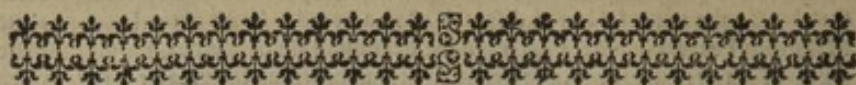
But those Symptomes which are thought to arise from the Loins do not arise from the Parts which constitute or make up the Loins, but from the neighbouring parts, which being spread upon the Loins, do cause pain, and transfer their humors into other parts, by a quick or slow motion, by the veins and Arteries, such as are *Vena Cava* and *Aorta*, the Hemorrhoid veins and the Mesaraicks. Out of Galen.



The End of the Second Book.



THE



THE
 THIRD BOOK
 OF THE
 ANATOMY
 AND
 PATHOLOGY
 OF
 John Riolanus,
 THE
 KINGS PROFESSOR
 OF
 PHYSICK.

Chap. I. Of the Chest.

Its Bounds.

LET us proceed unto the parts of the Chest: Now the Chest is the Mansion House of the vital Parts. It is bounded, and circumscribed below, by the ^a bastard Ribs, and ^b Midrif; above by the ^c *Clavicula*, and the whole Circumference, and bulk thereof is made up of all the ^d Ribs, the *Vertebra's* of the ^e Back, and the ^f Breast-bone. And because the Neck comprehends the beginnings of certain Parts which belong unto the Chest, it is referred thereunto, rather than to the Head, though it be the prop and Pillar thereof.

Shape.

^a T. 10. f. 2, 11, 12, &c. ^b f. 1, 11. f. 6, 7, &c. ^c f. 1. f. T. 12. f. 1. B B. ^d T. 10. f. 1, 2, 3, &c. ^e f. 3. ^f f. 2. A A.

That the Chest may be well shaped, it ought to be of an Oval Figure, and not flat before, which is termed *Pectus Tabellatum*, a Table-shap'd Breast, and is a token that the Party so Breasted, will fall into a Consumption.

The

The Chest is compounded of divers Parts, which are divided into external and internal, that is to say into Parts containing, and Parts contained. The containing Parts are common and proper. The common are five. The Scarf-Skin, the Skin, the fatty Membrane, the fleshy Membrane, and the Membrane common to the Muscles, which were explained in our Anatomy of the lower Belly.

The Membrane of Fat and the fleshy Membrane have one thing proper and peculiar in the Chest, that they receive the Paps in Men and Women. In Men there are only the Marks of Paps or Dugs, in Women they are Parts made not only for a feminine ornament, but to nourish the Infant, of which we are now to treat before we pass any further.

Chap. 2. Of the Dugs of Women.

THE Dugs are made up of a company of Kernels very like the Kernels of Prune-Stones, clustered together, and disposed confusedly in heapes upon a Membrane proper to themselves, in the midst of which there lies one Kernel greater than the rest, under the Teat. *Their Sub-
stance.*

The Dugs are placed upon the Breast, not to defend the Heart nor to adorne and beautifie the Woman, but that the Infant may be more conveniently nourished, while the Mother embracing it in her Arms laies it to the Dug, and the Child Tickling her Nipple with its sucking provokes her the more to love it, and to express her Love by frequent Kisses. *Situation.*

The largeness of the Dugs is different, according as the Woman is of a more or less fleshy and lascivious constitution of Body: for the lustful heat of the Womb does, puff up and swell a Womans Dugs. In a Marriagable Virgin they become more large, if she enjoy carnal Embracements with more than ordinary pleasure and content. *Magnitude.*

Nature, our bountyful Mother, has given a Woman two Dugs, that she may nurse two Children; or if one breast be sore, the other may serve the tune for a time. And for this Cause they communicate one with another. *Numbr.*

The shape of the Dugs is not flat but bunching out, that they might contain the greater Quantity of Milk. At the end of the Dugs, are the Teats, out of which drops the Milk, which the Infant sucks. *Shape.*

The Teat or Nipple is made of the Skin drawn together and boated with little holes. It is wrinkled on the out-side that the Infant may more easily lay hold upon it, and keep it in its mouth. *The Teats.*

Round about the Teat there goes a Ring or circle of different colours in women in respect of their Age and of their being with Child or not with Child &c. In virgins it is red, in such as are devirginated it is Black and Blew. In Women with Child it is larger than ordinary; and if they go with a Boy it is Black and Blew or red; if they go with a Girl, it is of a whitish Colour. *The Circle
about the
Teats.*

The Medicinal Consideration.

The largeness of the Chest is commended as sound and healthful; but a narrow Chest is blamed because it occasions shortness of Breath, because the Lungs are ill housed wanting Room to display themselves. The shape of the Chest ought diligently to be considered by a Physitian when he sees any troubled with shortness of Breath. In healthy persons, that the Chest may be perfectly shaped, it is requisite that it be round in the forepart and not sharp, and that it be streight before and behind; if it prove crooked, there is a fault in the Back-bone, of which we shall speak in our Doctrine of bones. *Mis-shapen
Chest.*

Terence blames the affected Care of Mothers who strained the Chest of their young Daughters, that they might become Slender and small in the waist. (Such are rightly termed Wasp-waisted Wenches, because they seem divided in the middle, like a Wasp or Bee.)

A misshapen

A mis-shapen Chest by reason of the Crookedness of the Back-bone is more frequently seen in Women than in Men, because they are the weaker Vessels. These Crookednesses we endeavour to correct with a firm Pair of Bodies, made either of hard Leather, or of strong Linnen with Whale-bones sowed between, or of very thin Plates of Iron. Also the Back-bone is daily by contrary motions bowed the other way.

By Crookedness
of the Back-
bone.

Some are born thus Mis-shapen, and they are incurable, let the Rectifiers of Crookedness do what they can.

Many times Rheumes fall upon the Muscles of the Back-bone, which draw the Vertebrae awry, whence proceeds a mis-shapen Breast-bone and consequently a Crooked Chest, because their shape depends upon the shape of the Back-bone.

By falling of the
Breast.

To the evil shaping of the Chest appertains the falling down of the Breast, or the bowing in of the Sword-like Gristle, which hurts the Stomach and provokes vomiting, and also shortness of breath by hurting the Midriff; therefore this Gristle ought speedily to be lifted up and restored to its place. *Baptista Codronchus* and *Ludovicus Septalius* have treated of this Disease.

Empyema.

Droppe.

The Diseases of the Cavity of the Chest are *Empyema*, or a collection of quitor within the said Cavity, and the Droppe of the Breast: all which Diseases require a perforation to be made between the fourth and fifth Rib of the Chest on that side in which the Humor is contained.

Sometimes winds do so violently distend the Lungs, that the Patient is in danger of Choking, unless the Chest be opened by the Perforation aforesaid, which is often practised at *Paris* to the great benefit of the Patients and easing of the Chest; although no watry Humors come forth, but only wind, which Issues violently, with a noise. Those whose Chests are distended with wind, are by *Hippocrates* termed *Pneumatici*.

Condition of the
Dugs.

In a Marriage-
able Virgin.

The Dugs are to be considered at divers seasons, in a Virgin Marriageable, in a Married Woman, in a Woman with Child, and in one that lies in Child-bed and gives suck, because in these several times they are subject to several Diseases. In ripe Virgins fully marriageable, the Dugs are firme and solid. They become more soft and swelling, when they are transported with a burning desire of carnal Embrace-ments: and by how much the higher they swell without pain, and the fuller Obe that they make, strouting and Kissing one another, the greater is their desire after bodily Pleasure, and it may be guessed that they have tasted the Sweetness of Mans Flesh.

In a Married
Woman.

If when the Dugs are pressed, milk drop forth, it is a sign of the Parties being with Child, though *Hippocrates* accounts it but an uncertain Sign. The Dugs of a married Woman which were raised with the Ardency of fleshly lust, do sink and fall by little and little. Women that have large strouting Dugs are termed in Latine *Mammosa Mulieres*, and they are of an hot Complexion, lustful and lovers of Wine and good Liquor. If they happen to be of a cold Complexion, the swelling of their Dugs, comes from an Wheyish Humor which they suck in like Sponges. So saies *Hippocrates*.

Inflammation
of the Dugs.
Impostum.

Scirrhus.

Cancer.

Large and ponderous Dugs, do hinder Breathing, by burthening the Chest. So the swelled Breasts of Ancient Virgins and married women, are liable to the same Diseases. For either by reason of a Flux of Humor or of some bruise, they are inflamed and impostumate; sometime they become Scirrhus and Knobbed as it were with the Kings-Evil, by reason of the Kernels; and then a Kernel or two if they be movable, ought to be taken clean away, by cutting the Skin before they cleave to the Fat, the Disease encreasing and creeping on to infect other Kernels: Hence comes an incurable Cancer; Because the dugs are full of Kernels and spongy, and therefore ordained by Nature to receive superfluous Humors. So that such Women as have them dried and shrunken up, are unhealthy and much troubled with spitting.

The Dugs of a Woman with Child, sometime after her conception, do swell by little and little, by reason of the flowing back of the Menstrual blood, and they drop a milky Whey: but in Child-bed women, they become yet bigger, by reason of a greater afflux of blood, than the Dugs are able to contain. From this distention springs a Fever, on the third day after they are delivered, which lasts a day or two, or longer; unless the Milk be forced back, or some Child suck the Dugs.

In a woman with Child.

Distention by blood.

This Milk is called in Latine, *Colostrum*, and many are afraid to nourish the Child therewith. Yet *Spigelius* has proved, That this first Milk is no bad milk, and that a Mother ought not to refuse to nourish her Child therewith.

If in a Woman with Child, the Dugs are liable to *Inflammation, Tumors, and Nipples*; much more are they so in a Child-bed Woman, and one that gives suck, by reason of the curdling of her Milk. *Dioscorides* writes, That the swelling of the Dugs is brought down, by the application of braised Hemlock, which Experience shews to be true. Howbeit, *Dodonæus* approves not of this Medicine, by reason of the malignant, and venomous Nature of this Herb, which being applied unto the Dugs, may wrong the Heart.

In a woman that lies in.

Hippocrates in his Epidemics, has this Saying: If the Nipples of Womens Dugs, and that which is red in them, be pale, their Womb is diseased.

There is a great League, and fellow-feeling, between the Dugs, and the Womb, by reason of two Veins, viz. The *Vena^a Mammaria*, or Dug-Vein; and the *Vena^b Epigastrica*: and also by the *Vena^c Thoracica*, or Breast-veins, which are Branches of the *Vena^d Cava*, which in the bottom of the Belly, affords the Hypogastrick Vein unto the Womb.

Consent of the womb and dugs how caused.

The Ancient Chyrurgions were wont to cut off Cancerous Dugs with the Incision Knife; but because it looks not well, women are not willing to undergo so cruel a Remedy, neither do our Chyrurgions practice it.

^a T. 2. f. 19. d. T. 12. f. 1. C C. ^b T. 2. f. 9. e. T. 12. f. 1. E E. ^c f. 1. 11 o. ^d f. 1. A B. &c. ^e f. 1. 55.

Chap. 3. Of the External Parts of the Chest.

The proper sustaining Parts are bony musculous, or membranous. The bony Parts are of four sorts, viz. Twelve ^a Ribs, two *Claviculae*, or Channel-bones, the *Sternum* or ^b Breast-bone, and the twelve *Vertebrae*, or turning Joynts of the Back-bone, of which we have spoken in our *Osteologia*, or History of the Bones.

Proper sustaining parts

^a T. 10. f. 2. 1, 2, 3, &c. ^b f. 1. f. T. 21. f. 1. B B. ^c f. 10. f. 2. A A. ^d T. 10. f. 3.

The Musculous parts, are either external, or internal, at least placed between the bones. The External musculous parts, are divided into muscles proper to the Chest, or such as are referred to other parts; such as the *Musculus^a Pectoralis*, or Breast-Muscle; *Serratus^b minor anticus*, or the smaller fore-side Saw-Muscle; and the greater *Saw^c Muscle*; or *Serratus major*; the rest belong unto the Chest, of which we shall speak in our *Myologia*, or History of the Muscles.

The Internal musculous Parts are, the Intercostal Muscles, both ^d internal and ^e external; which are placed in the spaces between the Ribs, as their name imports.

^a T. 10. f. 1. A B. ^b f. 1. E. ^c f. 1. C D. ^d f. 1. H H. ^e f. 1. G G.

Chap. 4. Of the Pleura, Mediastinum, and Pericardium.

That continued membranous Part which incloses all the internal parts of the Chest, and bestows Membrans upon every one of them, like the *Peritonæum*,

The Pleura what it is, is

is termed ^f *Pleura*; which being every where stretched out under all the Ribs, is firmly joyned to the bony Parts, and to the Midrif. Because of its thickness, it is accounted double; but it cannot be demonstrated to be so, without tearing.

Its thickness.

In Diseases of the Chest, when it swells, its doubleness is easily separated. Being on either side reflexed unto the Back, and rising up unto the Breast-bone, it is ^h reduplicated, and makes the ⁱ *Mediafinum*, and leaves within it self a certain void space, full of threads, which also comprehends the Heart, and the *Pericardium*: it is nothing else, save a Production, or a doubling and folding of the *Mediafinum*.

The *Mediafinum*, what it is?

Its cavity.

This Cavity of the *Mediafinum*, is diligently to be observed, as that which helps to form the voyce as an Eccho to beat back the sound: it does likewise separate the bulk of the Chest into two Cavities, and divide the Lungs one from another.

f. 5. A. A. ■ g. 5. C. C. ■ h. 4. B. B. ■ i. 4. A. A. ■

The *Pericardium*, what it is?

The *Mediafinum* is fastened unto the *Claves*, and the *Midrif*, by reason of the *Pericardium*, which is circularly knit unto the ^a *Circulus Nervens*, and the Breast-bone; and by this Artifice, the *Mediafinum*, by help of the *Pericardium*, does hold the Heart suspended, and becomes the band of the *Midrif* it self. Now the ^b *Pericardium* is the Bag, or case of the Heart, which contains a watery Humor to moisten the Heart, from which it is round about so far distant, as is requisite that the Heart may freely move it self. If the *Pericardium*, or *Heart-case* has no proper Coat of its own, yet it does at least borrow one from the *Mediafinum*, which compasseth it about. By reason of the neer conjunction of the one unto the other, the membranous substance is no thicker, than the Membrane of the *Mediafinum* in other places.

k. ^a T. 10. f. 6. F. F. f. 7. G. G. ■ ^b T. 11. f. 1. A. f. 2. A. ■

The Medicinal Consideration.

Diseases of the Costal Muscles

Because Contraries compared together, are the better understood, having seen the Natural Constitution of these Parts, let us now take a view of their Preternatural Dispositions, or Diseases.

The Muscles, as well those that are spread upon the Ribs, as those which are placed between the said Ribs, which are subject to divers Diseases, caused either by the Flux of Humors from other parts, or by Humors collected in, and about the said Muscles.

Pains of the sides. How known from the Pleurisy.

They undergo divers Tumors, Inflammations, Impostumes, Rheumatick pains, springing from a serous, or wheyish Humor; all which do produce sharp pains in the sides, with a Fever, and sometimes with a dry Cough, which imitate the Pleurisy; wherefore the difference must diligently be marked, lest we apply the same Remedies to these pains of the sides, which are proper to a Pleurisy.

Hippocrates has observed this difference; and after him *Dareus*, the *Ghost* of *Hippocrates*, and his *Faithful Interpreter*: For every Pleurisy is a pain of the side; but every pain of the side, is not a Pleurisy, or at most, but a bastard Pleurisy.

How they differ in

But some will say, both Diseases require the same Cure in respect of blood-letting, because the passage is easie for the Humors to go from the external parts, unto the internal. I do not deny that blood is to be taken away, but not so much, and so often, as in a true Pleurisy. And therefore *Hippocrates* in a pain of the side, was wont first to make use of Fomentations, that he might try whether the pain was in the side, or in the ^c Membrane called *Pleura*; for a simple pain of the side is eased by Fomentations, but the Pleurisy is thereby enraged the more, in which there is a continual Fever, an Inflammation, a Cough, and a pricking pain of the side.

Situation.

And therefore the pains of the side differ in a Situation, and in matter; because one is seated in the Membrane ^a *Pleura*, and the ^b Intercostal Muscles; another in the greater Muscles, which are spread upon the Ribs, such as are the ^c Pectoral Muscle,

cle, the ^d *Serratus major*, and ^e *minor*, the ^f *Latissimus*, and the Muscles of the ^g Back.

They differ also in matter, because wind, or wheyish Humor, or blood does insinuate it self into the greater external Muscles, and is carried likewise, or slips ^{Masse.} down from the Brain, by the Veins termed ^h *thoracica*, or Chest-Veins: but the Humor which does possess the intercostal muscles, is brought by the small Branches of the *Vena Azygos*, or Vein without a Fellow, and does produce the true Pleurisie.

^a T. 10. f. 5. A A. ^b f. 1. G G. H H. ^c T. 10. f. 1. A. B. ^d f. 1. C D. ^e T. 10. f. 1. E. ^f T. 14. f. 1. C C D D. ^g T. 14. f. 1, 2, &c. ^h T. 12. f. 1. ll. 00. ⁱ T. 12. f. a a a &c.

It is not necessary that the Humor be contained within the Membrane *Pleura*; because it is not capable nor apt to receive the Flux when the pain begins; but the Humor being shed abroad into the space which is between the muscles, and the *Pleura*, it becomes partaker of the pain, which is more shap in the *Pleura* it self; by reason of its Nervous, or Sinewy Nature, than it is in the musculous Flesh.

The Action of the Chest, is motion, ordained for Respiration; which motion is governed by muscles and Nerves which are subject to the Palsy and Convulsion. To the Convulsion of the muscles of the Chest, does belong the stoppage of the breath, difficult breathing, and *Hippocrates* his double-stroak'd fetching in of the wind.

The membrane *Pleura* being inflamed with a continual Fever, a pricking pain in the side, and a Cough, makes a Pleurisie, which some late Physicians do think, never lasts long, without a transmission of the Humor into the Lungs, which often cleave to the *Pleura*, yea, and that the Humor passes over by a *Metastasis* into the Lungs, and causes a *peripneumonia*, or Inflammation of the Lungs.

Zecchinus was the first that broached this Doctrine in his *Counsels*, building upon the Authority of *Hippocrates*; others did in their writings, confirm it by reasons, as *Vincencius Baronius*, in his Book *de Pleuropneumonia*. And this Combination of two Diseases of the Chest in one, they term *Pleuropneumonia*, that is, the *Side-and-Lung-Sickness*; which thing I gave an hint of before them, in my *Anthropography*, or *Description of Mans Body*, in the Chapter which treats of the Lungs. That place of *Hippocrates* is worthy consideration, which many have undertaken to explain: I for my part do thus interpret the same.

Ofentimes the Lungs in one, or both the sides, do cleave unto the membrane which covers the Ribs, or if they do not cleave thereunto when the side is first inflamed; the membrane *Pleura* being soaked, and made softer by the afflux of Humors, does sweat out a clammy wheyish Humor; so that the Lungs when breath is drawn in, filling the whole Chest, do at length stick unto the said membrane *Pleura*, and there cleaving is made the faster by the heat of the Fever. Neither does the motion of the Lungs hinder that same cleaving too aforesaid, because when the pain is increased, the Patient breaths short for fear of augmenting the same, and so the Lungs are moved very little: whereupon the Lungs are fastened to the part pained, and then the Pleurisy turns into a *Peripneumonia*, or Inflammation of the Lungs, or both these Diseases are joyned together; and therefore there follows an easy Expectoration, first of a bloody Humor, by reason of a light Exulceration both of the *Pleura*, and of the membrane of the Lungs, and then of the rest of the matter, which comes partly out of the side, partly from the Excrement of the Lungs Nutriment, or from the impurity of the mass of blood, passing by its circular motion through the Lungs: whence it is, that so great a quantity of a Choleric and Flegmatick Humors flows, which is spit up with Coughing.

But if the Lungs do not cleave to the side, the blood-watry Humor being shed into the Cavity of the Chest, and scarce ever drawn back again, there is bred an *Empyema*; which if it be not voided of it self, it must be let out by opening the side; with operation sometimes lacks well.

The difference
of a Pleurific,
and Peripneu-
monia.

So that according to the Doctrine of Hippocrates, whom Hierophilus (as Calius Aurelianus relates) and Cornelius Celsus do follow, there is a true Pleurific, if there be joynd thereunto, an Inflammation of one side of the Lungs; if both sides be pained, it is a true Peripneumonia, or Universal Inflammation of the Lungs, because the whole Lungs are affected both in the right, and left side; and continually beating upon the Ribs, they are apt to infect them with the blood-watry Humor wherewith they abound. Wherefore the Pleurific, and the Inflammation of the Lungs, are Diseases of a brotherly Kindred, which help one another to destroy the Patient, or to comfort him, according as the Constitution of the Lungs is weak or strong; and as they are assisted with Remedies, especially, liberal blood-letting.

Neither can the matter causing the Pleurific, be transferred, or propagated by any other waies into the Lungs by any Metastasis, or Epigenesis. Howbeit, we see in dead bodies, the diseated Pleura ten times thicker than ordinary, which argues that the seat of the Disease was there. I deny not but that it may be communicated to the Lungs, and that the Pleurific may degenerate into a Peripneumonia, or inflammation of the Lungs, after the manner aforesaid.

On which side
the blood is to
be taken away in
a Pleurific?

Touching blood-letting, there has been for an hundred and fifty years, an eager contenti on between the Modern Physicians of Germany, Italy, and France, from what part blood is to be drawn in a true Pleurific, whether on the same side that is pained, or on the other side. At last, the Opinion of Hippocrates confirmed with the Authority of Galen, has prevailed, and got Victory over the Doctrine of the Arabian Physicians. The Physicians of Paris, and all true Artists, do follow Hippocrates; for they let blood on the Arm, of the same side which is pained. After three or four times letting blood in the Arm; for Revulsion sake, a Vein may be opened in the Foot; but the diseased side must be first disburdened.

Out of what
Vein?

In blood-letting, we chuse our Vein, because the Patient is sooner eased by opening the ^a Basilica Vein, if we consider the Rectitude of the Vessels by the Fibres; for this Vein is a continuation of the ^b Axillary Trunk, which produces the ^c chest-Vein, which glides through the external parts of the Chest, and is joynd to the Extremities of the Solitary Vein called *Azygos*. This was formerly declared by Gordonius, a Physician of Montpellier. Ludovicus Duretus has confirmed the same with Histories, in his Commentaries upon the Practice of Hokerius.

Diseases of the
mediastinum.
Inflammation,
Impostume,

The *Mediastinum* is subject to divers Diseases. Its Membranes are inflamed as in the Pleurific, because of the near Neighbor-hood of the Heart, and the communion of substance with the *Pericardium*. The Quittor therein collected, makes an Impostume, which is drawn out by perforation of the Breast-bone, or by an Instrument fitted for that purpose. Winds also are sometimes shut up within the Cavity of these parts, which do vex, and torment the Chest, and pierce it through as it were.

Pericardium
Inflamed,

The *Pericardium* may also be inflamed, with much pain, and no little danger, because it is near the Heart; which therefore is subject to frequent swoonings; and then the pulse is quicker, the Fever stronger, the thirst more vehement than in the Pleurific, or in the Inflammation of the Lungs.

Fall of Humor

Oftentimes abundance of moisture is collected therein, which causes Suffocation, and over-whelms the Heart. If thou canst not draw away the said moisture with such Medicines as purge waeyish Humors; what if you should bore an hole in the breast-bone, a Thumbs breadth distant from the Sword-like Gristle; because the *Pericardium* if there fastened, that the Heart may hang pendulous. A doubtful Cure, is better than certain Desperation: it is better to try a doubtful Remedy than none at all, where there is no hope of help, save in some extraordinary providence of God.

Deficient of
Humor.
Worms.

If there be no water at all in the *Pericardium*, the Heart pines away by little and little, as it has been observed in many Patients.

Certain it is, that Worms are bred in the *Pericardium*, which feed upon the Heart, and are destroyed by the use of Scordium. Petrus Salinus Diversus has treated

treated of this Disease. Neither is it any absurdity, that worms should be found within the Ventricles of the Heart; notwithstanding they are bred in the *Vena Cava*, and come from thence into the Heart.

Seeing the Heart hangs upon the Breast-bone, it will not be unprofitable to apply Topick Medicaments, and Fomentations, whether hot or cold, made to strengthen the Heart, unto this part, according as the Disease wherewith the heart is troubled, shall require.

^a T. 24. f. 1. C C. ^b T. 12. f. 1. B B. ^c f. 1. ll. 00. ^d f. 1. aa. ^e

Chap. 5. Of the Midrif, or Diaphragma.

THE Method of Dissection has brought us to the ^a Midrif, the principal Instrument of free Breathing, which separates the Chest from the Belly like a Partition wall, being tied to all the bastard Ribs, to two of the true Ribs, and to the Sword-like Cristle; and being on this manner obliquely stretched round about, it sends forth two ^b fleshy Productions somewhat longish, even to the utmost *Vertebra's* of the Loyns.

It is made up of Flesh, and a ^c Sinewy membrane, which is placed in the Centre thereof, the rest of its compass being fleshy, and of the Nature of ^d Muscle. On that part which is towards the belly, it is covered with a membrane of the *Peritoneum*: on the other side, towards the Chest, it is compassed with the *Pleura*.

The Sinewy Circle is placed in the midst, to strengthen that part, that it may bear the point of the Heart beating hereupon, and that it may bear up the Liver: for the Liver hangs fastened to the *Diaphragma*, which is drawn upwards within the Chest, by help of the *Mediafinum*: for the Figure of the *Diaphragma*, or midrif, towards the belly, is hollow, within the Chest, it is bunching out.

It receives ^a *Veins*, and ^b *Arteries*, termed *Phrenica*, from the *Cava* and *Aorta*. It has two notable ^c *Nerves*, which taking their Rise between the fourth and fifth *Vertebra's* of the Neck, are inserted into the Sinewy Centre of the *Diaphragma*.

Seeing the midrif is a muscle of a peculiar Nature by itself, so that there is not such another in the whole Body, it has a perpetual motion like the Heart, if not so fast an one: for it is dilated and contracted; sometimes slowly, and softly; otherwhiles swiftly, and violently. Sometimes it is moved alone with slow and soft breathing, but more often with the Lungs, when the body is stirred with exercise; but in violent Respiration, it is compelled to follow the motion of the Chest.

Hippocrates calls the Midrif, the *Fan* of the *Belly*, because by its motion of dilatation and contraction, descending and ascending, it fans both these Cavities.

Seeing therefore there are two parts of Respiration; Inspiration, and Expiration, it is worth our Enquiry in which part the midrif is moved. By motion I understand contraction.

In the Inspiration, or drawing in the wind, while it is brought unto a right line, that is to say, of hollow, is made streight, then the midrif is contracted. In the Expiration, or letting go of our breath, it is slackened, raiseth it self upwards, and of streight or even, becomes hollow. When it is moved alone, it directs our free Respiration, which is done by an insensible and invisible motion of the Chest, while the whole body does rest in peace; otherwise in violent fetching the breath, it follows the motion of the Chest, which is elevated, and depressed [as we see after running] not only by the *Intercostal* muscles, but also by the greater muscles stretched out upon the Chest, and by the muscles of the *Abdomen*. In which case the midrif is hated and forced to follow the violent motion of the Chest.

^a T. 10. f. 6. C C. ^b T. 10. f. 6. B B. ^c T. 10. f. 7. A B. ^d

The Medicinal Consideration.

- Its Diseases are* The Midrife is sometimes Diseas'd of it self, sometimes by accident as Sympathizing with the Diseases of other Parts.
- Distemper.* Of it self it is troubled with an hot or cold *Distemper*, also with *Inflammations* and *Impostumes*. And it communicates its disorders to other Parts neighbouring thereupon, and to the Brain, and upon this Account it is wont to cause a Phrenzy.
- Tumors.* *Fernelius* saw hard Tumors fixed in the Roots of the Midrif, which waited away the Patients by a slow Consumption, without any Phrenzy or other Dotage.
- Inflammation.* When the Midrife is *Inflamed*, an acute Fever does begin to shew it self: under the short Ribs towards the Midrif a palpitation or panting is felt, the Hypochondria are drawn together by reason of the Membrane of the *Peritonæum*: the Breathing is unequal, sometimes swift, sometimes slow, sometimes great and sometimes little, and at length Convulsions happen.
- Wounds.* The Midrif being wounded causes the Patient to die laughing, it we believe *Hippocrates* *Pliny* and other later Physicians.
- Wounds inflicted upon the fleshy Part of the Midrif are not so dangerous and deadly, as those in the sinewy or Nervous Part, and therefore *Ulysses* (in *Homer*) intending to give the *Cyclops* a deadly wound, chose the place where the Liver is fastened unto the Midrif, as *Galen* has observed.
- In an universal Palsey of the whole Body the Midrif is affected, which is known by difficulty of breathing.

Chap. 6. Of the Lungs or Lights:

- Their Substance.* **T**He Lungs or Lights are the Instruments of breathing and framing the Voyce: to which end they are framed of a substance light, soft, Spungy, whitish without, and reddish within, interwoven with many Vessels which are spread through the whole substance thereof; such as are the *Bronchia* or Pipes of the Wezand, and the Pipes of the *Vena^b Arteriosa* and of the *Arteria^c Venosa*, which go so in company, that the *Bronchia* or Wind-Pipes are interposed between the Veins and Arteries.
- Vessels.*
- Situation.* The ^dLungs are *Scituate* within the Chest, and do with the Heart fill up Both the Cavities thereof, while they are dilated to fetch in breath; but they leave the Chest Empty, while they are contracted to expell the footy or superfluous breath.
- Motion.* These interchangable motions of the Lungs are perpetual and never cease from the beginning of our Life until we Breath our last.
- Division.* Nature has *Distinguished* the Lungs into two Parts, placed in the several Cavities of the Chest, and she has divided each Part into sundry Lobes, Laps, or Scollops, for the facility of motion and for their preservation, for by this means they do more easily spread abroad (as it were) their wings; and one Lap or Scollop being hurt or corrupted, the other may remain whole and sound.
- So pt.* If you take a diligent view of the Lungs after they are taken out of the Chest, you shall see that each Part of each Cavity does in its shape represent the form of an Oxes Hoofe, for it is cloven and convex or bunching out in the external Part, and hollow on that part on which it touches the Back.
- Membrane.* It is girt about with a very thin ^e*Membrane*, which is manifestly porous and full of little holes, that being pressed and overburthened in suffocations, it may disburthen it self into the Cavity of the Chest, and also suck in again such Excrementitious moisture, as shall there at any time abound.

This Bowel alone is nourished after another fashion than the rest of the Body, or it borrows its blood from the Heart, from whence it has Vessels and not from the *Vena Cava*. And therefore those Physicians are shamefully over-^{Peculiar manner of nourishment.} seen who in Diseases of the Lungs, are wont to say that they are oppressed by an afflux of blood, shed thereinto by an innumerable company of Veins.

They cannot receive Humors from the Head unless with coughing, so that where there is enough, the Lungs are affected only by that blood which comes from the Heart.

The Medicinal Consideration.

The Lungs are extremely necessary for the maintenance of Life, *For we live so long, as we Breathe, and no longer*: Not is it enough merely to breathe we must breathe easily, or it will go ill with our Heart and our whole body. For in Diseases, difficult breathing is of great moment, and was more regarded by *Hippocrates* than the pulse: And *Galen* composed three admirable Books of *Difficult Breathing*, according to the Doctrine of *Hippocrates*, howbeit they are obscure and not to be understood save by skilful Physicians and Anatomists. ^{Excellency of the Lungs.}

I will give you a little taste of them, after that I have laid open the Diseases of the Lungs.

Because the substance of the Lungs is soft and spongy above that of the other Bowels, therefore it is more subject to Fluxions than the rest which flow either from the Brain, or from the Bowels, by way of the Heart. ^{Why the Lungs are so subject to Fluxions.}

They lie in the middle space between the Head and the Midriff, not only between the Hammer and the Anvil, as the Proverb is, but between two Hammers, where with they are beat upon and hurt on both sides: while the Head distils upon the Lungs, and the Liver affords impure or over plentyful Blood unto the Heart, which the Heart spues and casts back into the Lungs, whereby they are infected and overwhelmed.

Which infection of the Lungs springs not from the Heart, but from the distempered and ill disposed Bowels, which suggest unto the Heart very impure blood, whose vitiousness the Heart is not able to correct, save after many Circulations.

In the mean while the Lungs are grievously offended by the foresaid blood passing through the substance thereof, for they are subservient unto the Heart as it were in the Nature of an Emanatory Emisary or Common-shore, whiles the filth of the Heart flowes unto the Lungs with the Blood, whereupon the Lungs are subject to sundry Diseases. ^{The chief Diseases of the Lungs.}

For they are troubled with an hot or cold Distemper, with a Cholerick and Flegmatick Tumor, and a frequent Inflammation called *Peripneumonia*, or at least with an inflammatory disposition; also with Impositions and Ulcers, which bring the Consumption: for from spitting of Blood comes spitting of quitter, and from thence the Consumption. ^{Distemper. Inflammation. Consumption.}

Also they are subject to a certain kind of Pusht or rising which in the end turns into a secret mischievous Imposition termed *Vomica*, of which few escape. ^{Pusht. Vomica.}

If the Quitter be derived from the Lungs into the Heart, unless it pass readily into the *Aorta*, it suddenly chokes or stifles the Patient. If it be carried into the right ventricle, it causes the greater danger, because it cannot be so easily Purged out.

Furthermore the Lungs are obstructed in the *Asthma* either perpetual or coming by fits, which causes difficulty of breathing, which as it is more or less, is distinguished with different names. The lesser is termed *Dyspnea*; the greater when the Patient cannot breath save standing or sitting upright, is termed *Orthopnea*. ^{Asthma. Its Kinds.}

Cough.

Ofentimes the Patient is vexed also with a cough, which is sometimes moderate and sometimes vehement, with great wheezing and ready to choak the Patient, which Springs from a cruel fierce *Catarrh* or sudden and plentyfull defluxion. Whereupon by reason of the extreame troublement of the Cough which shakes the Lungs, there arises that disposition termed *Spasmodicorum*, or a dilatation of the Vessels, being a dangerous and formidable sort of *Aneurisma*.

whether Blood-letting is good in these Cases?

In the *Peripneumonia* or Inflammation of the Lungs, there is no small dispute about Blood-letting, for it is written that Blood must be drawn from the common Veins. Now there is none of those Veins which are usually opened, that communicates with the Veins of the Lungs; neither are there any branches distributed from the *Vena Cava* into the Lungs: which has by *Galen* in many places been disputed against *Erasistratus*.

The motion likewise of Nature shewes the same: for whereas in Diseases of the Bowels and in burning Feavers the Crisis is wont to happen by bleeding at the Nose; in a *Peripneumonia* there is no such Crisis, because the veins of the Nose from whence blood is wont to Issue, have no Communion with the Lungs.

Affirmed.

If it be true that Blood naturally does pass from the right ventricle of the Heart into the Lungs, that it may be brought into the left ventricle, and from thence into the *Aorta*: and if the Circulation of the Blood be acknowledged, who sees not that in Diseases of the Lungs, the blood flows thither in greater quantity than ordinary, and oppresses the Lungs, unless it be first liberally taken away, and afterwards at several times, a little at a time be let out, to ease the said Lungs: which was the advice of *Hippocrates*, who when the Lungs were swelled, did take blood from all Parts of the Body, from the Head, Noie, Tongue, Armes, Feet; that the quantity thereof might be diminished, and the Course thereof drawn from the Lungs.

He himself in Diseases of the Lungs, bids us draw blood, till the Body were Blood-lesse, and in one that had a Consumption, when he saw that the corruption of the Blood infected and corrupted the Lungs, he took away blood in so great a quantity, that the Patients body remained quite empty of the same, in a manner.

Supposing that the blood circulates, the Lungs are easily emptied by Phlebotomy. If the Circulation be denied, I cannot see how blood may be from thence drawn back; for if it should flow back by the *Vena Arteriosa* into the right Ventricle, the *Sigma* shaped Valves do hinder it, and the three forked little Valves, do hinder the recourse thereof, from the right Ventricle of the Heart into the *Vena Cava*. And therefore when the Veins of the Armes and Feet are opened, blood is drawn from the Lungs by reason of the Circulation thereof; and consequently the Opinion of *Fernelius* comes to nothing, namely that in Diseases of the Lungs, Blood should be taken rather from the right Arme than the left; Because the blood cannot returne into the *Vena Cava*, save by breaking two Doors and Bolts, placed in the Heart.

* T. 11. f. 2. EFG. ¶ T. 11. f. 3. D D. ¶ T. 11. f. 4. BBB. ¶ T. 11. f. 3. CCC.

Some Causes of Consumption of the Lungs.

Ulcers of the Lungs do often happen by reason of a fierce cough, caused by very sharp Serosities, or by spitting of Blood: which if it come from an opening of the moathes of the Veins by reason of Abundance of blood, it is not so much to be feared, as when it proceeds from eating asunder the Coats of the Veins, by the acrimony of Humors.

NAT.

NATURE

Nature in this case, out of pity, that our life might be preserved, has distinguished the Lungs into divers pipes and sundry Lobes, Laps or Scallops that the infection might not spread over the whole body of the Lungs, which is usual in all continued or evenly united bodies. And therefore we see many that have Ulcers in their Lungs do live long, if they have but an indifferent Care of themselves.

Why the Lungs are distinguished into Lobes or Laps.

If the Circulation of the blood be allowed, so that it passes often through the Lungs, and not through the *Septum MEDIUM* or *Partition-Wall* of the Heart, we must maintain a twofold Circulation of the blood: the one is performed by the Heart and Lungs, while the blood spirting from the right ventricle of the Heart is carried through the Lungs that it may come unto the left ventricle of the Heart (for it is squirted out of the Heart and returns thither again) the other is a longer Circulation, by which the blood flowing from the left ventricle of the Heart, compasses the whole body by the Arteries and veins, that it may return into the right ventricle of the Heart. He that approves of one of these Circulations, cannot deny the other.

A twofold Circulation of the Blood.

The Lungs as it were do hang upon and are firmly fastened to the clavies and the Breast-bone, for they do not depend or hang by the *Aspera Arteria*, for so in a violent Cough and when the Lungs are overburdened, the Weeland or Wind-pipe and Parts fastened thereunto would be torn in pieces. Howbeit the Lungs and Heart being inflamed (according to *Hippocrates*) if the Lungs fall to one side, the Patient faints away, lies Cold and senseless and dies within the third or fourth day. If the Heart be not inflamed, the Patient lives longer, and some escape.

Seeing the Substance of the Lungs ought to be light and soft to Facilitate respiration; and in old People it becomes dry and hard, either through the dryness of their temper, or by being filled with Flegm: this is the reason of that shortness of Breath we see in Old Men, which ushers them to their Grave.

Why Old People are short Breathed.

Chap. 7. Of Respiration, or fetching of Breath.

THE proper action of the Lungs is breathing: which we must consider how it ought to be in bodies that are in health, that we may discern faults thereof, when it is depraved. In our whole practice, especially if you regard acute Diseases, there is no Disease or Symptome so usual as difficulty in Breathing. It is well for the Patient, if in all Diseases, especially acute ones, he breath easily, because life is inseperable from Respiration, according to *Galen* in his 6. Book of the Parts Diseased. And if withall the Patient Sleeps kindly and sweetly, and feels no pain in the noble Parts of his Body, it is to be hoped the Disease will end well, because *Hippocrates* never knew any one die, in whom these conditions were found.

Necessity of Respiration.

Now Respiration or breathing is twofold, free, or forced, free is that whereby the Air is gently drawn in and Issued out, without any remarkable motion of the Chest. And this depends only upon the Midrif. The Ribs and whole Chest never moving: unless happily the lower bastard Ribs are gently stirred; and this kind of breathing is truly natural.

Its twofold.

Free,

and

forced.

The second sort of breathing, which is forced and violent: is partly naturall, partly against Nature. Natural, when it depends upon our own power, so that we can make it quicker, or slower, as when we puff out our wind with a long blast, and when we hold our breath. It is against Nature, when it depends not upon our will, but upon the violence of the Disease. In this kind of Respiration the whole Chest is moved by all the Muscles, and the midrif, to avoid the oppression and suffocation of the Lungs and Heart, which desire Air to cool them, and that their smoaky Sooty Vapours may be expelled.

V

There

There are two parts of Naturall Respiration; *Inspiration*, and *Expiration*. *Inspiration* is caused by drawing in the Air, and the dilatation of the Chest by the Ascent thereof: *Expiration*, is a breathing out of fuliginous, or footy Vapors, the Chest being drawn together by the descent thereof. Between these two motions, is interposed a two-fold Pause, or Rest, viz. The space between the drawing in, and blowing out of the breath; and the like space between the blowing out of the breath, and the drawing it in again, as in the Pulse there is a two-fold Rest, termed *Perisyfbole*.

In Respiration, or breathing, *Galen* writes that three Organs are to be considered: The Principal Mover, viz. the Heart; The Secondary Movers, namely, the Muscles; and the Things moved, viz. the Chest and Lungs. The Organs by which the motion is performed, are the Animal Spirits; and the Nerves.

Now that unnatural, and disordered breathing, may be discerned, we must principally learn to know, wherein the Natural manner of fetching breath, does consist, viz. In the moderation, and equability of Inspiration, and exaspiration, and of those things whereby Respiration is performed.

Now these are four; Motion, Rest, that which is moved, and that which by the motion, is drawn in, and carried forth. That Respiration will therefore be moderate, wherein we shall observe a Mediocrity of motion and Rest, and of the distention of the Chest, and of the matter it self, which is drawn in and breathed out, and wherein Persons in health appear no waies changed from what they were wont to be.

And this Natural Respiration ought to be the Rule of the contrary, which is not natural, viz. of the hurt Respiration, and of that which is immoderate. Now Respiration is hurt as many wayes as there are parts which make up Natural Respiration, viz. Motion, Rest, Swiftnefs, or Slowness. So that the hurts of Respiration, are these following, namely, Defections from Natural Motion, Rarity, and Frequency of the Rest; Greatness and smallness of Inspiration and Expiration; Pleny, and penury of the matter drawn in, or breathed out, with cold, or heat.

Wherefore all difficulty of breathing, consists in Magnitude, or Paucity; Frequency, or Rarity; Swiftnefs, or Slowness; and consequently, Respiration is said to be faulty, when it is too great, or too little; too slow, or too swift; too frequent, or too rare; too hot, or too cold.

Also these Defections, as well in excess, as defect, are to be considered, either in both parts of Respiration, or in one alone; also some are little without, and great within; others great without, and little within: and some are great, swift, and frequent; others contrarily, are little, seldome, and slow; and some are doubled, both in drawing, and rendring back the breath. These are the Compound Differences of Respiration hurt.

If Respiration fail, the Question is, Whether Perspiration can supply the defect thereof? *Galen* saies it may, and he describes Perspiration, to be an evacuation of Spirit, or Air, by the Arteries which are dispersed into the Habit of the Body, by receiving in of Air, and expelling fuliginous Vapors. For *Hippocrates* has written that the whole body is perspirable, within and without. And the Author of Transpiration, or Perspiration, is counted to be the Heart, the Instruments are the Arteries; the Pores of the Skin, are the Passages by which the Transpiration is made.

But I very much doubt, whether Perspiration can supply the Office of Respiration for a time, the Heart not being moved, because I cannot perswade my self, that the Air can pass so far as the Heart, by the small Arteries, unless they did gape very wide, seeing it would meet with the Arterial blood, to stop its course. The Arteries may indeed expell the footy vapors of their blood, but it is hard for them to draw the Air in again.

And if Perspiration be hindred by suppression of the smoaky vapors, then putrid Feavers are wont to arise; as *Galen* has observed in Book 11. of his Method. In which

Parts of Natural respiration.

Inspiration
Expiration

Its three Organs.

wherein Natural Respiration consists.

Differences of unnatural Respiration.

whether Perspiration may supply the use of Respiration?

which case, blood-letting is good for Ventilation, and must be repeated, if need be.

Unnatural Respiration, is sometimes necessary in those that have their Health, to expell smoaky vapors by forcible blowing out of the breath; or to expell the Excrements of the belly, or to force out a child by holding the breath. Exufflation, or forcible puffing out of the breath, answers to Expiration; and holding of the breath is a long Inspiration, as much as the party is able to endure, for some necessary use; and it is performed (which is strange) by one very small muscle which shuts the *Arytenoids*, and the *Glossis*.

Unnatural Respiration sometimes needfull in healthy persons.

Chap. 8. Of the Heart.

THE Heart is the *Principal, and most Noble Bowel* of the whole Body, the Fountain of Life-giving Nectar; by the Influx whereof, the vitality, or lively force of all the parts, is recreated, and cherish'd; *It is the first that lives, and the last that dies*: by the benefit whereof, all the parts of the Body do live, and subsist.

Nobility of the Heart.

And therefore it is, that Nature has framed this principall Part with admirable Workmanship, both without and within, of a fleshy substance, strong, and thick, interwoven with all sorts of Fibres, and because it is the Seat of Native Heat, lest it should become dry, and parched up, she has moisten'd it with fat placed round about, and watered the same by circumfusion of a wheyish Liquor.

Its Substance.

^a T. II. f. 24 B.

It is situate in the middle of the Chest, hanging by the *Mediaſtinum*, and *Pericardium*. For those two parts do joyn in this Office, as hath been said in our Chapter of the *Mediaſtinum*.

Its Situation,

The Heart is alwaies of the same greatnes; in some strong men it is more small and solid, than ordinary: in feeble Persons it is greater, and of a looser substance, as in some men, and frequently in women.

Biggest.

It is shapen like a *Pine-Apple*: having a broad bottom, and growing pointed towards the top. The broad end is called the *Basis* or bottom, which receives four Vessels; the *Vena cava*, running through the Breast, and opened neer the Heart, and fastened thereunto; the *Vena Arteriosa*; the *Aorta*; and the *Arteria Venosa*.

Shape.

Vessels.

In the *Basis* we find *little Cases* or *Covers* placed by the Vessels, which carry blood into the Heart: They are called *Auricula cordis*, the *Ears of the Heart*, and are hollow. In grown persons, the right Ear is larger than the left: but in the child in the womb, and all infants, the left Ear is larger than the right.

Ears.

The other end of the Heart is termed the *conus*, or pointed end. There appear Veins and Arteries creeping upon the surface of the Heart, which seem ordained to repair the Fat as it spends.

Before we proceed to the inner Structure of the Heart, we are to consider how it is moved: For its Action is Motion, or Pulsation; because look what blood it receives in, it drives the same out by pulsation.

Action, viz. the pulse.

There are therefore two parts of the Hearts motion; *Systole* and *Diastole*; or Contraction, and Dilatation; when it takes in blood, it is dilated or widened; when it expells the same, it is contracted, or drawn together: between both which motions, there interceeds a pause, or resting time, which is termed *Peri-systole*. How these motions are caused, is a doubtfull Question.

Systole.

Diastole.

^a T. II. f. 4. A. A. ^b T. II. f. 1. A. ^c T. II. f. 1. C. ^d f. 2. E. E. G. ^e f. 1. M. f. 2. C. ^f f. 2. H. H. ^g f. 24. C. C. ^h f. 2. by B.

Rejecting the various Opinions of others, I will tell you how I conceive this motion is performed. It is probable, that the heart being widened, cannot receive the blood,

Cause of the pulse, according to our Author

blood, unless its dilatation be made by drawing back the *Basis* thereof to the *Cont*, that the Vessels may shed their blood, and the heart draw the same to it self. In the *Systole* the heart is contracted, and the blood received, is thrust out; and then the Heart becomes narrower, and longer than it was before. And because it is shut up in the *Pericardium*, or Heart-case, which is fastened circular-wise to the Sinewy Centre of the *Midriff*, with its *Cont*, or pointed end, it smites the Nery Centre of the *Midriff*, with its *Basis*, or broad end, and the *Aorta* sticking out, it smites the Breast at the same instant, when it is extended and prolonged.

How necessary
the circulation
of the blood is
to continue the
motion of the
Heart.

This perpetual motion of the Heart, though it depend in respect of its production, upon the inbred faculty thereof, yet can it not alwaies continue, save by the coming in of the blood, out of which, the Heart frames the vital Spirit: and in case at every pulse the Heart receive one drop of blood, or two, which it casts into the *Aorta*, and that in an hours space, the Heart pulses two thousand times, it must needs be, that a great quantity of blood, or all the blood in the Vessels, should pass through the Heart within the space of twelve or fifteen hours.

Now this quantity may come to fifteen, or twenty pounds of blood, which is as much as is contained in the Vessels, and therefore it must needs be that in the space of twenty four hours, the whole mass of blood is twice or thrice passed through the Heart, according as the motion of the Heart is quicker, or slower.

Whether the
blood do pass
from the right
Ventricle of the
Heart unto the
Lungs.

And that this *Circular Motion* of the blood, might be performed with the greater commodity, and facility, *William Harvey*, an *English-man*, the *Kings Physician*, the Author and Inventor of this motion of the blood; and *Johannes Wallani*, a Professor of *Leyden*, and most eager *Defender*, and Protector thereof, will have the blood to be carried through the Lungs, from the right, unto the left Ventricle of the Heart, not allowing that it should pass through the *Septum*, or Partition-wall between the Ventricles of the Heart; and that the whole mass of Blood, in an hour, or two hours space, is circulated through the Heart, and the whole Body: which I do not allow of, and I have else-where laid down my reasons of the impossibility, and inconveniency of such a motion.

The Heart is
the Originall of
Vena Cava.

When I had observed that the Trunk of the *Vena Cava* was separated from the Liver, running continually from the *Jugulum*, to the *Os Sacrum*, without any interruption, and that it passed not through the Liver, as we may see with our Eyes, and perceive also by thrusting a small stick thereinto; I came to be of Opinion, that the *Vena Cava* did spring from the Heart, as the *Vena Porta* takes its rise from the Liver; and that two sorts of blood were contained in those veins, though both of those sorts are labored, and wrought in the Liver: the one of those sorts of blood being sent into the *Porta*, the other by a branch rooted in the Liver, twice as small as the Trunk of *Vena Cava*, carried unto the Heart.

The Liver of
Vena Porta.
They have different
blood in
them.

What kind of
blood is circu-
lated?

The blood which is contained in the *Vena Porta*, is not circulated, although it have a flux, and reflux within its own Channels, and communicate with the *Caeliac Arteries*, which are joynd one to another by mutual *Anastomoses*.

Within those Vessels, the blood may pass to and fro reciprocally; but it does not run out according to the longitude of the body; neither is it in such a sense circulated.

In what Vessels?

And therefore the Circulation which is made in the Heart, does borrow its matter from the Liver by the *Vena Cava*. The Circulatory Vessels, are the *Aorta*, and *Cava*; neither do their branches receive that Circulation, because the blood being shed into all the parts of the second and third Region, does remain there to nourish the said parts; neither does it flow back unto the greater Vessels, unless it be revealed by force, when there is great want of blood in the larger Vessels, or when it is stimulated into some violent motion, and so flows unto the greater Circulatory Vessels.

After what
manner?

And so the blood which is brought from the Liver unto the right Ventricle of the Heart, does pass through the Partition Wall of the two Ventricles, into the left Ventricle.

I confess that in a violent Circulation the blood is carried through the Lungs unto the left ventricle of the Heart, where it is forcibly ejected in the *Aorta*, that it may afterwards be carried into the greater Veins of the Limbs, which communicate by mutual Anastomoses with the Arteries; and then from the Veins it flows up into the right Ventricle of the Heart, and so there is made a perfect Circulation, by the continuall flux and reflux of the blood.

How the circulation is performed?

So that the blood in the Veins, does naturally, and perpetually ascend, or return unto the Heart, the blood of the Arteries naturally, and continually descends, or departs from the Heart.

Howbeit, if the smaller Veins of the Arms and Legs, shall be emptied of blood, the blood of the veins may descend to succeed in the place of that which is taken away, as I have clearly demonstrated against *Harvey*, and *Wallens*.

No man can deny the mutual Anastomoses of the veins and Arteries, seeing that *Galen* has said it, and demonstrated the same by Experiments, and our daily Experience confirms the same.

Hippocrates himself, in his third Book of the Joynts, takes notice of this communion of the veins and Arteries, in a Discourse by it self.

You see how necessary it is for the blood to circulate, that the motion of the Heart may not cease; and how this Circulation may be performed without confusion, and perturbation of the Humors, and without destroying the Antient Art of Healing.

How necessary the circulation of the blood is.

And therefore the Circular motion of the blood is necessary, to continue the motion of the Heart; as in Mills, the Water must perpetually fall upon the Wheel to make it turn about; also to warm again, and restore the strength of the Blood, which is decayed by the loss of Spirits dispersed up and down the body; whereas in the Heart, it is refurnished with new Spirits; and that the Heart being the Fountain of Native Heat, may be moistened with a perpetuall Dew, left by little and little, it should parch, and wither away, for want of the dewy moisture, or Life-giving Nectar.

The utility thereof.

By the Circulation of the blood in the Heart, the Causes of Life and Death, are more easily declared, than by the *Humidum Primigenium*, or Original Moisture bred in the Heart when the Child is formed; which is so little that it is soon consumed, and the perpetual motion of the Heart continuing day and night without ceasing, would at length wear away the Substance of the Heart, unless by a perpetuall flowing in of the Circular blood, it were moistened, and repaired.

Howbeit, we must hold that the heart and Arteries do move by Course, one after another, not being moved at the same instant with the same kind of motion; but taking their turns, and performing their work interchangeably; for when the heart sends out the blood, the Arteries receive it, and transmit it into the veins; not that which is expelled the same instant, but that which is neerest the veins.

whether the Heart and Arteries are moved at the same time?

This being granted, these parts must of necessity be moved one after another, and the swelling motion of the Artery when it rises under our Finger, is dilatation, or widening, and not contraction; Although it seem very like the pulse which the Heart makes, when it contracts it self.

Having explained the Circulation of the Blood, we must now open the Heart, which you shall see divided into two ventricles by the *Septum Medianum*, or Middle Partition: The one is termed the ^b Right ventricle, being the wider and softer: The other the ^c Left, being harder, narrower, and compassed with a thicker wall, reaching as far as the *Cone*, or Point of the Heart, which the Right does not. The Right Ventricle receives the *Vena^d Cava*, and the *Vena^e Arteriosa*. The *Cava* pours blood into the Heart; the *Vena Arteriosa* carries back all, or a part thereof into the Lungs.

The right Ventricle of the Heart.

Its Vessels.

To the Orifices of the *Cava*, are adjoynd certain three pointed ^f Valves, or Shutters, which hinder the going back of the blood. The Orifice of the *Vena Arteriosa*, is compassed with three *Valves*, or *Shutters*, shaped like an old-fashioned ^g

Their Valves.

Greek

Greek Sigmæ, which hinder the reflux of the blood.

T. 11. f. 1. C. D. D. f. 1. C. f. 2. E. f. 2. EEG. f. 4. A. T. 12. f. 3. all f. T. 11. f. 3. C. C. C. f. 4. B. B. B. f. 4.

The left Ven-
tricle of the
Heart.

Its Vessels.

Their Valves,

The *Left Ventricle* receives two Arterial Vessels, the *Aorta*, and the *Arteria Venosa*. Which latter, according to the Doctrine of some Anatomists, carries blood from the Lungs into the left Ventricle of the Heart, or carries Air prepared in the Lungs, into the said Ventricle, and likewise carries back fuliginous Vapors; howbeit, many do not allow the said use.

The *Arteria Venosa* hath in its Orifice, only two *three-pointed Valves*, or *Shutters*. The *Aorta* carries back Arterial blood out of the left Ventricle of the heart, and its Orifice is stopped by three *Sigma-shaped Valves*, or *Shutters*, which hinder the blood from returning back again.

It is to be observed that these three-pointed Valves, or Shutters, are membranous near their Vessels; but they depend upon fleshy Pillars, which within the Heart are like unto Muscles, being fastened to the sides of the partition wall, or *Septum* of the heart, which remains unmoveable, saving towards the Basis, where it is softer, and gives away a little, when the Basis is drawn back, in the *Diastole*, or Dilatation of the heart.

The Septum
Medium of the
Heart.

Whether the
blood pass
through it, or
no?

The *Septum medium*, or *Partition-Wall* of the heart is porous, full of little holes, which are sometimes manifestly discerned towards the *Cone*, or Point of the heart. It is more probable, according to the doctrine of Galen, that the Blood does naturally pass through the said *Septum*, or partition wall, than through the Lungs. howbeit, I deny not, but that in the violent Agitation of the heart and Lungs, the blood is carried through the midst of the said Lungs.

T. 11. f. 1. M. f. 2. C. f. 5. A. f. 2. H. H. f. 6. A. T. 1. e. f. 6. all f. T. 11. f. 6. C. C. f. 5. B. B. B. f. 5. O. D. D.

The Medicinal Consideration.

usual Diseases
of the Heart,
or,

Swimming

Fainting.

Having finished these Observations, I proceed unto the Diseases of the Heart. The Heart (as *Pliny* saies) cannot endure long Diseases, nor suffer lingering torments. And *Galen* tells us, that Physicians have not been able to find out, or invent Medicines able to cure an evil, and malignant distemper which has taken hold of the substance of the Heart. Wherefore this part is diligently to be preserved, which suffers not by its own fault, but by the Impurities of other parts wherewith it is infected and corrupted.

Wherefore, if the Heart be supplied with pure, and good blood, and be not infected by contagion of the neighbouring parts, the Lungs, and the Liver, it flourishes most chearfully, and causes a very long life. But by our Intemperance we suffer it not to continue in Health for the good of the whole body. And therefore it is exercised with divers Diseases, by the loss of strength, that is to say, of Spirits, or by their Dissipation; such as are *Syncope*, and *Leipothymia*, or swooning and fainting away, which differ only in degrees: *Syncope* being greater than *Leipothymia*.

Oftentimes the Heart does counterfeit, and make shew of a kind of Apoplexy, but without snorting; neither does it leave a Palsey after it, or any feebleness of Body, or mind. If this Disease return often with violence, at length it over-whelms and stifles the Heart, not only because the blood is stopped from going forth, by reason of the fullness of the Vessels, but by the Hearts being oppressed by some gross substance of the blood, forcibly crowded into the Ventricles of the Heart, stopping the pulsative motion of the Heart and Arteries, and causing sometime that the Patient cannot speak, and bringing him finally to his Grave.

This Disease is as common among the Germans, as is the Apoplexy, by reason of their full, and Champion-like habit of Body, contracted by their daily Feastings, and liberal drinking, especially at dinner, which lasts till within

within Night, they in the mean time taking no care to abate their Plethorick habit by liberall blood-letting. Nor is it any wonder, if from so great plenty of blood, they fall into an Apoplexy, or the Heart-swoonings aforesaid. Hence depends the Explication of the 42. Aphorism of the second Book.

The motion of the Heart is depraved in the Palpitation, or Panting thereof, and it is interrupted in *Syncope*, and *Leipothymia*. Palpitation.

The Ventricles, and Partition, are oftentimes obstructed, being filled with little bits of Flesh or Fat, wherewith the Heart is choaked, the Circular motion of the blood being stopped. Sometimes they stick in the right Ear of the Heart; whence follows Palpitation, or inequality, or Interception of the Pulse. The Circulation intercepted by obstruction of the Ventricles.

Worms are also bred in the Heart, of which *Salinus* treats. There is a memorable Story of a certain English man, whose Heart was eaten into by a Worm. You may read the Story in *Aurelius Severinus*. Or of

The Circulation of the blood is stopped, not only in the Heart, but also in the Veins, when they are stopped with very thick blood, or with blood congealed like the pith of an Elder stick, as I have often seen it after burning Feavers, and as it has been observed by *Fernsius*. The Veins.

The most frequent Diseases of the Heart are Feavers, wherewith it is inflamed, and casted as it were; so that the Originall moisture thereof, becomes exhaust, and dried up: for as *Ludovicius Duretus* saies in his Commentary upon *Hippocrates* his Coick Discourses: *We lose more of our strength by a feaver of seven daies continuance, than by the depradation of our Naturall Heat, in seventy years time: a young man dies in seven daies, consumed by a Feaver, who might have lived seventy years under the sole Regiment of his Naturall Heat.* A Feaver.

The History of Feavers belongs to this place, which I shall dispatch in few words. The Hot Distemper of the Heart, is termed a Feaver. The Differences of Feavers are taken from their conjunct Cause, which is three-fold; The *Spirits*, the *Humors in the Vessels*, and the *Humors fixed in the solid parts of the body*. Differences of Feavers. In respect of the Cause, a Feaver is Spiritual,

From the *Spirits*, a Feaver is termed *Spirituosa*, or *Spiritual*; from the *Humors in the Vessels*, it is termed *Humoralis*; and from the *Humors fixed in the solid parts*, it is termed *Hectica*.

Though there be three sorts of spirits, Natural, Vital, Animal; yet is it the Vital Spirit alone, which being inflamed, causes the Spiritual feaver. There are four Humors contained in the Vessels, whence comes four sorts of Humoral feavers; the Sanguine, the Choleric, the Flegmatick, and the Melancholick. But the Hectick Feaver is distinguished by three degrees: For the simple Hectick arises from the fixed Humor, being only inflamed; the middle Hectick is when the said Humor begins to waite; and the *Hectica Marasmodis*, when it is quite exhaust, and consumed. Humoral. Hectick.

The *Modi* of Feavers, or their manner of afflicting, is two-fold: for either the Feaver is continuall, or it intermits; it is putrid; or not putrid; malignant, or well-affected. A continuall Feaver never ceases burning, till it go wholly away. An intermitting Feaver, leaves the Patient some space of time free from burning. In respect of the manner, Continual, Intermittent.

The Cause of the Continualness of a Feaver, is the plenty of Morbifick matter and its nearness to the heart, and the distance and paucity of the said matter is the Cause of its Intermision. A Putrid Feaver is caused by Putrefaction of the humors: An Imputrid Feaver is caused only by the fervency of the Spirits and Humors contained in the Vessels, or fixed in the solid parts. A Malignant Feaver is caused by extream Putrefaction, or by divers Symptomes grievously afflicting the noble Parts: a Well-affected Feaver, has none of all these. A great Feaver is the same with a Malignant, and a little Feaver differs not from a Well-affected. Hence are all the differences of Feavers taken; a spiritual Feaver is continuall indeed, yet lasts but a day, and is therefore termed *Ephmera*: a Sanguine Feaver is also continuall and threefold, Encreasing, standing at a stay, and decreasing; Putrid or Imputrid. It is by some termed *continens* to distinguish it from the rest of the Humoral Feavers. Choleric, Melancholick and Flegmatick Feavers, are continuall. Putrid, Imputrid, Malignant, Non-Malignant.

tinual, when the Humors from whence they arise do putrefie in the great Veins : when they putrefie in the little Veins, or out of the Veins, they make Intermitting Feavers. An Heftick Feaver is also continual, but slow and lingering.

The fit of a
Feaver.
Its Exacerba-
tion.
Circuit.

The Return of Intermitting Feavers is termed their fit ; the more than ordinary violence of continual Feavers is called their *Exacerbation*. The beginning of a fit is called *Invasio*, the time of Remission and Exacerbation, of intermission and accession, is termed *Periodus* or *Circuitus*, the Period or Circuit.

Tertian Fea-
ver.

Now the Accessions or Exacerbations of Feavers are various according to the various motion of the Humor. They come every third day, by reason of the proper motion of the Cholera, whence all bilious intermitting Feavers are called *Tertians* or third day Agues ; as the *Quartans* come every fourth day, because the Melancholick Humor is moved upon that day ; as Flegm is moved every day, whence quotidian Agues are Flegmatick.

Quartans
Quotidians

Quintan, *Septan*, *Nonan*, or fifth, seventh and ninth day Agues, as they are exceeding rare, so are they not comprehended under any Rules of Art.

The proper Symptomes of the beginnings of Ague-fits, do shew the sort of Ague what it is : so a shaking shews a Tertian Ague, A grinding cold fit that makes a man think it would break his bones, argues a Quartan, and for the fit to begin with a meer simple coldness, is the token of a Quotidian.

Confused

A double Tertian comes every day, as the Quotidian does, but with extrem shakeing ; whereas the Quotidian comes only with a coldness.

Implicated

Confused and implicated Feavers, are made of those Feavers, which we have now explained. Confused or mixed Feavers, are made by mixture of Humors, as a bastard Tertian is made of a mixture of Cholera and Flegm. But Implicated Feavers are stirred up by vicissitude of Humors put into putrefaction or Commotion, whereupon there is observed in them, distinct fits one following another, as in a double Tertian, and in a double and triple Quartan, and in a Semiterian, which is nothing else but a complication of a continual Quotidian and an Intermitting Tertian ; and in the Feaver called *Triteophya*, which lasts thirty hours and longer.

Erratick

Two Agues are observed to follow one another, so that the first being not quite finished, another which is worse succeeds and follows the same. But if these fits are inordinate, keeping no certain Course, and returning upon several daies, they make such Agues as are termed *Erratica*, wandering giddy Agues.

In respect of
Symptomes.

There are other differences of Feavers taken from the Symptomes, yet so as they may be reduced to these sorts I have spoken of : as the Feaver *Epiala*, *Leipyria*, *Typhodis*, *Elodis*, *Pestilens*, *Causus*, for they are all Humoral, and distinguished by some remarkable Symptomes.

Epiala
Leipyria

In the Feaver *Epiala* there is a sence of heat and cold by reason of the unequal motion of the Morbifick matter. In *Leipyria*, the outward parts are cold, and the inner Parts burn with Heat, because the Feaverish Heat is drawn inwards. *Typhodis* and *Elodis* are, in which the Patient sweats much, without any ease thereby. A *Pestilential Feaver* is no other than a putrid, but it Springs from an extrem and remarkable putrefaction, and so deadly, that more die than recover. *Causus* is a name signifying extrem Heat and burning, such as is in a continuall Feaver arising from Cholera, so that a Cholericke continual Feaver by way of Eminency is so termed.

Typhodis.

Burning Fea-
vers.

Symptomatical
Feavers.

Cremnodes Febris the Feaver so called, is said to proceed from an Inflammation of the Lungs ; but such Feavers as are caused by Inflammation of the internal Parts, are Symptomatical, neither are they properly termed Feavers. For here we speak of a Feaver only as it is an hot distemper of the Heart primarily affected.

Chap. 9. Of the Vessels viz. Veins, Arteries and Nerves contained within the Chest.

I Have a few things to speak of one Part of the Trunk of *Vena Cava*, for the whole Trunk has been sufficiently explained in our Chapter of the lower Belly. In the Chest are Veins.
 You shall observe that the Trunk piercing through the Midriff, does receive that same ^a Hepatick branch which arises from the top of the Liver, and carries Blood Hepatica. into the *Cava*, and from that same Oblique insertion, unto the opening of the Trunk, in the right Ventricle of the heart, there is the distance of two Fingers breadth.

^a T. 12. f. 1. rr. &c.

From whence we may gather, that Blood is carried directly from the Liver to the Heart, although it is mixed with other blood ascending by Circulation. That same opening of the *Vena Cava*, and its cleaving to the right Ventricle of the heart, is contained and to be seen within the *Pericardium*: which when the Trunk has passed through, it ascends unto the Claves.

And therefore you may know, that the blood ascending unto the heart by Circulation, does also come as far as the Throat, and is derived into the upper Limbs, with that blood which descends from the Head by the Veins.

You shall observe, that this Trunk does afford no branches to the heart except the ^a *Coronaria*: but only to other parts of the Chest, and how blood shed out of the left Ventricle of the heart into the Lungs, may be revealed by Blood-letting, seeing it has two Doors to be broken open in the heart, before it can come to the Trunk of *Vena Cava*, which hinder the flowing back of the Blood from the Lungs. Coronaria.

You shall consider if the ^b *Anastomosis* of the *Arteria Venosa* with *Vena Cava* be remaining, by which the foresaid Reflux may be made: or whether the blood of the Lungs, ought not to return into the left Ventricle of the heart, that it may be made vital, and then speedily to be cast into the *Aorta*, from thence to be forthwith delivered over into the Veins.

Then you are to search for the *Vena* ^c *Azygos* or Vein without a fellow, which nourishes the Ribs. In it you shall observe two or four *valves* or *shutters*, not feigned and imaginary, but true, interchangably disposed, which resist the blood flowing in abundantly. I have many times shewed those valves, and an inferior branch of this Vein, ending into the Trunk of the *Vena Cava*, below the Kidnies. For which cause it cannot drink up nor transmit purulent matter into the Kidneys. Azygos. Its Valves.

This branch serves to disburthen the *Vena Cava* above the Heart, if blood do any time there abound, or be contained in any great quantity, within the little branches or twigs of the *Azygos*, or solitary Vein.

Furthermore you shall search out the mutual *Anastomoses* of the twigs of the *Azygos* or solitary Vein, with the twigs of the Chest Vein, under the lesser saw-fashioned Muscle, near the Arm-Pitts. Hence it comes that in the Pleurisie, the pained side is better disburthened and the pain sooner eased, by opening the *Vena Basilica*, than any other Vein. Anastomoses.

^a T. 12. f. 2. ^b T. 11. f. 3. and 6. B. ^c f. 1. D. 1. 12. f. 1. aaa. X

After the *Azygos* or solitary Vein, out of the Trunk of the *Cava* ascending, the *Intercostals* arise, on ^a each side one, if the branches of *Vena Azygos*, do not reach unto the upper Ribs. Intercostals.

When the Trunk is come as far as the Claves it produces the *Mammaria* or *Dug-Vein*, which is twofold; ^b internal and external, they are both carried through the Mammariae.

the Longitude of the breast-bone unto the Dugs. But the internal being the greater, having transmitted a branch through an hole in the Breast-bone, into the Dugs, Runs a long unto the Right or streight Muscle, that it may Joyn it self to the *Epigastrica*. *Hippocrates* was wont to open the external, in Inflammation and pains of Parts belonging to the Chest; but now because of the Obscurity of those Veins, that operation is not of use; instead whereof *Horses* Leeches may be applyed, or Cupping- Glasses with Scarification.

^a T. 12. f. 2. bb. ^b T. 12. f. 1. cc.

Thymus & *Kernel*
so called,

In the parting of the *Vena Cava* you shall under it observe a great Kernel, placed in the Throat under the Claves like a Pillow, that it may gently bear up and enfold the Subclavian branches. It is called *Thymus*. In young Animals it is soft, as in Calves, and together with the great Kernel of the Pancreas or Sweet-bread, it is eaten as a dainty Dish.

Mediastina

By the swelling of this Kernel, Strangulations or a fence of Choking may happen even to Men, but in Women subject to the Mother it is more frequently swelled, and Chokes them if they be not relieved by Blood-letting. Some do reckon up three small Veins which are termed *Thymica*, *Capsularis* and ^a *Mediastina*: whereas notwithstanding the *Capsularis* and *Mediastina*, are one and the same Vein.

Cervicalis

From the ^b *Ramus Subclavius*, four notable branches do arise. The first is called, *Anterior* ^c *Cervicalis* the foremost Neck-Vein, which being drawn out upon the *Musculi Mastoidei*, ascends unto the Chin and Waters the fore Parts of the Neck.

Internal Jugular
so called,

After this follows the ^d *Internal Jugular*, being larger than the external, which ascends unto the Neck under the *Musculus Mastoideus*, and about the middle thereof, it is divided into three Branches, one of which being greatest and thickest, creeping a long the *Vertebra's* goes under the Scul, making its entrance at the hole which is near the *Apophysis Styloidea*, so as being applyed to the lateral Channels of the *Meninx dura* or *Dura Mater*, is poures out its Blood and goes no farther.

The Second branch creeps through the sides of the Neck and is distributed under the Jaw.

The third goes into the Tongue and produces the *Ranula* or Veins under the Tongue, the opening of which does wonderfully help in Diseases of the Brain.

External Jugular
so called,

A Finger-breadth distant from this Vein you have the *Externa* ^e *Jugularis*, which creeping assant or sloping under the *Clavicula*, it sends forth two twings, whereof the one passes Obliquely unto the *Delta-shaped* Muscle unde the Shoulder-point, and is united unto the *Vena Cephalica*; the other arises to the lateral Parts of the Head; where at the corners of the Jaw-bone it is divided into two, and is distributed into the Jaws and all the Parts which are subjected unto the Jaw-bone.

The Other Portion, being carryed behind the Eares, is distributed into the Fore-Head and hinder Part of the Head, and upon the Temples with manifold branches; and in these Parts, by reason of the Veins, *Fernelius* did conceive that a serous Humor was heaped together, which flowing down upon the Parts beneath, does breed Fluxions in the Habit of the Body: he conceived likewise that an Issue made, or a caustick applyed to the Cavity behind the Ear, did more good, than if it had been made in the hinder part of the Head, because of a branch of the Jugular Vein, reaching unto the Eye.

whether and in
what Case it
may profitably
be opened.

This external Jugular Vein being opened by a skilful Surgeon in sleepey diseases, is very good, as many Histories do testifie: but many will not allow of it, who prefer two or three Horse-Leeches fastened according to the Longitude of the Vein, as far as the corner of the lower Jaw, where it sticks out and is visible.

Howbeit

Howbeit you must observe, that the internal Jugular does in the Neck communicate with the external; and there this external Vein being opened, although it reach not unto the Brain, yet may it disburthen this Part, seeing the internal Jugular is hid, under the *Musculus Mastoideus* and cannot easily be opened. And therefore that same opening of the Jugulars which is so much spoken off, is to be understood of the external Jugular, and not of the internal.

And because the Arteries and Veins are alwaies contiguous and coupled together, in the same Line you shall look for the *Trunk of the Aorta ascending*. Spunging out of the left Ventricle of the Heart, it does presently even in its Rise produce the two *Coronary or Crown Arteries*, which do compass the Heart like a Crown.

These you will not see exactly, unless you cut the *Aorta* and look into it through the left Ventricle of the heart; if there be only one, you shall find a little Valve placed at the Orifice thereof, as in the Coronary Vein.

The Trunk of the *Aorta* after a little progress, is without the *Pericardium* divided into two Branches, the one whereof is termed *Ascendent*, the other *Descendent*.

^a T. 12. f. 4. C. & c. ^b T. 12. f. 5. ^c T. 12. f. 4. A. ^d T. 12. f. 4. C.

The ascendent is triparted, three Arteries being brought from the same place; that on the right side ascending to the Claves, makes the *Subclavia dextra*; the other two ascend unto the left side; the first whereof, is called *Carotis Sinistra* going upwards; the second is named *Subclavia sinistra*; and a while after *Axillaris*, when it is come as far as the Arm-pits, and sends forth the *Arteria Cervicalis*, near the Shoulder-point.

The *Right Subclavian Artery* having over-pass the Claves, does produce that Artery which is termed *Carotis Dextra*, which near the corner of the lower Jaw-bone, is like the internal Jugular Vein, divided into two notable Branches, the *Internal*, and *External*. They are termed *Arteria Carotides*, Sleepy Arteries; because they being compressed, do make a man fall into a deep sleep and take away his Voyce. Which I have often demonstrated in Dogs, and how the same is done by tying a Nerve of the sixth Conjugation.

Galen, in his book, of the Utility of Respiration, does conceive, and proves by making experiment in Live Creatures, that Animals are no way offended by tying or straitning the Jugular Arteries; and therefore he refers the Sleepy-Evil to the Jugular Veins. I shall rather think, that in Apoplexies and Dead-sleeps the Arteries are stopped, than the Veins.

Valverde does testify that *Columbus* made publick demonstration in a youth, that deep sleep is caused by compression or constriction of the Carotick Arteries; but he does not tell us how he did it.

That the ascent of the Carotick Arteries and their penetration into the brain by the holes of the Skull may be plainly perceived, you shall put in a very small Brais Wire that will bend, with a knob at the end, into the several divisions of this Artery; which may be done and shewed, by the vulgar way of dissecting the Brain, beginning from the upper Part, not from the lower Part after the manner of *Varolius*, and in the Neck you shall put your Probe into the Carotick Artery.

^a T. 12. f. 4. B. ^b f. 4. a. ^c f. 4. B. ^d T. 24. f. 2. A. ^e T. 12. f. 4. d. ^f f. 4. a. ^g f. 4. c. ^h f. 4. b.

The Trunk of the *Aorta* being writhen towards the left side, and bent downwards again, is born up by the *Vertebrae* of the Back, and in its progress as far as the *Ossis Sacrum*, out of each side produces as many Arteries as there are *Vertebrae*, neither is there found any solitary Artery to accompany the solitary Vein, but there are such like petty Arteries which supply its place.

Lumbal.

Within the Chest they may be termed ^a *Intercostal Arteries*; beneath in the lower Belly, ^b *the Lumbal or Loyn Arteries*; they insinuate themselves into the spinal Marrow by the holes of the *Vertebra's* which may be proved by a memorable example in *Galen*, in his fourth Book of the Parts affected,

One out of a vehement Inflammation of the Lungs, fell into a Palsie of his upper Limbs, and the upper intercostal Nerves being anointed, he was cured.

Communion of
the Arteries &
spinal Marrow.

I, and my most learned fellow Collegiate, Dr. *Merlet*, have seen a Palsie caused by translocation of the matter of a Pleurisie into the Marrow of the back, which Palsie freed the Patient from the eminent danger he was in by reason of the Pleurisie.

So *Hippocrates*, in his *Coicks*, observes, that a Convulsion takes away a Fever, by translocation of the Morbifick Matter into the Marrow of the Back. The hinder ^c Neck Artery may do as much, which waters the Marrow of the Neck.

I know not how the Humor which causes an Apoplexy, falling through the fourth Ventricle of the Brain upon that Marrow of the Back, should bring the Palsie into one side more than another; by that way before mentioned, *viz.* The Cervical and Intercostal Arteries, the ferous Humor may be derived into either side.

By the same Reason, the ferous matter may through the Celiac Artery return back into the *Aorta*, and by the little Arteries penetrating the Marrow of the back, be derived into the Nerves of the inferior Limbs; and on the other side, the matter of a true or bastard *Sciatica*, by the continuation of the thickest Nerve, may return into the Marrow of the back, from whence it may be revealed by the *Aorta* into the Mesentery.

Nervous.

In the Chest we are to take notice of eight remarkable Nerves or Sinews. Two of which are called *Diaphragmatici*, two are termed *Recurrentes*, two *Stomachici*, and two *Cestales*.

Diaphragmatici.

Diaphragmatici, the Midrif Nerves, taking their rise between the ^a fourth and fifth *Vertebra's* of the Neck, from that same thick Nerve of the Neck which goes into the Arm; they descend between the foldings of the *Mediaſtinum* unto the Nervous Centre of the *Diaphragme*, or Midrif.

Recurrent.

The *Recurrent* ^b and *Stomachic*, are branches of a Nerve of the sixth Conjugation or pair, whose Trunk you shall seek for in the Neck near the internal Jugular, by the *Apophysis Mastoidea*; where it is cleft into two branches, the one of which is disseminated into the superior Muscles of the Neck; the other being placed between the internal Jugular and the *Carotis* descends unto the Claves, where it is parted into two branches, the *Recurrent* and the *Stomachic*.

Their bending
back where to
be found.

The bending back of the left *Recurrent* Nerve is found about the place where the *Aorta* is bowed in, and that easily, before the *Pericardium* is opened.

You shall find the bending back of the right Nerve, about the right subclavian Artery.

I have often seen Dogs live and run, after their Recurrent Nerves were cut, and have my self made publick demonstration thereof, but they could not bark at all; and when these Nerves are tied they deprive the Animal of voice, and being united the voice returns: wherefore it is apparent, that these Nerves serve to make the voyce, because they return upwards, that they may be inserted into the Heads of the Muscles of the *Larynx*, Tongue, and *Oss. Hyoides*, which arise from the Inferior Parts.

Stomachic.

You shall search for the *Stomachic* ^c Nerves beneath the Heart, near the *Vertebra's*, they lie hid within the folding of the *Mediaſtinum*, and from them you shall perceive ten or twelve twigs drawn into the ^a Lungs; and of the small branches of two Stomachic Nerves folded and fettered together, is made that same *Nervorum Mirabilis Plexus*, wonderful contexture of Nerves in the upper Orifice of the Stomach.

^a T. 10. f. 7. A. B. ■ ^b T. 3. f. 1. §. ■ ^c T. 3. f. 8. III. &c.

Afterwards the Stomachick Nerves creeping along the hinder Parts of the Stomach, are near the Back-bone between the two Kidneys Joyned to the ^c Costals, so as to make that ^d Contexture of Nerves, out of which all those Nerves are derived, which are distributed into the Parts of the lower Belly.

All ^e Anatomists derive the Costal Nerve from the sixth pair, when as in the mean while, it arises from the same point of the brain from which the sixth pair arises. *costal.*

The costal Nerve, being come without the Scal, is strengthened as it were with a Knot tied about it, and it descends undivided upon the Neck; and when it is come to the three last *Vertebra's* of the Neck, it is defended by another Knot, and grows thicker by addition of three small Nerves, and being slipped down within the Chest, in its progress near the Back-bone, under the Membrane *Pleura*, it is augmented by additions of other two small Nerves proceeding from the Marrow of the Back.

Having pierced the Midriff, it is Joyned to the Stomachick Nerves, to make that same Contexture of Nerves, resembling a Net which is between the two Kidneys.

^a T.3.f.8.bb. ^b T.3.f.2.H. ^c T.3.f.8.BB. ^d T.3.f.8.Δ. ^e T.3.f.8.BBB.



The End of the Third Book.



[Faint, illegible text from the reverse side of the page, including a faint anatomical diagram of a head and neck.]



THE
FOURTH BOOK
OF THE
ANATOMY
AND
PATHOLOGY
OF
John Riolanus,
THE
KINGS PROFESSOR
OF
PHYSICK.

Chap. I. *Of the Head.*

*Why the Head
is placed in the
highest place?*



HE Head being the Seat of the Soul, the Mansion-House of the Brain is placed a loft in the highest part of the Body, as it were the prime Castle, which commands, and bears Rule over the whole City. *Galen* saies the Head was thus placed on the top of the Body, because of the Eyes, which are the Scouts and Guides of the Body: *Aristotle* saies it was for to cool the Heart, by that coldness which the Brain would shed down thereupon.

Its Size,

An Head that is well framed, ought to be of an indifferent Size; for a great, and a little Head, are disallowed, and dispraised.

Its Shape,

The Natural Figure of the Head is round, or spherical, somewhat longish, bunching out before and behind, with two Eminences, and a little flat, or compressed towards the Temples. The

The Head is divided into the hairy Part, and the smooth Part, so long as it is whole, and unparted: The smooth part is termed the *Face*, and thereunto is the Forehead appertaining. The hairy part retains the Name of the *Head*.

The Head is otherwise considered in the History of the Bones: for it is divided into the ^a Scul, and the two Jaws, the ^b upper, and the ^c lower; and the Forehead appertains unto the Scul.

Again, The whole Head is divided into two direct parts, and two side parts. The direct are the ^d fore part of the Head, which from the beginning of the Hair, arises four or five fingers breadth towards the top or Crown of the Head. *External parts of the Head.*

After which, the space of two fingers, and as much after the Vertical point of the Crown, where the Hairsturn, is termed ^e *Vertex*: the hinder part is called ^f *Occiput*; the lateral parts are called *Tempora*, or the Temples, or Times; because they discover the Times of a mans Age by their hollowness, hoariness, or baldness.

The Head is compounded, and made up of many parts, of which, some are external, others internal; or containing, and contained. *The constituting parts.*

The Containing, or Membranous, or Bony; the contained, or internal, are the Brain, the *Cerebellum*, or petty brain, the four roots of the Spinal Marrow, and such as are included in their Cavities.

The first containing part we meet with, is the ^b hairy Skin, which has also its *Epidermis*, or Scarf-Skin. Under the Skin, lies the Fleshy ⁱ Membrane, which is the foundation, and Seed-plot of the hairs; which if it be fleshy, it makes the hairy skin movable, because it sticks close hereunto without any fat coming between. *The hairy Skin. The fleshy Membrane.*

The *Perieranium* follows, which does immediately compass the bony Scul. It is produced from the thick *Meninx*, which in Children, goes through the Sutures, at what time they are not firmly closed, nor joynd Tooth within Tooth. *Perieranium.*

* T. 15. f. 3. ABC. ^b f. 5. and 6. ^c f. 3. LMN. ^d f. 3. A. ^e f. 3. B. C. ^f f. 4. C. f. 6. AA. ^g f. 3. D. f. 6. B. ^h f. 1. AA. ⁱ f. 1. BB. ^k f. 1. CC. ^l

Besides the *Perieranium*, there is scraped from the Scul, as from other bones, the *Periostrium* being a thin Skin, which immediately covers them. Wherefore the *Perieranium* is not the Periosteon of the Scul, but is spread out upon the Scul by a great Providence of Nature, that it might hold fast the Muscles which arise from the Scul, such as are the temporal Muscle, the strongest in the whole Body, which with its companion, contracts, and lifts up the Jaw, and bears greater burdens in some bodies, than the other Muscles acting altogether. *Periostrium*

Also it strengthens, and closely comprehends the Muscles of the hinder part of the Head. Descending to the Eyes, and stretched out under the Eye-lids, it makes the Conjunctive Coat of the Eye. *Its use.*

These Membranes being separated, and plucked off, and the ^a Scul having its Cap taken off, it presents it self to our sight, being framed together of many bones, which are joynd one to another, by looser, or faster Sutures, or Seams. *The Skull.*

Sometimes there are no Sutures, or Seams to be seen, when the Scul is one continued bone. But the History of the Scul appertains to that double *Osteology*, or Bone-story; the one of which has been premised unto this Work, and the other shall be demonstrated at the end hereof.

* T. 15. f. 1. DD.

The Medicinal Consideration.

The Head being the Fountain and Original of almost all Diseases, according to *Hippocrates*, by reason of Fluxes of Rheum, which flow from the Head into the inferior parts, even as low as the Feet, does condole, and has a fellow feeling with all parts. Being placed on the top of the Trunk of the Body, like a Cupping-glass, it attracts and receives vapors which mount from the inferior parts, according to *Hippocrates* in his fourth Book of Diseases: which vapors, the brain being spongy like a kernel, does drink, and sup in, according to the said *Hippocrates*, in his *Book of Glandules, or Kernels*. The Vapors being congealed into Water, do fall down, *General diseases of the Head.*
and

and return up again like a River that ebbs and flows, according to *Aristotle*; which *Hippocrates* had taught before him, having in that respect, termed the Brain, the *Metropolis of a cold, and moist, glutinous, and clammy Humor*.

Shape depraved.

If the shape of the Head be depraved, so that it be sharp pointed, or the longitude thereof, be turned into latitude; such an Head cannot be sound and healthy; and therefore either it is diseased, or the principal Faculties are weakned. If in Children new born, such a Figure be observed, it may be corrected by Art, and with the Hand; as if it be great, and large, when the Child is a month or two old, drying Medicines being applyed, and Fontanels, or Issues made in the Nape of the Neck, the over-great moisture of the Brain may be dried up; and consequently the Head will become less; which cannot be effected when the Children are grown up. A narrow Head, cannot be by Art enlarged, in any Age whatsoever.

Over lax, or loose, &c.

If the Sutures of the Skul are straiter than ordinary, or if there be no Sutures, or they be wider than is fit, the Head is subject to Diseases, because the smoaky Excrements of the Brain, have not a free passage.

If the Head be more loose and open than is fit, it is the mote exposed to the Injuries of the ambient Air.

These inconveniences may be remedied by help of Physick, or by wearing a Cap, or by going bare-head, as occasion requires.

Particular diseases.

I proceed unto the Particular Diseases of the Parts containing. And first of the hairy Skin, whose Action is the breeding of Hairs, the efficient cause whereof is a temper moderately hot and dry, and an indifferent Constitution of the Skin; and the internal cause is a sooty Excrement, which thrusting it self forcibly by the small Pores, gains the form of a thred. The hurting of this Action, is a Symptom of the hairy Skin. The hurt thereof is three-fold, it is diminished in the Disease termed *Opbilasis*, in which the Hairs fall off from the hinder part of the Head, along to the Fore-head, making bald wreaths like those of Serpents; or it is abolished in baldness, and the *Alopecia*, or Fox-tall of the hairs.

Opbilasis.

The Cause of falling off of the Hair of the Head, is the hot and dry distemper of the Skin, with a naughty and sharp Humor, eating away the roots of the Hairs.

The Naughtiness of the Humor is known by the colour of the Skin, and of the blood, which comes out of the Skin being pricked.

Baldness.

Baldness is a deprivation of the Hair of the Head, by reason of an Heetical dry distemper, and hard Constitution of the Skin. A defect of Nutriment, and profitable Humor, or of the fuliginous Excrement, causes this distemper of the Skin. Hence it is that Eunuchs, because very moist, do never wax bald.

Gray Hairs.

Gray-hairedness is a Symptom of the Hairy Scalp or Skin of the Head, by which the Generation of Hairs is depraved, so that they grow white before the time. The cause of both these kinds of baldness, as well that which comes Symptomatically, as that caused by Age, is the cold and moist distemper of the Skin, whereby the fuliginous Excrement of the Skin is alliaied and tempered. When I say a cold distemper, I mean the weakness of the Natural Heat; Whence it comes to pass that by sickness and sorrow, many become gray-hair'd, because the Natural Heat is by both diminished.

Dandruf.

Ulcers of the Head are either light, and possess the Scarf-skin only, which turns into little Scales, Scurf, or Dandruf, when the Head is combed; whence the Greeks term it *Pituriasis*, the Latins *Porriago*; such like Ulcers are either dry and invisible; or they are visible, and manifestly to be seen; their Cause is an hot and dry distemper of the Skin, with a sharp and thin Humor.

Sore Head.

Achor, is a Disease of the Skin of the Head, compounded of a tumor, and an Ulcer; the tumor is known by the inequality, the Ulcer by little holes, out of which flows a clammy Humor; which made *Pliny* call the flowing Ulcers of the Head, *Ceiron*, or the *Honey-comb*. But the *Honey-comb*, though a tumor, and Ulcer of the Head, yet differs from the former, because it has greater holes, and the Humor that comes out is mattery like Honey, or of the Consistency of Honey. *Pliny* calls them Ulcers congealed together like an *Honey-comb*. The Cause of both these

Diseases,

Diseases, is an hot and dry distemper of the Skin, with a sharp and biting Humor, which invites one to scratch; by scratching, the swelling is encreased, and at length Ulcerated, so that the holes break out: Vulgarly 'tis called *Tinea*, the Moath, because the holes are like those of Moath eaten Garments.

Hydrocephalus, or the Water-head, is a swelling of the Head, caused by a wheyish Humor, collected and shed abroad between the Skul, and the *Pericranium*; or between the Skul, and *Dura Mater*, or within the Ventricles of the Brain filled with wheyish moisture, which runs over as it were on all sides.

Head-dropsie.

In Infants 'tis caused by squeezing of the Childs Head at the time of Birth. In those that are grown up, the cause thereof is a cold and moist distemper of the Head and whole Body, or a transflation of serous humors unto the Head, which generally is swelled, and raised to a vast compass, by the humor under the Skin, or included within the Head.

Pibiritis, or the Louzy Evil, is a Symptome of the hairy *Scalpe*, when instead of the thicker Excrements, or together with them, Lice are bred in the top of the Skin, or deep in the same.

Louzy Evil.

The Cause hereof, is an hot and moist distemper of the Skin, with a putrified humor not very sharp; which makes this Disease commonly subject to Children, and old Flëgmatick Persons.

The Temple-Muscles are to be observed, which cover a great part of the Skul, whose wounds or bruises, do cause a Convulsion, and contract, and straiten the Jaw.

Chap. 2. Of the Brain.

The Skul being duly sawed in sunder, and the covering removed, the ^a Brain appears, proportionated to the Skul which contained it; such as is the thing containing, such is the contained. Or suppose the Brain gives Figure to the bones when they are soft, then the Skull follows the quantity of the brain, be it great or little. But in case the brain follow not the Natural figure and magnitude of the Head, its conformation is faulty; and consequently sickly and adverse to the internal Sences, both principal, and subservient, which it hurts in their Actions.

The Brains

The Brain is compounded of a ^b Substance soft, waxy, or plyable, whitish; which because, like a Kernel, it drinks and sucks up humidities, it is therefore by *Hippocrates*, termed the great Kernel.

Substance.

It is divided into two parts. That which is three times as big as the other, retains the common name of the ^c Brain: the lesser part placed in the hinder part of the Head, is termed ^d *Cerebellum*, or the Petty-brain. Both these parts are covered with common Coverings, termed *Meninges*. The first Coat, or Covering, is called ^e *Crassa Meninx*; the second ^f *Tenuis Meninx*. The *Arabians* termed these Membranes, *Mares*, or *Mothers*, because they were perswaded, that the other Membranes of the Body, were propagated from these.

Division.

Two Coats,

viz.

1 Crassa-meninx.

2 The Tenuis

meninx.

The first *Meninx* is hard and thick, being united to the Sutures of the Head, suspends the whole bulk of the brain; these Connexions must be viewed when the Skul is taken off. In the thick *Meninx* are observed innumerable ^h Vessels, where-with it is sprinkled and strewed: they are rather Arterial than Venal, being produced from the *Rese Mirabile*, being drawn out from beneath upwards, as far as the Channels of the *Meninx*, where they unload their blood; and therefore it is the Membrane which is seen to beat and pant, rather than the substance of the Brain.

^a T. 16. f. 1. ^b f. 3. AA. ^c f. 6. AA. ^d f. 6. DD. ^e f. 1. AC. f. 2. Bf. 3. H. & c. ^f f. 1. BB. ^g f. 1. AA. & c. ^h f. 1. AA.

Now the Pipes belonging to this Coat, are four; whereof two are lateral, which run along the sides of the *Sutura Lambdoidea*, that they may receive the blood from

The Pipes.

from the internal Jugulars, and from the Neck Veins; or by them according to the Doctrine of Circulation, the blood may flow back unto the Heart.

From the Union of these two Channels, is formed a third, longwise, drawn out directly as far as the Nostrils. In the Concourse of the three beneath, there springs a fourth^c Channel or Pipe, which goes into the Substance of the Brain, between the Brain, and the Petty-Brain: it is not shut up in the foldings of the *Dura Mater*, but there is a great Vein, so called by *Galen*, which descending into the^d former Ventricles, makes the *Plexus^e Chorooides*, which is dispersed through all the Ventricles, unto the Basis of the Brain.

Plexus Chorooides.

Torcular.

The Channel which runs longwise, deserves rather the name of *Torcular*, than the^f fourth: because from thence, is the blood distributed into the lower parts, by innumerable little Veins, through the turnings and windings of the Brain.

The lateral Channel, neither do the Veins, nor the Arteries go into, and pass through with their Coats, but are terminated at the entrance; and therefore those Channels are rather Arterial, than Venal: for the Brain being of its own Nature cold and soft, ought rather to be nourished with hot, subtil, and Arterial blood, than with such as the Veins afford, being thick, and hard to penetrate.

And in case the Vein, and Arterial blood were confused and mixed together in these Channels; they would not pant or beat; and the Pulsation of the Channels demonstrates, that it depends not upon the Body of the Arteries; for there are none in that place, but upon the leaping of the blood, after the manner of Arteries.

^a T. 16. f. 5. a. and b. ^b f. 2. aa. f. 5. cc. ^c f. 5. ee. ^d f. 3. D E. ^e T. 17. f. 1. O O. R R. T. 16. f. 3. F F. f. 5. ff. ^f T. 17. f. 5. F. ^g

Now this Membrane, namely, the *Crassa Meninx*, divides the Brain into two parts, as far as the middle thereof, by the *Corpus Callosum*. This Partition is termed^a *Falx*, and being doubled on both sides, it severs the Brain from the Petty Brain.

Falx.

Tennis Meninx.

Why the Brain is full of windings and turnings?

The *Tennis^b Meninx* follows, which immediately incloses the brain, being closely conveyed into the windings and turnings thereof; for the substance of the brain, is^c without, after a wonderful manner, full of deep turnings and windings, for the lighter passage of the Arteries, which disperse the blood here and there; and therefore *Pelops*, the *Master of Galen*, seeing those little Arteries dispersed up and down the Brain, did believe that there was the beginning of the Veins.

The *Tennis Meninx* is three times so long as the *Crassa Meninx*, because it passes into the inner Part of the Brain, and as a Veil it covers and separates, and divides the whole Bulk of the Brain into three Parts. For near upon the upper half of the Brain, which covers the Ventricles being placed upon the *Corpus Callosum*, it is on both sides Circularly separated and lifted up as high as the Roots of the Marrow of the Back, which do knit together that same upper portion. So that the Brain is divided into three Parts; on each side one over the Ventricles, and the third which includes the Ventricles, being continued, and no waies disjoyned.

The two former Ventricles.

A small quantity of the^d *Corpus Calosum* being cut off, the *Two^e former and upper Ventricles* appear, which in their lower Part towards the Basis of the Brain are larger, from whence they take their rise upward, being smaller at the top.

Septum lucidum

They are separated by a *Thin Membranous Partition*, which is framed of the *Tennis Meninx* doubled together, and is called *Speculum Lucidum*, or the *Bright Mirror*, because it is transparent.

^a T. 16. f. 3. A A. f. 5. E E. ^b f. 1. B B. ^c f. 1. b b. ^d f. 2. B B. f. 3. B B. ^e f. 3. D D. E E. f. 4. C C. D D. ^f

^g T. 16. f. 3. G. ^h

The former Ventricles are perforated in the forepart towards the *O^s Ethmoides*, that the serofities may flow down from the superior Parts to that place.

Above the foremost Ventricles there is spread out a ^b Tripartite body, which is termed *Corpus Psalmodicum*, or the *Welch Harp*, sustained by three Pillars: whereof two are ^c Lateral: turned back, about those ^d Eminencies which *Galen* calls the *Chambers of the Optick Nerves*.

The other forward ^e Column, is placed between the two Ventricles. If you shall follow those two lateral *Columns*, you will find them to be productions of the Optick Nerves, which within the Ventricles do Joyn themselves one to another, as in the Basis of the Brain; behind the *Choana*, they are again united; whence I conjecture that the power of understanding and knowledge, is principally contained in the former Part of the Brain, and that from thence the Animal spirit is drawn, which is administered unto the Eyes.

By the Concourse of the two Ventricles *Between the two large Hillocks* aforesaid, and other subsequent Eminencies, is formed a Guttur or Channel, which makes the *third Ventricle*. In the Basis of which Channel there is seen an ^h hole, which penetrates into the *Choana*, to purge out Wheyish Flegm into the throat, near the *Palate*.

In the sides of this Channels, the *Circumjacent Eminencies* do form, some the ^b *Nates* or *Bucrocks*, others the *Testes* or ⁱ *Stones*. For so those *Eminencies* or *bunchings out* are termed, being interchangeably disposed, and from that Channel, the *Hole* which goes into the fourth Ventricle, is termed *Anus* or the ² *Arse-hole*.

^b T. 16. f. 3. bb. f. 4. B. ^c T. 17. f. 1. GG. ^d T. 16. f. 4. bb. cc. & c. ^e T. 17. f. 1. F. ^f T. 16. f. 4. E. ^g T. 17. f. 1. below Q. ^h T. 16. f. 4. bb. ⁱ T. 16. f. 4. cc. T. 17. f. 1. MM.

² T. 17. f. 1. above Q. f. 2. F.

In the upper Part of this Channel is superincumbent that same Kernel which is termed ^b *Conarium* the *Pine-Apple Kernel*, because tis sharped like a *Pine-Apple*. And over this Channel and the fourth ^c Ventricle, is a thin Membrane stretched out, derived from the *Tennis Meninge*, upon which runs the ^d *Plexus Choroides*, diffused through the foremost Ventricles.

In the entrance of the fourth Ventricle, there is placed a certain portion of the Brain more firm than ordinary which represents the tail of a River-Crab when the shell is peeled off. It is called *Scolioides* and *Vermiformis* ^e *Processus*, the *Worm-fashioned Production*: it opens and shuts the passage into the fourth Ventricle. This is placed in the *Cerebellum* or Petty Brain; which contained within it self the two hindermost portions of the spinal Marrow, as the Brain contained the other two foremost, which I have named with *Galen* the *beds of the Optick Nerves*.

In that same ^f fourth Ventricle, there appears a certain ^g Chink like a Writing-Pen, which is the separation of the Marrow of the Back.

The Petty-Brain being pulled asunder, you shall see, how it contains within it the fourth Ventricle, between the two aftermost Roots of the Marrow of the back; and how being drier than the Brain, it gives Original to ^h seven or eight pair of Nerves, saving the Optick Nerve.

It is not full of windings above but beneath, according to the external form of the brain it self. In like manner it is divided beneath into ⁱ two Parts, being continued above.

^b T. 16. f. 4. a. T. 17. f. 1. L. ^c f. 2. N. N. ^d T. 16. f. 3. FF. T. 17. f. 1. OO. RR. ^e T. 16. f. 6. E. T. 17. f. 2. CC. ^f f. 1. NN. f. 2. DD. GG. T. 18. f. 4. F. ^g T. 17. f. 2. H. T. 18. f. 4. E. ^h T. 18. f. 3. ⁱ T. 18. f. 4. A. A. E

Pelvis.
Glandula Pituitaria.

Tubuli.

Seven pair of Nerves.

If you shall gently draw upwards the foremost Part of the brain, as far as its basis, you shall observe the ^k Optick Nerves, and the Nerves, serving for ^a Motion, and then the ^b Choana or funnel dropping Wheyish moisture upon the ^c Glandula Pituitaria or Flegm-Kernel, which fills up and possesses the Sella Equina or Horse-Saddle. In the Choana or Funnel you shall see Four Pipes distilling Wheyish moisture into the Palate and Throat. Then you shall consider the order of those seven pair of Nerves recorded in the following Verses.

The ^d First Pair sees, the ^e Second moves the Eyes;
 The ^f Third and Fourth taste, the ^h Fifth hears and makes us Wise.
 The ⁱ Sixth is large and wanders all about:
 The ^k Seventh Larynx moves a prating Tongue so stout.

Rete Mirabile.

Then you shall search under the Dura Meninx in the basis of the brain about the Compass of the Sella Sphenoides, for the Rete Mirabile or wonderful ^l Net of Arteries interwoven one among another, being formed of the two ^m Carotides or sleepy Arteries.

You shall observe in the Basis of the brain, that Wheyish Humors or blood is powred forth, in extream pains of the Head coming with Inflammation, which while they seek to go forth by the Cavities of the Ears, they cause extream sharp pains, which bring the Patient into Madness and Sickness. Whether or no in such a desperate Case, may we boar either side of the Hindermost Part of the Head, to let out the superfluous putrid Humor, which corrupts the substance of the Brain?

The ⁿ Auditory Nerve is worthy of Consideration, which is inserted into the Cavity of the Ear, and by a little Channell slides down into the Palate, and is distributed into the inner Part of the Larynx: from whence comes that same Consent that is between the Tongue and Teeth, the Larynx and the Lungs.

^k T. 17. f. 1. S. T. V. T. 18. f. 1. B. f. 3. BB. ^a T. 18. f. 1. CC. f. 3. GG. ^b T. 18. f. 3. D. ^d T. 18. f. 1. BB. f. 3. BB. ^c f. 1. CC. f. 3. GG. ^e f. 1. DD. f. 3. HH. ^f f. 1. EE. f. 3. II. ^h f. 1. FF. f. 3. KK. ⁱ f. 1. GG. f. 3. LL. T. 3. f. 8. ^{all} ^k f. 3. MM. ^l f. 3. PP. ^m f. 3. CC. ⁿ T. 18. f. 1. FF. f. 3. KK. ^o

Observe Whether or no they be intersected Cross-wise, so as the right should from its original be carryed unto the left Part, and the left unto the right, which I have never seen.

Whether the Nerves in their Rise have Arteries Joyned in company with them? Whether the Nerves are made up of many small threds? Whether the other Nerves differ from the Optick Nerve.

I will not wholly pass over those four notable Questions: Whether the brain be moved? Whether or no the brain does cool the Heart? Whether the Ventricles of the brain are ordained only to contain Excrements? Whether or no the blood be there Circulated and how?

whether the Brain have any Motion?

As to the first Question, I say that the substance of the Brain is not moved of it self, by *Diafole* and *Sisfole*, after the manner of the Arteries, but only the *Crassa Meninx*, which is sprinkled all over with Arteries, arising from the wonderful Con-texture of Arteries, unto the upper Channels of the said *Crassa Meninx*: also the Channels do pant, and the brain is moved by elevation and depression of the substance thereof, according as it is driven by the Animal spirits.

whether it cools the heart?

The brain does cool the Heart, inasmuch as by Circulation, it sends back the stance blood unto the Heart being cooled in the Brain.

The use of the fore Ventricles.

The foremost and uppermost Ventricles are Receptacles for spirits, the whey may indeed descend into the upper Ventricles, from the whole Mass of the brain, but it presently

presently falls down into the lower Ventricles, that from thence it may flow through the *Osses Ethmoides* into the Nostrials: if the *Osses Ethmoides* or Colander-bone be obstructed, it distills by the *Choana* or Funnel, or by the little holes over the Funnel, into the Palate and Jaws or Throat.

The Circulation of the blood is performed in the brain, with a slow pace. The blood rises out of the Netlike-Contexture, by the Arteries of *Dura Meninx*, unto the four Channels, afterwards it descends by the Veins unto the Heart, having been plundered of its spirits, which the brain drank up. And so the blood being cooled, is said to cool the Heart. Of all which I shall treat more fully in my *Anthropographia*, or large Description of the body of Man.

The Brain, being of its own Nature cold and moist, is nourished only with the purer and more spiritous arterial blood, which ascends by the *Carotides* and passes speedily forth. And though the Spirits are tempered, they lose none of their subtilty, because they are not mingled with the Air. From the *Plexus Mirabilis*, blood ascends by the Arteries which spring from the said *Plexus* unto the Crown of the Head, where the blood Channels of the brain are Scituate. From whence it distills into the lower and side Parts of the brain, and also by that same great Vein mentioned by *Galen*, which makes the *Plexus Choroides*, it is distributed into the inferior Parts.

And therefore in bleedings of the Nose, the most pure blood does alwaies come away, whereas that which is taken away by opening the Veins of the Arms or feet, seems alwaies most impure.

Whereby you may know, that it is only the Arterial blood which nourishes the brain and which comes away by the bleeding at Nose: and it was not without cause that *Fernelius* would have it stopped, after it had bleed a pound, to cool the body and extinguish the Fever. And therefore refrigerating and astringent Medicaments are to be applied, not only to the hinder Part of the Neck, but also before upon the Carotick or sleepy Arteries.

You shall observe that the Air drawn in by the Nostrials, does not pass under, nor enter into the foremost Ventricles of the brain, because they are void of any Inlets, but being shed externally round about the *Crassa Meninx*, it cools the Surface of the brain. Nor is it mingled with the Spirits, because they ought to be most subtle, otherwise by permission or mingling of the Air, they would become more thick and would not run so swiftly by the Nerves all the body over.

The same I conceive touching the Air received into the Lungs; that it is not mixed with the vital Spirit but only cools the Lungs.

Now that the brain may be demonstrated after that manner, which *Farolius* describes in a particular Book: You shall saw in sunder the Scull of a body newly dead, round about near the Eyes, and the hollow of the hinder part of the Head, and with a pair of Pinners you shall take off the upper portion of the Socket of the Eyes, that you may draw out the Eyes hanging at their Optick Nerves.

Afterwards having pulled the *Dura Meninx* from the Scull round about with help of a Spatula, leave it at the Basis of the Scull, where it sticks exceeding fast to the Bones. Then you shall take out the Brain and as much of the Spinal Martow as you can both at once, and let some body hold the Brain turned upside down in both his hands whiles you shall dissect it.

But you shall first search within the *Dura Mater* for those four bendings or Hollownesses, for the place of the *Presß*, the great Vein described by *Galen* which makes the *Plexus Choroides*, and that division of the brain which resembles a Sickle: Afterwards returning to the Basis of the Brain, you shall observe the *Tenuis Meninx* to be more easily plucked and separated in the lower than in the upper Part: because the Petty Brain in its Basis or Bottom is not so full of turnings, away, and windings, as on the top. And therefore the thick *Meninx* being first taken we meet with that same *Rete Mirabile*, or Miraculous Net, made of multitudes of small Arteries, springing from the *Carotick Arteries* and two other ascending through the holes of the *Vertebrae* of the Neck; but it will be tortu, which cannot

Whether or no
and how the
blood is Circu-
lated in the
Brain.

What Blood the
Brain is nourish-
ed with?

What Blood
comes away in
the Nose bleed-
ing?

Whether the
Air goes which
is drawn in at
the Nostrials?
Whether it is
mingled with
the Spirits?

The Manner of
Dissecting the
brain and the
History of its
Parts.

be prevented. Now each of the Carotick or sleepy-Arteries enters within the Scull divided into two, to Weave that same wonderful Ner, and creeping upwards, through the windings of the brain it is disseminated up and down every way even as far as the Longitudinal Cavity of the *Dura Meninx*.

The *Carotis* is drawn obliquated and as it were crook backt, within that same winding hole at the Basis of the Scull, and within its Cavity, contains certain very small Bones, like those which are called *Sesamoidea*.

Neither has Nature placed these little bones only in these Arteries, but she has likewise inserted them into other Arteries, where it was requisite, that they should be kept open.

^a T. 16. f. 1. AA. f. 2. DD. Cc. T. 17. f. 1. AA. ^b T. 17. f. 2. II. ^c T. 16. f. 5. alce. ^d f. 5. F. ^e f. 5. ff. ^f f. 2. AA. f. 5. EE. 1. & T. 18. f. 3. PPPP. ^h f. 3. CC. ⁱ f. 3. OO.

Then you shall observe that the *Processus* ^a *Mammillares* or Teat-like Productions do not run out so far as *Varolius* has described them.

Then you shall see the growing together of the ^b Optick ^c Nerves near the *Choana* or Funnel. And therefore Masticatories may do good in the diseases thereof. Also you shall observe that the Veins of the *Plexus* ^d *Choroides* descending to the Basis of the ^e Brain, are interwoven with exceeding small *Kernels*.

In that place the *Plexus Choroides* is more easily discerned, than upon the foremost Ventricles.

Afterward, you shall contemplate four *tuberos Eminencies*: two ^f before, situate in the middle of the brain, and the other two ^g behind, which constitute the *Cerebellum*, or petty Brain. Those Eminencies, or Risings, do receive four white and hard Roots of the Spinal Marrow, whereof the foremost, longest, and hardest, are drawn along between the greater Eminencies of the Brain. The other two short ones, are carryed within the petty brain; which a thickened Portion of the Marrow of the said petty-brain, placed athwart, as broad as a mans Thumb, does fasten together like a Swath-band, and is by *Varolius* termed ^h *Ponticulus*: or rather it is the pavement of the Channel from the third, into the fourth Ventricle.

And the said *Channel* lies above those foremost Roots of the Spinal Marrow, and is stretched out according to their longitude. Between the growing together of the Optick Nerves, and the foremost Roots of the Spinal Marrow, there appears a four-square hole, which is taken for the ⁱ *Choana*, or Funnel, serving to discharge the Excrements of the Ventricles of the Brain.

^a T. 18. f. 3. aa. ^b T. 17. f. 1. T. ^c f. 1. SS. VV. ^d f. 1. OO RR. ^e f. 1. PP. ^f T. 16. f. 4. cc. ^g f. 4. bb. ^h T. 18. f. 4. by CCC. ⁱ f. 3. E.

When you have viewed all these things, you shall pass over unto the ^a Petty-brain, where you shall separate from the Spinal Marrow the *Processus* ^b *Vermiformis* which lies between the two *Tuberos Eminencies* of the Petty-brain, by taking away the *Membrana Choroides*; that so you may see the ^c Chamber of the fourth Ventricle and the Cistern of the Animal Spirits.

Then you shall cut a sunder ^d the little Bridge, or the Band of the Roots of the Spinal ^e Marrow, that the ^f foremost and Superior Ventricles of the brain may appear, which you shall see separated by a partition ^g as long as ones Finger, drawn from one End towards the Fore-head, as far as the Petty-brain: it cleaves to the ^h Arched Roof of the Ventricles, but beneath it is loose, and free from all ties, that the passage of the Spirits might be free.

But you shall diligently note, that the Extremities of the said partition are double forked: the hindermost bifurcation is longer than the foremost, and it cleaves unto that same transverse Ligament, which connects the two *Tuberosities* or bunchings out of the brain, and so being spread out like a beam it bears up the Vaulted Arch

of the Ventricles; the foremost bifurcation cleaves unto a little transverse cord, which resembles the Optick Nerve in thickness and in Color.

The same partition which is termed *Septumⁱ Lucidum*, being pulled back, you shall manifestly discern the Vault of the Ventricles, which is called *Corpus Psaloides* or Harpe fashioned body; also you shall see that the foremost Ventricle make but one continued Cavity.

^a T. 16. f. 6. DD. T. 17. f. 2. AA. T. 18. f. 4. AA. ^b T. 16. f. 6. E. T. 17. f. 2. CC. ^c T. 17. f. 2. DD. &c. T. 18. f. 4. F. ^d T. 18. f. 4. by CCC. ^e T. 18. f. 4. DD. ^f T. 16. f. 3. DD. EE. f. 4. CC. DD. &c. ^g T. 16. f. 3. G. ^h T. 16. f. 3. bb. f. 4. B. T. 17. f. 1. F. GG. ⁱ T. 16. f. 3. G. ^k T. 16. f. 3. bb. f. 4. B. T. 17. f. 1. GG. F. ^l

Mean while you shall observe, that the inferior Ventricles placed at the Basis or bottom of the brain, are larger or at least equal unto the superior, and that the continuity of the superior and inferior Ventricles is one and the same: or rather that there are but two Ventricles which contain the whole brain. For the ^a fourth Ventricle lies concealed in the Petty-Brain, and is manifestly seen to be wholly and only there.

Further you shall observe that all the ^b Nerves even the Optick ones, do arise out of those same Roots of the Spinal Marrow; and therefore all the Nerves in the body do arise out of the Spinal Marrow, within or without the brain.

For if those *Prominencies*, which are termed by *Galen* the *Beds of the Optick Nerves*, are productions of the Roots of the Spinal Marrow within the brain; we may with good reason aver, that the Optick nerves themselves do spring from the Spinal Marrow.

Finally you shall see that the moving Nerves that give motion to the Eyes, are continued, and make one Cord as it were: and that the Optick Nerves being bowed or turned back near the Beds of the Optick Nerves, do ascend unto the foremost Ventricles.

You shall likewise see that the *Testes* or *Stones* are ^c portions of the Roots of the Spinal Marrow, growing out of the Brain: and the *Nates* or *bustocks* are portions of those Roots which are derived from the Petty-brain.

And if you shall compare this my description of the Parts which are to be seen in the brain turned upside down, beginning from the basis, with that of *Varolinus*, you will find it larger and different from his. And he that will take pains to do as much, after he has once or twice seen me demonstrate these things, he will acknowledge the truth of them with admiration.

^a T. 17. f. 2. DD. T. 18. f. 4. F. ^b T. 18. f. 13. &c. ^c T. 16. f. 4. cc. ^d T. 16. f. 4. bb.

Now that in the brain the Diseases and Symptomes thereof, may be distinguished as much as may be by their proper places, the whole bulk of the brain must be divided into three Parts, *viz.* The ^e brain properly so called, the Petty-brain and the ^b Marrow of the back.

But I divide the brain, as it is the subject of dissection into three Regions, the uppermost, the Middlemost, and the Lowest. In the uppermost you shall observe the turnings and windings of the brain, the ^d Sickle, and the *Corpus^e Callosum*.

In the Middlemost which is beneath the ^f Vault, you shall observe the Arched ceiling of the said Vault, being the Roof which is placed over the Ventricles; the Partition-Wall, born up by ^g three Pillars; three ^h Ventricles with certain ⁱ Eminencies, which make up a Channel to the fourth Ventricle.

And then you shall observe the *Plexus^k Choroides*, the ^l *Conarium*, and the ^m Petty-brain, and the ⁿ fourth Ventricle therein concealed.

The Parts of
the Supreme
Region.

Of the Middle
Region.

In

Of the lowest
Region.

In the lowest Region, you shall mark the \circ *Choana*, or Funnel, the *Glandula*, or ρ Kernel; the Mammillary, or Teat-like ρ Productions; the seven τ Pair of Nerves; the ζ *Retis Mirabile*, or Wondrous Net; and the Roots of the Spinal τ Marrow.

^a T. 16. f. 6. DD. \circ c. T. 17. f. 2. AA. \circ c. \square ^b f. 2. II. T. 18. f. 4. DD. \square ^c T. 16. f. 1. bb. \square ^d f. 2. AA. f. 5. EE. \square ^e f. 2. BB. f. 3. BB. \square ^f f. 3. bb. f. 4. B. T. 17. f. 1. FGG. \square ^g T. 10. f. 3. G. \square ^h f. 3. DE. f. 4. CD. \circ c. f. 4. E. \square ⁱ f. 4. bb. cc. \circ c. \square ^k f. 5. \circ 6. ff. T. 17. f. 1. OO RR. \square ^l T. 16. f. 4. a. T. 17. f. 1. L. \square ^m T. 16. f. 6. DD. T. 17. f. 2. AA. \circ c. \square ⁿ f. 2. DD. GG. T. 18. f. 4. F. \square ^o T. 18. f. 3. E. \square ^p T. 18. f. 3. D. \circ c. \square ^q f. 3. aa. \square ^r f. 3. BGHIKLM. f. 1. BCDEFG. \square ^s f. 3. PPPP. \square ^t f. 4. DD. \circ c. \square

And forasmuch as *Cassparus Hofmannus*, in his *Book against Montanus*, and in his *Indications*, calls those Men Fools and Blockheads, who suppose that the *Ventricles of the Brain, are the Shops, or Work-Houses where the Spirits are made*; and so confidently, and arrogantly avers it to be impossible, that he accounts it a great Crime or Madness to think otherwise: I shall briefly examine his, by him supposed invincible Arguments, because no man has yet had the Courage to contradict them; only I shall in the first place demonstrate the contrary to be true.

The place where
the Animal
Spirits are
made according
to our Author.

The Animal Spirit is made of the Vital, which is continually brought in great quantity, by the Carotick Arteries to the Basis of the Brain, where the branches meeting, and being woven together, do make the *Retis Mirabile*, from which innumerable branches are derived into the *Crassa Meninx*; that the blood may ascend on every hand to those blood-channels of the *Dura Mater*, which I conceive does alone palpitate, or pant; and I have seen in Fractures of the Skull, that when that Membrane is broken, the brain remains immovable.

Seeing therefore the foremost Ventricles are opened in the Basis of the Brain, and equal in their wideness to the upper Cavities of the said Ventricles, and are close unto the *Retis Mirabile*, from it the Ventricles draw their Spirits, or the Spirits exhaling from that Texture, whose Arteries are exceeding tender and thin, they are brought along into the foremost Ventricles; and soon after, by the third Ventricle which serves instead of a Channel or passage, they are forthwith carried by a straight course into the fourth Ventricle, the Cistern, or Conduit Head of Spirits; that from thence they may be distributed into the inferior Nerves, and into the Cavity of the Spinal Marrow.

But the seven Pair of Nerves are propagated from those four Eminencies; of which the two greater do form, and enclose the sides of the foremost Ventricles; the other two make the sides of the fourth Ventricle, whose Roof, and fore, and after parts, are made up by the double *Apophysis Scolioidea*.

Those four Eminencies are Spongy, and receive Spirits, which ran directly into the Nerves of the Spinal Marrow by the fourth Ventricle.

And no man can deny that the Nerves of the brain are the off-springs of those four Eminencies: and so this Proposition is to be interpreted, *All Nerves of the Body and Brain, do spring from the Spinal Marrow, either within, or without the brain.*

I deny not that the Spirits are diffused through the whole substance of the Brain, and not wholly contained in the Ventricles: but I aver that the Ventricles are the true Shops, or Work-Houses of the Animal Spirit, which is distributed unto the seven Couple of Nerves, and to the Spinal Marrow.

That this is absurd and impossible, *Hofman* does thus seek to prove; 1. *Arg. There is the Spirit made, where the Action is performed.*

The Arguments
of Hofman to
the contrary,
answered.

I Answer, many Actions are performed in parts, in which no Spirits are bred; and I deny that in the Body of the Brain, all Actions are performed. Again, there needs no other elaboration than their passage through the brain: for as the blood of the Veins, passing through the Hearts Ventricles, is in a moment made Vital; so the vital Spirits running through the middle of the Brain, as far as the Ventricle do become Animal.

For

For if it were needful that the Animal Spirit should be elaborated in the substance of the Brain, it would lose much of its subtilty, because the brain is cold and moist.

2^d Arg. of Hofman. *If the Spirit be to act, it must needs be under the command of the Soul in the Vessels; for after that it is entred into the Sea of the Ventricles, what is there to compel the same to return into the strait passages of the Nerves?*

I answer: If the Spirit be diffused into the whole substance of the brain, being really soft as Wax, how can it return into the Nerves, seeing there are no Vessels running through the substance of the brain? Those bloody marks wherewith it is sprinkled, are points of blood dropping down from above, out of the Arteries which runs between the winding substance of the brain. The great Providence of Nature, because the blood could not pierce, nor pass through the midst of the Substance of the brain, hath carried the same through the Channels of the *Dura Mater*, as far as the blood-passages, whence it slideth into the inferior parts, and by the Prefs, or that great Vein which Constitutes the *Plexus Chorooides*, it flows into the Ventricles.

More probable it were to assign the Seat, and Shop of the Animal Spirits in the *Plexus Chorooides*, which is diffused through all the Cavities of the brain, as far as the basis thereof. But shew me (friend Hofman) the way by which the Animal Spirits made of the Vital, may be diffused into the substance of the brain, so as to flow back into the Nerves.

3^d Arg. *The Ventricles are surrounded within, with the Pia Mater, which hinders the ingress and regress of the Spirits.*

I Answer: If the Ventricles have for their Covering, the thin *Meninge*, the passage is thereby the safer into the foremost Ventricles, without any loss at all. I have already demonstrated in an Entrance in the basis of the brain, being the way into the fourth Ventricle; there is no need of a regress for Arterial blood, which ascends upwards by the *Crassa Meninge*, distilling into the brain, does on all sides afford Spirits to the whole brain; neither can the blood penetrate without Spirits.

4. Arg. *Hofmans strongest Argument is this: Seeing the two superior Ventricles, open into the third, and that into the Funnel, and it into the Pallate, who will be Sworey, that the Spirits will not make their escape this way?*

I Answer: This danger is easily shunned by the continual flux and pulse, or driving of the Spirits to the Cistern; and that some hole is exceeding small, and so deep, even to the *Ossis Sphenoides*, that it can equal the length of a Mans Finger.

You who believe that the blood passes from the Right Ventricle of the Heart, through the Lungs, that it may return into the Left, are you not afraid lest we should lose our vital Spirits, when we blow our breath out in Respiration?

5. Arg. *The Ventricles are not continued with the Nerves, but with the whole Body.*

I Answer: If the Nerves proceed from those same Eminencies, which are roots of the Spinal Marrow, between the Brain, and the Petty-brain, and they are principal portions of the Brain; do not the Nerves arise from the brain it self? But you your self have often times written, that the Nerves arise within the brain, from the Roots of the Spinal Marrow,

6. Arg. *The Ventricles have now another Office, which cannot stand with that of the Spirits.*

I Answer: That I deny any such Office. For the *Choana*, or Fannel, can purge away any wheyish Excrements which shall be in the Ventricles; but the great rest part, flowing down by the external windings of the brain unto the basis, falls partly into the *Ossis Echinoides*, or Colander-bone, partly it descends to the basis of the brain; and if not by the *Choana*, yet by other holes near abouts, it is purged into the Pallate.

But because *Hofmans* *Spirits* fail him in handling this *Question* (can you forbear laughing) for they are his own words, we shall also leave him to enjoy his self-love, with a great flock of bleating Animals (so he saies) which follows his absurd Opinion, provided that he be the *Bel-wether*. Let him no more triumph before the Victory, nor let him be so secure and undaunted, as not to fear *Hercules* himself.

Hofmans Tenent
disturbs
the Practice of
Physick.

That same new Tenent of *Hofman*, disturbs the whole Doctrine of Diseases of the Brain: and that I may declare so much, I will chuse not only two Diseases, which have their Seat in the Ventricles, *viz.* The *Epilepsie*, and *Apoplexy*.

The *Apoplexy* he makes to be in the whole Substance of the brain, not in the Ventricles: The *Epilepsie*, he will have to be caused only by vapors ascending into the Head, and diffused through the whole substance of the brain. He allows of no *Epilepsie* from a primary affection of the Head, but only by Sympathy from other parts.

He assigns the Seat of the *Apoplexy* to be in the whole substance of the brain obstructed, and avers that it is caused only by blood-shed forth of the Veins; and makes the Cause thereof to be the obstruction of the *Preis* introduced by *Nymmanus*. But if the *Torcular*, or *Preis* is obstructed, which is the fourth Channal carrying blood into the *Plexus Chorooides*, the passage of the blood and Spirits is intercepted. But according to *Hofman* in an *Apoplexy*, only blood is found shed out of the veins within the Ventricles, and therefore the *Torcular* was not obstructed.

It is a certain and undoubted thing, confirmed by many Experiments, that in the *Apoplexy*, the Ventricles of the brain are obstructed, or there is an obstruction in the *Choana*, or Funnel. But especially the hole of the fourth ventricle which is shut with the *Apophysis Scolicoides*, is stopped by thick and clammy Flegm sticking there; which if it be not dissolved, or removed, being evacuated through the Funnel, it causes death.

If the Matter be serous, and pass into the Spinal Marrow, it causes the Palsie instead of the *Apoplexy*; and so a greater Disease is cured by a lesser, the matter being translated from one place to another. But if blood happen to be shed into the ventricles, present death follows.

But if so be the *Apoplexy* should be produced by blood alone, as *Hofman* will have it; how could blood which was shed into the ventricles, pass into the Nerves without putrefaction, and how could it enter into the Cavities of the Nerves?

In these two Diseases he hath betrayed his own Ignorance, although he could find no such difficulty in the falling sickness, as *Crato* acknowledged, whose Wish was this: *Would to God I could see before I die, the Essence of this Disease, together with the Cure thereof rightly explained.*

The Medicinal Consideration.

Principal
diseases of the
Brain.
Distemper.

The brain is exercised with many kinds of Diseases, with an hot, cold, moist Distemper; with divers Humors, Flegmatick, Choleric, Melancholick, Sanguine, and Wheyish; which either do molest the Membranes of the brain, especially the *Crassa Meninx*, or are diffused into the Channels thereof, and being there stopped of their course, they cause most acute pains: or they slide into the exterior windings of the brain, and by little and little, they distill into the substance of the brain, and the ventricles thereof; or into the hinder part of the Head, or the Petty-brain; or they descend into the lowest parts of the brain.

If the Humor ascend by the Carotick Arteries unto the brain, it may produce the same Diseases; now all Diseases that are caused by consent, or sympathy, without matter, only by evaporation, are not so dangerous, as if they were bred within the brain, so as that the Matter should be therein contained.

Obstruction of
the Cavities.

The brain, besides similar Diseases in Distemper, and Laxity, suffers also Diseases in Conformation, when as, according to the motion of the Moon, its bulk is increased

created or diminished; in the Disorder of its Passages, when the Channels of the *Dura Meninx* are obstructed, especially the fourth, which is called *Torcular*, or the *Prefis*: which being obstructed, is thought to cause the Apoplexy, the passage of the Spirits to and fro being intercepted. Which I do not believe, because the Spirits are shed abroad into the inferior Vessels from that admirable Net of Arteries, called *Rete Mirabile*, and that same Cavity being stopped, only the *Plexus Chorsides*, being defrauded of its blood, is hurt.

The Ventricles are also obstructed, especially the fourth, which being stopped, present death follows, by reason of the stoppage of that continual influx of Spirits, which ought to be into the inferior parts, and the Marrow of the back. *Of the Ventricles.*

The *Choana* may likewise be obstructed, which intercepts the Efflux of serous and Flegmatick Humors, whereby flowing back into the brain, they may cause the Epilepsie, or Apoplexy, and induce divers deadly Diseases. *Of the Choana or Funnel.*

If the anterior, or foremost ventricles, are perforated into the Nostriils, the obstructions of those passages, will be very hurtfull to the brain.

A fault of evil Conformation, cannot be amended exactly; by strengthening and drying the brain, both the fore-mentioned may be helped.

The brain is *Inflamed*, not only the Meninges, or Coats, but sometimes also in the proper substance thereof; whence comes the Phrenzy. and *Siriafis*, or Dog-day midness; but not any *Paraphrenitis*. *Siriafis.*

Siriafis is termed from the Dog-Star; for in the Dog-Daies chiefly, it afflicts both Boys, and elder persons; and therefore it comes rather from an external Cause, as long abiding in the Sun, &c. than from any internal Cause: as a Phrenzy comes only from an internal Cause, whether it be Primary, or Secondary, by consent of other parts in a burning Fever. *Frenzy.*

The Brain may likewise swell, by reason of a Commotion thereof from some internal Cause, it is called *Eoplexis*. Stupidity of the Head after a blow, is a bad sign, according to *Hippocrates*. At length these Diseases bring a Sphacelism in the brain, causing putrefaction, corruption, and mortification. *Tumors.*

Again, it is subject to a watry Tumor, either in its Circumference, or within the Ventricles. If in its Circumference it is termed *Hydrocephalos*, or the Water-Head; and at length the wheyish Humor slipping by little and little, within the ventricles, causes the sleepy Disease, and after it the Apoplexy.

And these I take to be Diseases of the Brain; however *Fernelius* has written, that all the Disorders of the Head, which have been observed by Experience, are symptoms, and not Diseases.

But he Elegantly, according to his wonted fashion, does divide the Symptoms into three Ranks, with reference to the parts affected. Some possess the Membranes; some the substance of the Brain, and some the hollow Passages. *Symptomes of the Brain, Or Membranes.*

In the *Pericranium*, and *Meninges*, Pains are caused. In the Substance of the Brain, which is the seat of the Animal chief Faculties, are contained the Symptoms of Fancy and Reason depraved, such as are, Dotage, Melancholly, Extasies, Lyncanthropy, Madness. Also the Symptoms of Memory abolished, such as are Forgetfulness, Foolishness, Doltishness, and Blockishness. Symptoms consisting in the Cavities, and passages, are very many, appertaining to Sense and Motion; and to sleeping and waking, as dead sleep, sleeping Trance. Symptoms of Motion are walking in ones sleep, to be taken stiff, as it were blasted, or Plannet-struck; the Night-Mare, Convulsion, Falling-sickness, Unquietness, and Tumbling, Shivering, Shaking, Trembling, Palsies, Feebleness of the Limbs, and Apoplexy. *Or in the Cavities, and passages.*

Symptomes in the undue proportion of what should be voided forth, do belong to the passages and Cavities, as a Catarrh, *Rhenmatismus*, Bleeding at Nose. All these Symptoms aforesaid, I will now declare particularly. *Symptomes of the Membranes.*

The *Head-ach*, either occupies the *Pericranium*, or the *Meninges*; if the *Pericranium*, the pain is outwards; if the *Meninges*, the pain is inward. Each of these pains reaches unto the Eyes; because the internal Membranes do produce the Coats of the Eye, called *Cornea*, and *Uvea*; and the *Pericranium* produces the Coat *Conjunctiva*. *Pain.*

The kind of the Pain shews the Nature of the Disease. A sharp and biting pain does argue a Choleric Distemper of the Head; a heavy pressing pain, shews a Flegmatick Distemper: a panting, or pulsing pain, argues somewhat of an Inflammation; A pricking pain shews an Erosion, or gnawing, caused by a sharp Humor, or a Worm which is rare. A stretching pain, argues abundance of Humor, or of windy Spirits, which distend the Membranes.

Now the Pain is either in the whole Head, or in the half, or in some one particle thereof. If it infect the whole Head, it is called *Cephalalgia*; if half the Head, *Hemicrania*, because the brain is divided into two parts: If the pain possess one part, as if a Nail were driven in there, the *Arabians* call it *Clavus*, and *Ovum*; the Nail or Egg. If the pain of the Head be of long Continuance, it is termed *Cephalaea*; which together with the *Hemicrania*, is periodical; but the *Cephalalgia* is a continual universal Head-ach.

A continual Pain of the Head joynd with a continual Fever, and signs of malignity, is exceeding dangerous, according to *Hippocrates* in the Second of his Prognosticks.

Pains of the Head are *Primary*, and *Proper*; or *Secondary*, and by *Sympathy* from other parts; These are not so dangerous as the former.

Symptoms of
the Substance of
the brain.

The Principal Actions of the Brain, Imagination, Ratiocination, and Memory, are diminished, depraved, and abolished. *Depravation of the Fantasie and Reason*, is Raving; the *Imminution* thereof is Foolishness.

There is a three-fold *Hurt of the Memory*; but the Abolition thereof has only found a name, being called *Oblivion*.

Foolishness.

The Cause of *Foolishness*, is every great distemper of the brain, which is known by its Causes, as by signs; or some ill shaping of the Head, which is easily discerned.

Dotage.

Dotage, or *Raving*, consists in absurd Thoughts, Words, or Deeds. The Sayings of such as Rave, are estranged from Truth and Reason, or not to the point in hand; their Deeds are either unusual, or undecent; their Thoughts are absurd, ridiculous, and Chymetical.

Melancholy.

The manner of Raving, ought to be distinguished to know the differences of the Melancholly which causes the same; for a *Delirium*, or raving with depravation of the Fantasie, is termed Melancholly, which consists in a false Opinion touching things past, present, and to come, which being manifold, it is defined by vain fear, anxiety, or sorrow.

Again, Melancholly is either *Primary*, or *Secondary*: The *Primary* has its Original in the brain; the *Secondary* springs from the Hypochondriacal parts, whence it is termed *Hypochondriaca Melancholia*, which is either Humoral, or Flatulent; the former is the worse of the two, and brings at last Madness, and Out-ragiousness.

Exstase.

The Melancholly *Exstase*, is an excess of Melancholly, which is three-fold: An Exstase simply so called; an Exstase with silence; an Exstase with a Frenzy: they are caused by black Choler, according to the divers degrees of its Adulstion.

Foolishness with laughter is better and safer, than with seriousness and fierceness. Raving without a Fever, is so much the better by how much the Parts under the short Ribs, or the Brain, are less heated.

Coma or Dead
sleep.

The Resting, and binding up of the senses, is *Natural Sleep*: The breaking off, or hindrance of sleep, is *Watching*: Either of which being out of measure, is hurtful. If Sleep be profound, 'tis called *Coma*, or *Carus*, Dead-sleep. If this Symptome be mixed of sleep and Watching, so that the Patient seems to incline to sleep with his Eyes shut, but is not able to sleep; it is termed *Coma-Vigilans*, the Drowzy Watch. But if one that has a sleeping Disease upon him, every time he is awakened, does rave, and talk idly, the Disease is called *Typhomania*.

The Night-mare

And if a man lie stiff with his Eyes open, and when he comes to himself, remembers what was done about him, it is termed *Incubus*, the Mare; which is wont to happen

happen in the night to such as lie upon their backs, or have glutted themselves with feasting; and it seems that they are choaked, by some Devil lying upon them, or by some Thief that has laid hold upon them to Rob and Murther them.

The Abolition of all sense and motion saving Respiration, is called *Catalepsis* or *Coma*; whereby a Man is Frozen as it were in that posture he was in when the fit seized upon him. It springs from a Cold distemper of the Brain with Flegm. *Catalepsis.*

Carus is a dead Sleep, which comes upon Feavers and wounds of the temporal Muscles, or from an hot and moist distemper, or from much evaporation with ferocities, moistening the substance of the brain. *Carus.*

A Lethargy is an Imminution of sense and Motion and also of the Memory of necessary things. It Springs from a Primary hot and moist distemper of the brain, joynd with a putrid Humor which provokes a Feaver and cherishes and keeps it up a long time. There is also Dotage adjoynd. Touching this Disease there is a saying of *Hippocrates* in his *Coick*, Page 75. Which explains all the Symptoms thereof. The existence or particular Nature of the Lethargy and *Coma*, consists in a looseness, as that of the *Catalepsis* in a Tension or bending. Those that are in a Lethargick Sleep, at last become Apoplectick. *A Lethargy.*

An *Apoplexy* does oft times primarily and unexpectedly invade a Man, and sometimes it follows some other Sleepy Disease. It is an Abolition of sense and motion with respiration hurt, which at last brings snoring and suffocation, by reason of thick Flegm flowing out of the Funnel and obstructing the Larynx or Wind-pipe. *An Apoplexy.*

It is Caused by a Repletion of the Ventricles of the brain, either with a pituitous or Wheyish Humor, or with blood, some small Artery of the *Rete Mirabile* being broken in the Basis of the Brain, or blood being carried aloft in a Plethorick body by the fourth Channel, rushes into the Ventricles.

If it be Simple and meer Whey, by strength of Nature out of the anterior Ventricles, it slips into the fourth Ventricle, and from thence into the Spinal Marrow and so Causes a Palsie.

If it be a Flegmatick Humor stopped in the fourth Ventricle, or in the third, it cannot be discuss'd, and the brain is overwhelmed thereby.

If the blood be shed out of the Vessels, it suddainly suffocates.

In the *Carus* or other Sleepy Disease, only the foremost Ventricles of the Brain, are overwhelmed with Serosities, so that there is yet freedom for the spirits to pass into all Parts of the body.

But in an *Apoplexy*, all the Ventricles of the Brain, but especially the fourth, are obstructed, and unless the matter be discuss'd into the spinal Marrow, death follows unavoidably.

Fernelius avouches that an *Apoplexy* is bred by an Obstruction of that *Rete Mirabile*, the afflux of Arterial blood out of the Heart into the brain, being thereby intercepted. Therefore they are termed *Carotides*, because being obstructed they cause *Carus* or the Sleepy-Evil.

In the *Apoplexy* and Sleepy Diseases, besides general Medicines, as blood-letting liberally twice or thrice repeated out of the Arm and foot; strong Purgation of watry Humors, Cupping-Glasses fixed unto the shoulders and the hinder Part of the Head, Topical Remedies, are not to be neglected, which draw and Evacuate near the Part affected; such as is the opening of the Veins under the Tongue and of the external Jugular Vein, and likewise of the Temporal Artery; great Vesicatories applyed towards the top of the shoulders to the Cephalick Vein, strong Medicines to provoke sneezing, a Seton in the Neck, the string being often drawn about and anointed with Oyl of Vitriol, that it may bite the more and attract: opening the Veins of the Nose after the manner used by the Ancients, with a split Toothed Quil thrust up as far as the bottom of the Colander: a sharp injection into the *Cure of the Apoplexy, Carus and such like Diseases.*
Nostriils

Nostrils by a Syringe, and within the furrows placed between the spaces of *Ossamenta*: drawing out of the Flegmatick clammy matter which sticks in the Throat and stops the Larynx, but thrusting a feather far into the throat: to which intent a strong vomit is good to cast forth any Humor that has flowed into the Wind-Pipe: neither must we omit extream hard rubbings with salt, and continual stirring of the body, if it be possible.

All which remedies are to be applied with all possible speed one upon the Neck of another, in an Apoplexy, because there is danger in delay. In Sleepy Diseases which proceed slowly, and are caused by matter falling down from the Parts above, they are more slowly administered, and without Precipitation.

You shall observe also, that a great Part of these Humors is gathered together in the turnings and windings which are outmost in the upper substance of the brain, which do either putrefie there, or slip into the ventricles of the brain; and yet these windings of the brain are not considered.

The Palsie.

The Palsie is an Abolition of sense and motion, not in the whole body, as in the Apoplexy, but only in the greatest Part of the body, or in half thereof, which is termed *Hemiplegia*, or in one Part, which is called *Paraplegia*.

Fernelius observes that sense is taken away, the motion remaining unhurt: and sometimes motion is taken away and the sense remains, because of the difference of the Nerves of the brain and the Spinal Marrow. In the Palsie, the Nerves of the Spinal Marrow are obstructed, but those of the Brain not; and therefore many Parts remain unhurt, especially the internal.

Sometimes the Palsie happens without obstruction of the Nerves, because the softning and Humectation of the Nerves, brings a kind of Palsie.

Stupor.

In an imperfect Palsie when motion and sense are only dulled, the Disease is termed *Stupor* or *Nebrosis*, which arises from a moist distemper of the Brain. A Stupidity or dulness of sense and motion in a Fever, is wont to foretell a sleepy Disease to follow. When it comes alone without a Fever, it foretels a Palsie or an Apoplexy.

Vertigo.

Vertigo, is a depravation of sense and motion, which makes the Patient think that all things turn round: it springs from a windy Humor, which being agitated within the foremost Ventricles of the Brain, causes the foresaid Apprehension of all things turning about. If it Causes a darknes before the Patients Eyes, it is called *Vertigo Tenebrosa* or *Scotodinos*. It arises from the Brain or from vapors ascending from the inferior Parts. That is worst which arises primarily from the brain, and it is a fore-runner of the Falling-Sickness.

Convulsion.

The *Convulsion* is a violent pulling back of the Muscles towards their Head or beginning. It is threefold, *Emprostotonos*, when the body is bent forward; *Opisthotonos*, when the body is drawn backward; and *Tetanos* when both sides remain stiff, by reason of an equal bowing or stretching of the Muscles on both sides.

The Cause of a Convulsion, is either an obstruction of the Nerves, or their being pricked by a sharp Humor, or a dry distemper, which dries the Nerves, and so makes them stiff as a dried Lutestring; this is incurable. In one word, all Convulsions are said to arise either from too much emptiness, or over fullness.

Falling Sickness.

An Epilepsie or Falling-sickness, is a Convulsion of the whole body, coming by fits, and hurting the Mind and senses. It is caused by an obstruction of the foremost Ventricles of the brain, caused by an abundance of sharp Humors, either, Choleric or Flegmatick. Either it comes from the Brain Primarily affected, or from some other Part sending Malignant Humors to the Brain. If it proceed from the Brain Primarily affected, it is the more dangerous: if by fault of the Spleen or some other Bowel venomously infected: The coming of the fits may
be

be foreseen and prevented. The former comes in a moment, the latter by degrees.

Fernelius, besides the Humor which is the common Cause, accounts the peculiar Cause to be a venomous Air or vapour, which is exceeding hurtful to the brain; and therefore he conceives, it must be cured with specificks and appropriate Remedies, as well as those vulgar ones.

Trembling is a deprivation of Motion through weakness. It is caused by the weakness of the motive faculty and the bodies heaviness. So that look how much the motive faculty endeavours to lift up the Member, so much does the heaviness of the said Member not sufficiently illustrated with spirits, press it down again. And therefore it arises, from obstruction of the Nerves, or from their being over-much softened, or from some external Cause, as by anointing with Quick-silver, or other Application thereof. There is a certain mixture of the Convulsion and tremblings, which is called *Spasmo-Tremoris*. Trembling.

Shivering and shaking, are motions of the body, which happen in Feavers, and they are forerunners of the fits of Agues, or of the Exacerbations of Feavers. They happen also, to such as have ripe Imposthumes; when the Imposthume is ready to break. And therefore *Hippocrates* observes a threefold Shaking-fit; the one feaverish, the other Ulcerous, and the last Symptomatical. Shivering and Shaking.

Unquietness, Anxiety, tumbling and tossing of the body this way and that way; called by the Greeks *Assē*; is a deprivation of motion, which proceeds from a misaffection of the Stomach, by reason of a sharp Humor Netling and Stinging the Nerves of the body, or the Membranes of the Back-bones Marrow. Which makes that the Sick cannot rest in one place or posture; but are forced every foot to change place and tumble here and there, and to change the posture of their Bodies. Tumbling and Tossing.

Night-walking, ought to be reckoned among the Symptomes of motion deprived: because it is not performed by Judgement and Reason, but by force of a Disease, namely of sharp Fumes which compel the Sick person or the healthy to rise up and walk in their Sleep. Walking in ones Sleep.

I proceed to the Irregularity of the Excrements. The proper excretion of the brain, is either an Exhalation of a thin Vapour by the seames of the Scul or the pores of the Skin, or it is an Efflux of a thick Humor by the Nostrils and Palate of the Mouth. The Disproportion of this Excretion consists either in excess or defect. That in defect has no Name, but it degenerates into a Cause of Diseases of the brain, of which we have already spoken. Symptomes of things voided forth.

The disproportion in Excess is various, either when blood does immoderately flow from the Nose, or by drops. Both which Symptomes are Malignant. The former decays the bodies strength, by reason of the loss of blood and Spirits, the latter betokens a repletion of the Head, and a vain endeavour of oppressed Nature, And therefore drops of Blood coming from the Nose, is bad in a Vaporious Feaver, both as a Cause, and as a Sign. Nose bleeding.

The disproportion in Excretion of a serous and Plegmatick Humor, is many-fold. Their general Name is a Catarrh, which is a distillation of Humor from the Head into the Inferior Parts, from which Parts it receives divers Appellations. If it fall into the Nostrils, it is called *Coryza* or *Gravedo*; if into the Throat *Branchos*, Hoarsness; if into the Mouth and Palate *Pyelismos*, or the Spawle. And these three sorts of Catarrhs, are vulgarly comprehended under the Name of Rheum. Catarrhs.

A Catarrh falling upon the outward Parts of the body is named *Rheumatismus* or *Rheumaticus affectus*, the Rheumatick Pains. If it fall upon the Joynts it resembles the Gout, save that it comes not by fits; wherefore an *Eunuch* may suffer the Rheumatick pains, but not the true Gout. See *Galens* Comment upon that Aphorisme. *Boys and Eunuchs are not troubled with the Gout.* Rheumatismus.

Galen makes frequent mention of the *Rheumatick* Disease, which was common at *Rome*, as it is with us in *Paris*: in his Second Book to *Glanco*: in his Book of *Blood-letting*, against *Erastistratus* &c. This Disease he cured by liberal Blood-letting. It is described by *Hippocrates*, in his Book of the internal Diseases, under the Name of a Joynt-pan, which is wont to trouble young People more than Aged.

The other differences of *Catarths* with Reference to the diversity of Parts on which they fall, are Vain. It suffices to know, that all Fluxions upon internal Parts, are called likewise *Rhenmes*.

The Cause of a *Catarth* or Flux of *Rheum*, is a cold and moist distemper, or an hot distemper with an abundance of Humors working in the Vessels, or without. *Galen* acknowledges both these Causes, in his Comment upon the 24. Aphor. Of the third Book.

The latter Physicians, following the Doctrin of the Arabians will have the Humor which causes the *Catarth*, to be bred in the Head, only without the Vessels, by reason of Vapours ascending.

Fernelius contends that the Conjunct Cause of a *Catarth*, is a ferous matter, collected under the Skin of the Head, without the Vessels: and that the Antecedent Cause, is an Humor shut up in the Veins. If you desire to know more of this subject, Read *Fernelius*, who will give you abundant satisfaction.

Chap. 3. Of the Eyes.

The Eye.

BECAUSE the Eye and the Ear may be demonstrated without meddling to dissect the Face; I will dispatch these Parts, before I proceed unto the Countenance.

Situations.

The Eye, the Instrument of the Sight, is the principal Part of the face, placed in the Fore-Part of the Head, to direct the Actions of the body, because all actions are directed forwards, by reason of the Scituation of the Hands. Seeing it is an

Parts.

Organical Part, made up of many Similar Parts; some of those Parts are external and some internal. The external are the Eye-lids, which are the Coverings of the Eyes, wherewith they are covered, shut and opened. And therefore each Eye-lid is movable, howbeit the motion is more evident in the upper Eye-lids, and is performed by help of Muscles, of which we shall treat in our fifth Book containing the History of Muscles; from whence the Reader may fetch what does appertain to the present occasion.

The Eye-lids.

Its Membrane.

The Eye-lid is made up of the Skin, a Membrane and muscles. The Membrane stretched out under the Skin, is produced from the *Pericranium*, which descending by the length of the Forehead unto the Eyes, is an underwofe for the Eyebrows, withall makes the conjunctive Coat of the Eye, which being fixed to the Brain of the Socket, detaines and binds the Eye in its Hole or Cavity.

Tarsus.

The Extremities of all the Eye-lids, are terminated with a Cartilaginous or Gristle edging, which is called *Tarsus*, whereupon one by one in a row are fastened the Hairs of the Eye-lids; which are born with us, and look how long they are at our Birth, the same length they keep, during our whole life.

Cilia.

They seldom fall off by reason of Sicknes, unless in a Malignant Whores-Pocks, which mows down and makes wast of all the Hairs of the Body. These Hairs of the Eye-lids are termed *Cilia*.

Corners.

The angular Extremities of the Eye-lids meeting together, are termed *Anguli*, the corners of the Eyes. The one is greater, towards the Nose; the other is lesser, towards the Temples.

Tear-Spouts.

In the Eye-lids by the greater Corners are observed two little holes, which are termed *Puncta Lachrymalia*, or the Tear-Spouts, because the superfluous Humidities of the Eyes, or tears, do flow thither and Issue out of those Holes, which Humidities

Humidities to receive, the *Glandula Lachrymalis* or ^a Tear-Kernel is ordained, being thrust into the little perforated bone, that the Humor might rather distill through this Hole into the Nostrils, than fall out upon the external Parts.

The upper Eye-lid has a Muscle that lifts it up termed therefore ^b *Levator* or the Lifter, which arises from the bottom of the *Orbita* or Socket and being spread out upon the Muscle which lifts up the Eye, it is ^c widened into an Eye-lid, that when the Eye is lift up the Eye-lid may therewith be raised.

The *Musculus latissimus*, or broad Muscle is common to the two Eye-lids, which being Circularly derived from the bony brim of the Socket, is spread out through both the Eye-lids, that it may serve to shut them both: and because it reaches in the upper Part as far as the Eye-brow it draws that likewise down, in a strong and close shutting of the Eye-lids. Unless any man will contend, that there is a distinct Muscle for that use.

Now the Eye-brow is a Fleishy Hillock, adorned with Hairs; which serves for a Penthouse to overshadow the Eyes; it is depressed by the Orbicular Muscle of the Eye-lids, and lifted up, by the frontal Muscle.

These things being observed, the Eye-lids are cut away, and the Circular adhesion of the Conjunctive Coat unto the Eye; that the Eye may be viewed, which is compact and made into a round Ball or Globe of the fat which is placed ^d round about the same, to stop up the chinks and to make it more movable; and of six Muscles for motion; and of Coats, Humors, Veins, Arteries and Nerves.

Before the Fat be removed, the two Glandules or Kernels are to be considered in their Situation, of which one is of the greatest moment, *Viz.* The Lachrymal or ^e Tear-Kernel; whose substance you shall observe to be Fleishy, soft and small; and its Situation to be within a little bone, beneath the same.

^a T. 19. f. 1. ^b f. 1. CC. ^c f. 1. beneath B. ^d f. 1. by D. ^e f. 1. E. ^f f. 1. d d.

^a T. 19. f. 1. D. ^b f. 1. AA. ^c f. 1. B. ^d f. 2. AA. ^e f. 1. D.

Then you shall look out the other Kernel which is wholly unlike the former, placed in the other ^f Corner; which is flat, white, and like other Kernels.

The Fat being carefully taken away, the ^a six Muscles present themselves; in the investigation whereof, we must begin at the ^b *Trochleator*, or the greater Oblique Muscle, Scituate at the greater ^c Corner; and there we must be careful to preserve the ^d pulley, being a little strong Gristle fastened to the bone, beneath and close by the *Caruncula Lachrymalis* or ^e Tear-spout; through which Gristle (like a Rope through a Pulley) the round Tendon of the Trochleator is drawn, and inserted into the upper Part of the Eye.

The other, Oblique ^f *Minor*, must be sought for in the inferior Part of the Socket, being ^g tould back under the Eye, it is terminated by the lesser ^h Corner. The other four, are right Muscles, whereof one ⁱ lifts up, and its opposite ^j draws down; the remaining two draw towards the ^k Sides. They all take their Original from the Cavity of the Socket, by the hole of the Optick Nerve, and each one is produced right forwards to the Conjunctive.

These things being observed, the Eye must be pulled out, that the inward structure thereof may be made to appear: and in the first place you shall observe two true Coats of the Eyes, which are Orbicular as the Eye it self: the rest are imperfect Coates; and before you cut a sinder the *Cornea* or Horny-Coat, you shall take away the Nervous productions of the Muscles of the Eye, which some would have to be a ^m Coat, which is absurd.

You shall observe that the *Cornea* or ⁿ Horny Coat is transparent before, to setve the sight, but behind and on the sides, it is dark.

Its thick ° Substance, is divided into little Skins, especially on the fore-side; when it is cut, presently the watery P Humor runs out, which is also found Circumsised about the *Uvea Tunica*, or Grape-Skin 9 Coat, if the *Cornea* be divided in the hinder Part; this Humor cannot be stopped, because it presently Occurs, flowing out like Water.

^f f. 1. E. ^a T. 19. f. 2. BBB. ^b f. 3. F. f. 4. F. ^c f. 1. by D. ^d f. 3. G. ^e f. 1. D. ^f f. 3. and 4. E. ^g f. 1. E. ^h f. 3. 4. 5. A. ⁱ f. 3. 4. 5. B. ^k f. 3. 4. 5. C. D. ^l f. 2. CC. ^m f. 5. *aaaa*. ⁿ f. 6. AA. BB. ^o f. 8. CCC. ^p f. 9. DD. ^q f. 7. AA. CC.

² Uvea.
Papilla.
Iris.

Afterwards you shall see the ^a *Uvea* or Grape-Skin Coat, and its open hole, which makes the ^b *Papilla* or sight of the Eye; the external Face or Circle of the *Papilla* is termed ^c *Iris*, or the Rain-bow. The Circumference of the *Papilla* is adorned with small threds or little Fibres extended upon the Chrystalline Humor, which they retain in its Scituation.

The *Papilla*, in Catts, is manifestly moved, in Men it is unmovable, unless it be somewhat slackened and straitned; by the access and recess of some extraordinary light.

These things being observed, pour out the Humors, and you shall find the ° Chrystallin Humor overwhelmed in the Vitreous ^f Humor, and then the interior & Superficies of the *Uvea Tunica* will appear black, and clean; in Brute Beasts it is varigated, being tainted with Green Black and Sky-Colour. Wherefore, when you are to demonstrate the Eye, you shall have an Ox and a Sheeps-Eye in readiness, that you may compare them with the Eyes of Man-kind.

In the hinder Part of the *Uvea* you shall see the Optick ^b Nerve fastened, and the Marrow thereof piercing within that Coat.

The three Humors of the Eyes.
The watry.
Chrystallin.

There are three humors contained in the Eye; the first is the ⁱ watry Humor, already run out, there remain two fastened together, the Chrystallin and the Vitreous. The Chrystal is like a ^k Vetch, transparent, and being placed upon letters in a Book, it makes them shew larger as a spectacle is wont to do. There is a Membrane attributed thereunto, termed ^l *Chrystalloides*. Hippocrates sayes that in living Creatures it Runs like Water, or is more liquid at least.

The Glasse.

The Chrystallin Humor being pulled out, there remains the ^m Vitreous Humor, being compacted and not running about, by means of the *Reticularis Tunica*, or ⁿ Net-like Coat Interwoven: which being ° cut asunder, by frequent chopping of the Pen-Knife thereupon, it becomes Liquid and runs about, the threddy Fibres being cut in sunder.

Their Vessels

The *Veins* and *Arteries* which accompany the Optick Nerve unto the Eye, are more easily observed within the Brain, than in the Eye after it is pulled out.

Neither is the motive Nerve so easily detected being dispersed among the Muscles, as it is within the Brain, while you observe its progress, even to the very Eye-hole.

^a T. 19. f. 7. A. CC. f. 8. BBB. ^b f. 7. a. ^c f. 5. bb. ^d f. 7. BB. f. 9. BB. ^e f. 9. A. ^f f. 9. CC. ^g f. 7. CC. ^h f. 3. II. f. 4. K. f. 6. C. f. 8. D. ⁱ f. 9. DD. ^k f. 9. A. ^l f. 9. within A. B. a Circle ^m f. 8. AA. ⁿ T. 19. f. 8. aa.

The Medicinal Consideration.

There are divers Diseases of the Eyes.

Although the Eye be but a small Part of the body, yet is there no Part afflicted and destroyed with more Diseases. And therefore the ancient Physitians, when they had diligently examined the structure thereof they observed so many and so divers

divers disorders in its Parts, as did amount to about one hundred and twenty, partly Diseases, and partly Symptomes, and distinguished them by their proper Names; which in other Parts they did not do. And Rome and Alexandria had Physitians that attended only the Cure of the Eyes. In imitation of them I shall declare the disposition against Nature happening to the Eyes. And because most of the Names are Greek, few of them Latin, and our Chyrurgeons use them; after the example of *Leonardus Fuchsius* in his Medicinal Institutions, I will retain and use them as Latin Names.

Of which some are general of the whole Eye,

An Arabian Physitian, *Haly* by Name, has writ a Book by it self of Diseases of the Eyes; and there is a considerable French Book of the same Argument written by *Jacobus Guillemean* the Kings Chyrurgeon; unto which you may add if you please the Author of *Medicinal Definitions*; the Book of *Galen* touching the differences and Causes of Symptomes; and a bastard Book *de Oculis* attributed to him.

The Eye therefore is afflicted either by being encreased, or diminished in its Quantity.

Diseases of Magnitude.

The Eye is diminished, when it consumes for want of nourishment; its Magnitude is augmented when it swells without the Eye-hole or Socket.

Its Situation is changed, when it falls without the Eye-hole, which Disease is termed *Ectopismus*; or if it turn to one side or another, as in Squint-Eyed People, and in him that saw through his Nostrils and was therefore called *Rhinoptis*.

Of Situation.

There ought to be two Eyes; and therefore he that wants one, is diseased in Number, and is called *Monoculus*.

Number.

Furthermore the Eye is troubled by an hot and a cold Distemper and by inflammation of the whole body, which by putrefaction of the Humors is turned into an Impostume. It is sometimes Ulcerated, whence the Eye becomes spoiled and the sight diminished.

Distemper, &c.

And in case an Inflammation of the whole Eye turn to Suppuration, which is called *Hypopyon*, and transparent matter be collected under the *Cornea Tunica*, shewing that the other Humors are not putrified, there is hopes the Patient may recover sight, the quitor being let out by pricking the *Cornea*; which is happily practised at *Paris*; and so with the Quitor a watery Humor is let out, as in the couching of a *Cataract*.

Besides these general Diseases, all the Parts whereof the Eye is made up have their Diseases and Symptomes, which I will particularly and briefly explain, beginning at the Eye-Lids.

Special Diseases of other Parts.

Eye-Lids Diseases.

A moist distemper of the Eye-lids with wind, or a flatulent spirit, is called *Emphysema*. With much wheyish Humor, its termed *Hydatis*, and by *Celsus*, *Vesica*, and *Agnula*, which does so load and depress the upper Eye-Lid, that it cannot be lifted up.

As Emphysema. Hydatis.

An hot distemper of the Eye-lid, Joyned with a thick Humor, is called *Sclerophthalmia*, Hard-eyedness.

Sclerophthalmia.

A dry distemper without Humors, is *Xerophthalmia*; if it cause itching, *Pso-rophthalmia*. Unto which may be referred the *Phibiriasis*, or Lowlie-Evil of the Eye-lid.

Xerophthalmia. Pso-rophthalmia.

If the said hot and dry distemper Joyned with a sharp Humor, do cause Redness, pain, and falling of the Hairs, it is called *Ptilosis*, *Milphosis* or *Madarrbosis*.

Ptilosis.

If it make the inside of the Eye-lid rough its called, *Tracoma*; which if it be great, so as to resemble the small seeds that are in Figs, its called *Sycosis*; if it be hard and of long Continuance, its Name is *Talosis*.

Tracoma. Sycosis. Talosis.

A little Tumor upon the upper Eye-lid springing from a thick Humor, is called *Cristhe*, the Barly-Corn. If it be greater and movable, because of its likeness to hail, it is called *Chalasion*, the Hail-Stone.

Cristhe. Chalasion.

Anchiblepharos.

A Disease of the Eye-Lids in Contiguity is, when the Eye-Lids stick unto the Coat of the Eye, or to one another, which Disease is called *Anchiblepharon*; the cause whereof is an exulceration of the Coat of the Eyes, or the Eye-Lids: The exulceration being caused by an hot and dry distemper, with a sharp Humor.

Lagophthalmia Ippos.

Lagophthalmia is a Convulsion of the upper Eye-Lid, or a drawing back thereof by reason of a Cicatrice or some seam. *Ippos* is the trembling of the said Eye-Lid; both these Symptomes come by Consent of the Brain affected and therefore they are dangerous.

Ectropion.

Ectropion, Inversion, is a Disease of the lower Eye-lid in Scituation of Figure; it is caused by a Scar without, or by an excrescence of internal Flesh.

Chalasis.

Chalasis, or the looseness of the Eye-lid, is caused either by a Palsie, through consent with the Nerves of the Brain; or by a moist distemper of the Eye-lid; in both cases the Hairs are turned inward.

Trichiasis. Dytrichiasis.

The generation of the Hairs of the Eye-lids being depraved, is called *Trichiasis*, and it is twofold; when more are bred than ordinary, tis called *Dytrichiasis*, when there is a row of hairs more than usual. But when the natural hairs are only longer and inverted, tis called *Phalangosis*; in both these, the hairs prick the Eyes; tis caused by a moist distemper of the Eye-lids, with much Humor which is not sharp.

Phalangosis.

Tear-Kernels Diseases.

Euchantia. Rhyas.

The Caruncle or little bit of flesh in the greater corner of the Eye, makes a Tumor against Nature, which is called *Euchantia*; the diminution of the said Caruncle is termed *Rhyas*, which causes a dropping of moisture from the Eye.

Achylops. Agylops.

Near the said Caruncle and the Nose, there breeds an Impostume through inflammation; which is called *Achylops*; which being broken and turned into a Fistula is termed *Agylops*. The Diseases of the Muscles of the Eyes, as distempers, Laxity and solution of Continuity, are distinguished by the Names of the Respective Symptomes.

Diseases of the Tunica Conjunctiva.

Taraxis.

The hot distemper of the Conjunctive Coat with Humor as blood or Cholera, if it be light and proceeding from an external cause, as the wind or dust, or a blow, is called *Taraxis*.

Ophthalmia. Epiphora.

But if it spring from an internal cause as a *Plethora* or *Cacochymia*, it is termed *Ophthalmia*. When it is but beginning, it is called *Epiphora*; which is a Name common to an inflammation and fluxion.

Chemosis. Hypophagma.

And if the Inflammation be very great, so that it hinders the coming together of the Eye-Lids, and spoiles their evenness, so that the white of the Eye becomes higher than the *Iris* and *Pupilla*, it is called *Chemosis*, as much as to say *Hiatus*.

Pterygium.

Hypophagma is a collection of Blood under the *Adnata Tunica*, or an effusion of blood out of the Capillary Veins into the *Adnata*, proceeding from a blow or bruise. There is a Disease of Number, in the *Tunica Adnata*, called *Pterygium*; and it is a certain Membranous Eminency reaching from the greater corner of the Eye to the *Pupilla*; or a certain hard knob of the *Adnata* it self; both springing from a moist distemper Joyned with a clammy Humor.

Phlyctena.

Phlyctena, is a pustle or small Tumor of the *Adnata* or the neighbouring *Cornea*, proceeding from a thick and sharp Tumor, so that it terminates in an Ulcer.

Folliculus. Epicantha.

And if it be hollow, it is called *Batrion*, or *Folliculus*; if it be become crusty tis named *Epicantha*. After the Ulcer follows a Scar, which is the hardness and thickness of a Spermatick Part springing from a wound or Ulcer.

Diseases of the Cornea Tunica.

The Ulcers and Scars of the *Cornea Tunica*, have a great resemblance with the Diseases of the *Adnata*, in regard of neighbourhood; yet are they distinguished, because the Ulcers and Scars in the black of the Eye, that is, in the transparent part of the *Cornea*, belong only to the *Cornea*; such as is the *Cbeloma*, which is a broad Ulcer of the *Cornea*, about the *Iris*.

Cbeloma.

Argemon, is a round Whitish Ulcer of the *Cornea* towards the Circle of the *Iris*.

Argemon.

Scars in the Black of the Eye, or in the Transparent Part of the *Cornea*, do differ in the degrees of more or less. The greater Scar of the *Cornea*, about the *Iris* or *Pupilla*, because of its whiteness is called *Leucoma* and *Albugo*: if it be small it is termed *Nephelion* or *Nebula*, the Cloud; if the Scar be thin, its called *Achylis*, *Caligo*, a Mist or Darknets.

Albugo.

Nebula.

Caligo.

Diseases of the Uvea Tunica.

The Rupture and Exulceration of the *Cornea*, is attended by a Disease of the *Uvea* in Situation, which is called *Proptosis*, *Procidencia*, when the *Uvea* sticks out above the *Cornea*.

Proptosis.

If the Extuberance of the *Uvea* be small, its called *Myocephalon* or the Flie-Head, because it resembles the Head of a Flie; if it be great, tis termed *Staphyloma*, because it resembles a Grape-Stone, or *Melon* as being like an Apple. If there be an inveterate Ulcer of the *Cornea* through which the *Uvea* falls out, its called *Elos*, *Clavus*, the Nail.

Myocephalon.

Staphyloma.

Melon.

Clavus.

The Ulcers of the *Cornea* and *Adnata*, if they be Malignant are termed *Carcinomatosa*.

Diseases of the Pupilla.

The hole of the *Uvea* is termed *Pupilla* the Apple of the Eye. Between the *Pupilla* and *Cornea* there is a space, full of Spirit and Watry Humor.

There is a double Disease of that space; *Zinifsis*, springing from a dry distemper, which consumes the Watry Humor and Dissipates the Spirit; or from a wound, which lets out the watry Humor, and suffers the Spirit to vanish and reek away.

Zinifsis.

The other Disease of the space, is an Obstruction from a corrupted Flegmatick or purulent Humor. If it proceed of a purulent Humor or Quittor, it is called *Hypopium*: if the Obstruction be cause by Flegm, its termed *Hypochoyoma Suffusio*. But *Hypopium* follows an Inflammation, and *Hypochoyoma* is caused for the most Part by a Congestion or Concretion of a thick Humor; if the Disease be proper or primary, and do not arise by consent from the Stomach, sending Vapors up into the Eye.

Hypopium.

Suffusio.

Fernelius saw a thick and perfect Suffusion bred in one daies time; for if a thick Humor suddenly falling into the Optick Nerve do blind a man in a moment; why may not the same Humor falling lower into the *Pupilla*, breed a sudden and perfect Suffusion?

The narrowness of the *Pupilla*, springs either from the stiff formation in the Womb; or from a dry distemper, and then it is called *Phthisis* or *Corrugatio*.

Corrugatio.

Galen writes that a small *Pupilla* from ones Birth is occasion of a very sharp sight; but when it happens a while after, tis bad. In his first Book of the Causes of Symptoms. Chap. 2.

The Dilatation of the *Pupilla* is called *Mydriasis* or *Platu-Coriz*. It springs from a moist distemper, or from a Rupture, or by breach of Continuity caused by a blow.

Mydriasis.

Diseases

Diseases of the Chryſtallin and Glaſſie Humor.

- Diſtemper.** Diseases of the Vitreous and Chryſtallin Humors, are either a diſtemper ſimple or with Humors conjoynd; or ſuch as happen in the conſiſtence of the ſaid Humors, *Viz.* Thickneſs and hardneſs. The diſtemper of the Humors and Coats of the Eye, if it happen without a Tumor or an Ulcer, is commonly attributed to the weakneſs of the Faculty, and the quality and quantity of the ſpirits being miſaffected: but neither of theſe is a Diſeaſe; they are rather effects of a Diſeaſe: for what is the weakneſs of a faculty other than *Actio laſa*, the action hurt.
- Thinneſs of the Spirit.** Thickneſs of the Spirits is cauſed by a cold and moiſt diſtemperature, either proper to the Eye, or by conſent with the brain or ſome inferior Parts.
- Their Paucity.** Paucity of Spirits comes from a dry diſtemper, either of the Eye or the Brain: the Cauſe and ſomenter of which diſtemper may be a Choleric Humor not purged out of the body, being the cauſe and Effect of a diſtempered Liver.
- Glaucoma.** The thickneſs and hardneſs of the Chryſtallin Humor is properly termed *Glaucoſis* or *Glaucoma*, becauſe the colour thereof reſembles that of an Owles Eyes: it proceeds from a cold and dry diſtemper, and is therefore familiar to aged Perſons.
- The Diſeaſe of the Chryſtalline Humor in reſpect of its Scituation, has no name, but if it be ſomewhat higher and flatter than ordinary, it produces a Symptome, whereby all things appear double.
- Running out of the watry Humor.** The watry Humor may run out, by a prick in the Eye, but it is bred again in Children, as *Galen ſaw* by experience, and as we may obſerve in Chickens.
- Thickeſs of the Viſive ſpirits.** The *Viſive* or ſeeing Spirit implanted in the Eye, may become thick, and ſurround the Chryſtalline Humor with darkneſs and obſcurity: as the implanted Hearing-Spirit of the Ear, being rendred thick, does cauſe deafneſs or thickneſs of Hearing.

Diseases of the Optick Nerve.

- Obſtructions.** The Optick Nerve may be troubled with any kind of diſtemper, and with ſolution of continuity; but the proper and uſual Diſeaſe thereof, is Obſtruction, which is known by a ſudden blindneſs, the other Parts of the Eye being all ſound: which made the Neotericks call this Diſeaſe *Gutta Serena*, and ſometimes. *Amauroſis*.
- Amauroſis.**

Diseases and Symptomes of the Sight.

- Cecitas.** Sight aboliſhed is called *Cecitas* Blindneſs; when it is diminished only, 'tis termed *Amblyopia*, thick ſightedneſs; and it is accounted twofold *Myopſis* and *Nyctalops*: In the former the Patient is Pore-blind, and is ſain to look cloſe to what he would diſcern and to hold his Eye-lids almoſt ſhut together. In the latter, the Patient can ſee only by day, but very little or nothing at all by night, or very obſcurely; the other differences of ſight diminished are comprehended under the general name of *Amblyopia*.
- Hallucination.** Sight depraved, is a falſe perception of things before the Eyes; its termed *Paroraſis* or *Hallucination*.
- Causes of blindneſs.** The Cauſes of theſe Symptomes, are no other than thoſe Diſeaſes of the Eyes, which we have before recounted. For the Cauſe of blindneſs is, the Obſtruction of the Optick Nerve, *Glaucoma*, *Lencoma*, *Hypopion*, *Hypochyma*, *Proptofis*, the larger *Mydriafiſis*, a *Pterygium* or Film covering the whole ſight of the Eye, *Anchylo-Blepharon* or Gluing together of the Eye-Lids.
- of Anchylo-Blepharon.** Imminution or Impairing of the ſight, is cauſed by the other Diſeaſes of the Eye-Lids. As by a thin Scar of the *Cornea*, called *Nepheleon* and *Achlyſis*; and by a *Leucoma*

Leucoma and a small *Mydriasis*, which touches but part of the Sight.

Dry distempers of the Humors of the Eyes cause *Myopis*; the over Humidity and thickness of the said Humors, makes a Man that he cannot see in the Night.

The Causes of sight depraved is an *Hypopion* beginning; or an *Hypochyma*, Namely, when the Humor is not yet united and grown together, so that the Visive Spirit can pass too and fro between the Parts of the Humor through the empty spaces; whence it is that some see flies as it were, and certain dark bodies, move before their Eyes.

When true objects presented to the Eyes have a false appearance, the sight is depraved, and termed *Analops*; so all things appear Yellow, to such as have the Jaundice.

But that kind of Symptome happens, when the *Cornea* which is spread out before the sight of the Eye, is infected with Blood or Choler.

The Animal action of the Eye is hurt sometimes, as Feeling and Motion; the Feeling of the Eye is hurt by extream pain thereof, which notwithstanding, according to the Judgement of *Celsus*, remains within the Eyes, and draws not the Brain into content, as pain of the Ears is wont to do. The Causes of all pains in the Eyes, is a distemper, or Solution of Unity.

The hurting of the Eyes Motion, is either a Palsie, Convulsion, or Trembling. In the Palsie and Convulsion, the Eyes become stiff and fixed; in that sort of Convulsion called *Tetanus*, they are unstable, as in the Trembling.

The Natural Action of the Eyes, is likewise hurt, as *Nutrition*.

To the Irregularity of the Excrements of the Eyes, does belong the Involuntary shedding of Tears. Its caused by a moist or cold distemper of the Eyes, or from pricking by a sharp Humor, or some external Cause; or from the Erosion of that same Caruncle, which is in the greater corner of the Eye.

Herunto likewise belongs the filth of the Eyes, which is by the Greeks called *Leimai*; they are caused by an extream distemper of the Eye, which makes a dissolution or melting down of matter.

The simple infirmities of the Eyes, are the spots and Scars of the Conjunctive and Horny Coates, which are both Diseases and Symptomes.

The duskiness and obscurity of the Eyes, is when the Ball of the Eye, does not represent any outward object to him that looks upon it; which is a token of Death in an Acute Feaver.

Myopis.
Nyctalops.

Hallucination
Analops

Eyes pain.

Palsie.
Convulsion.
Trembling.

Flowing out of
tears.

Leimai.

Spots.

Obscurity.

Chap. 4. Of the Ear.

THE Ear, being the Instrument of hearing, is divided into the ^a External Part, broad and grittly, and the ^b Internal, which lies hid in the *Os Petrosum*.

The external Part is termed ^c *Auricula*, made up of a ^d Gristle, which is covered with a Skin full of ^e Folds, and made hollow, with divers ^f windings; with an hole ^g through the same placed upon the side of the Head, just against the hole of ^h *Os Petrosum*.

It is more beautifull, when small; for a great pair of Asses Ears are uncomely.

The Ear was placed as it is, for the conveniency of hearing; and if the Scituation of the Ear inverted would not have been deformed, it hath been more commodious for hearing, then placed as it is upright and Joyned to the Temporal Bone. For we see such as are thick of hearing, put the hollow of their hand behind their Ear, that they may hear the better.

In the Ear you shall observe two Parts; one is called ⁱ *Tragus*, and the other ^k *Antitragus*; the Names of the other Particles of the Ear, are useles.

The Ears Parts.

windings.

Tragus.
Antitragus.

Hole of the Ear. In the Auricula is contained the first passage, or *Hole of the Ear*, and reaches as far as the ^m *Tympanum* or *Drum*; its entrance is fenced with Hairs, to keep out dust and crawling Bugs, that might otherwise enter in. There is collected, the Choleric excrement of the Ear, called *Ear-Wax*, which Bird-Limes and intangles any Dust or creeping thing that would pass that way. Its termed *Marmoratum*.

Ear-Wax.

Concha. The internal Ear concluded in the *Oss Petrosum*, is altogether boney, and divided into three Cavities. The first Cavity is the ^b *Concha*: In the extremity of the first ^c hole is the Membrane stretched out, which terminates upon the ^d *Drum*; it has a string that runs cross it, as we see the Military Drums have.

The Drum.

^a T. 20. f. 1. and 2. ^b f. 3. f. 4. ^c f. 1. and 2. ^d f. 2. BB. ^e f. 2. AA. ^f f. 1. AA. BB. ^g f. 1. GG. ^h f. 3. A. ⁱ f. 1. G. ^k f. 1. D. ^l f. 3. B. f. 4. A. ^m f. 4. BB. ⁿ f. 4. BB. ^o f. 3. C. ^p f. 6. B. C. f. 7. *nithia* A. B. ^q f. 4. BB. f. 5. B. ^r f. 3. B. f. 4. AA. ^s f. 4.

Four little Bones.

Furthermore we observe three little bones, the ^e *Mallet*, the ^f *Anvil*, and the ^g *Stirrup*; others add a ^h fourth, which is a little *Scale* of a bone, such as is found in the *Carotick* Artery near the *Oss Sphenoides*. But this is vain and unuseful.

Fortunatus Plempius places another Membrane at the other extremity of the *Concha*, but how or where it is extended, he does not explain; whether at the two petty windows, whereof the one is the entrance of the labyrinth and the other of the *Cochlea*, or elsewhere? It is a most hard piece of service to find out and demonstrate the internal structure of the Ear.

In the Skuls of ⁱ *Infants*, and in a *Calves-Head*, it is more easily observed, by lifting up with a Pen-Knives Edge, that same portion of ^k *Oss Petrosum*, which within the Skul reaches unto the Basis of the Brain.

In the *Concha* you shall observe on the left side an Hole, which passes into the winding Cavity of the *Apophysis Mastoidea*, or Teat-like Production.

The Nerve.

The Auditory ^l *Nerve*, being ^m drawn through the ⁿ *Cochlea*, when it is come to the *Concha*, it slips through an hole or ^o *Channel*, which opens on the right side of the *Concha*, into the *Pallate*, by the Process which is termed *Apophysis Pterygoidea*.

And this is the natural structure of the internal Ear; for the finding out whereof we are obliged to *Fallopini*, after *Carpus*, who discovered those little bones the *Hammer* and the *Anvil*. The third, namely, the *Stirrup*, *Philippus Ingrassias* brags to have himself first observed.

Implanted Air

In living-Creatures, there is an inbred and implanted Air in the Cavities of the Ears, as there is a visive Spirit in the Eye, shut up within the *Cornea Tunica*.

^c f. 4. G. f. 5. E. f. 7. A. ^d f. 7. B. ^e f. 7. C. ^f f. 7. D. ^g T. 8. f. 5. 6. 7. 8. ^h T. 20. f. 10. BB. ⁱ T. 8. f. 1. FF. f. 3. KK. T. 20. f. 12. AA. BB. ^j f. 10. AA. ^k f. 7. DD. f. 9. Af. 11. BD. ^l f. 8. A. BB. ^m f. 7.

The Medicinal Consideration.

Diseases of the Ear.

The Gristle of the external Ear if troubled with Pustles or Pusshes, is confused, Swells, is inflamed and exulcerated. By cold it contracts Sphacelation, is contracted and dies do what a Man can; as its sometimes cut of both in sick and sound Persons. Whence the Greek phrases *Coloboma* and *Acrotiriasmosis*, for persons that are Crop-Eard.

Parotitis what it is.

The greatness of the external Ear, though it be ill favoured, cannot be helped. The Swelling and Inflammation of the Kernels which are beside the Ears, is termed *Parotitis*, which in regard of the narrowness of the place and nearness to the brain, is

not

not very safe, happening upon an acute fever, though it have the name of *Dioscorus* or *Castor* and *Pollux*, because of its good token, for such it gives when it is critical, proceeding from the strength of Nature, and attended with lightfomness of the Patient following the same. In Children and young People a *Parotid* does many times break forth, void of danger, caused by the over great moisture of their brains.

In the hollow behind the Ear, according to the advice of *Fernelius*, a Caustick must be applyed, in Diseases of the Ears and of the Eyes.

The first Auditory passage of the Ear, because tis fleshy is obstructed by a Tumor, by a Caruncle or bit of Flesh growing up, or by quittor Issuing out, or by Filth, or somewhat from without. It is inflamed, and impostumated, and Exulcerated either of it self, or by means of some eating Medicine poured into the Ear; or by a Choleric Humor; wherefore *Hippocrates* saies that when deaf persons fall into Choleric Looseness, their deafness is lessened, or taken away; and when their looseness is stopped, their deafness returns.

*Of the Auditory
Passage.*

This passage is terminated inwardly by the Drum, which either of it self and primarily, or secondarily and by accident through consent of the Bowels, but especially through fault of the Head, is troubled with a very painful and dangerous Inflammation, which draws the brain into Sympathy.

The internal Cavities, because they have no *Periostrium*, are not pained, unless the Auditory Nerve be affected, whose off-spring makes the Drum; from its inflammation proceeds an Imposthum and from that an Ulcer; which tears asunder the Drum.

*Of the inner
Cavities
Of the Drum.*

It is broken, not only by an Ulcer, but also by a blow and a vehement sound; whence it is that those who dwell by the Falls of the River *Nilus*, are all deaf, by reason of Loud roaring and Headlong fall of the flowing Water.

Also the looseness and over great moisture of the Drum is to be considered, because it may cause Deafness.

The proper Symptomes of the Ear, are those which belong to the hurts of hearing, and the Irregularity of Excrements.

The hearing is hurt in a threefold Manner. What it is abolished, it is called *Surditas*, *Deafness*; which if it come from the womb and is born with the Patient, it is incurable; if it come by accident, it may be curable.

*Symptoms of the
Action hurt.*

Hearing diminished is called *Barucola*, thickness of hearing.

Deafness.

Hearing depraved consists in a noise and ringings or buzzings in the Ear; tis called *Paracousis*.

*Thicknes of
Hearing.
Noise in the
Ear.
Their Cause.*

The Causes of Deafness and Thickness of Hearing are the same, save that they differ in Intension and Remission; and therefore the foresaid Diseases of the Auditory passage and of the Drum may cause these Symptomes.

Paracousis or Noise in the Ears springs from a distemper of the drum, being more moist or more dry than is fitting; which, as it causes a more exquisite sence than ordinary, so also does it cause a ringing in the Ear, as being affected with the very lightest motion of the internal implanted, or external Air, or while the spirits do continually flow into the Ears; which cannot be contained in so close a Room; or some Spirit may stir it self within the Dung-like Cavity.

Several sounds are imagined in the Ears according to the various motion and mode of the flatulent Spirit which causes the same. So that if it be thick, whisperings are heard and Hummings; if thin, Hissings; and when it moves by fits and starts, it presents a tinkling, as it were of bells.

Sometimes noises are imagined without any fault of the internal Ear, by consent of the Head, whiles the internal and external Arteries being hotter than ordinary, do beat more violently than they are wont to do, and do make a great sound in the Ears, if the Patient do lie upon one of them.

The differences and Causes of this seeming Noise in the Ears, are neatly expressed by *Fernelius* in his *Pathologia*.

In natural Deafness, springing from mis-formation in the Womb, and not from any of the Causes aforesaid; whether may we experiment that which fell out unex-

Their Cause.

pectedly well to a certain deaf Man; who thrusting an Ear-Picker very far into his Ear, rent the Drum and Break asunder the small bones, and afterwards attained hearing?

Whether in a tinging of the Ear may the tear like Process be perforated, to let out the Spirits which make a tumult in that Cavity?

Whether does the thickness of the *Tympanum* hinder Transpiration? so that the stultent Spirits cannot break out? whether or no will it avail to rub the extremity of the Auditory Channel, behind the Grinding-Teeth, with Mustard or some other opening Liquor?

Symptomes of
the Excrements,
Excretion of
blood Cholera
stom, quitters;
&c.

The Irregularity of Excrements in the Ear, is not only of Choleric and Wheyish Humors, but also of quitter and blood, proceeding from the brain; neither is so great a quantity of quitor as is avoided, bred in the Cavities, but in the Brain.

If an intollerable inflammatory and pulsatory pain does occupy the hinder parts of the head, and the matter flows thither and there stops, the pain abiding: it will be safe to boar an hole in the hinder part of the Head, that Egress may be given to the quitor: when no great danger is like to follow from the said operation.

Worms.

The Ear-Worms termed *Eblai*, which are voided from the Ears, belong to the Irregularity of things voided from these parts.

It is good in Children for the internal and external Parts of their Ears to run and void much Humor, because it purges their Brain and prevents great Diseases.

There is in Diseases observed a great Sympathy between the Ears, Mouth, Lungs and Wefand: and therefore when the Ears are hurt, the voyce is changed, by reason of the Auditory Nerve, which being spread into the Throat, reaches as far as the Wefand or Wind-Pipes Head.

And when Nature has been accustomed to Purge out the Excrements of the Brain, by the Ears; the stoppage of that Purgation, has made many to die suddenly.

Chap. 5. Of the Face and outside of the Mouth.

The Face de-
scribed.

THE *Face* is the broad and fore part of the head, comprehending the Fore-Head in a living and dead Man without dissection; and therefore the ^a Fore-Head, ^b Eyes, ^c Nose, and Mouth with its ^d Lips, as far as the Chin, do belong unto the Face; which, as it is the subject of Anatomical dissection, is *divided* into the Parts internal and external.

Its Parts.

The *External Parts* are the Scarf-Skin and the Skin, which are thin and very smooth in Women. The internal Parts, are the Muscles of the ^e Nose, ^f Lips, and inferior jaw, whose empty Spaces are filled up with fat.

Moreover the *Musculus Latissimus*, does cover the side of the Face, as far as the Fore-head; yea and it compasses the whole Neck, excepting the hinder Part thereof.

The Muscles of the Lips, are the Extremities of the Mouth: the other Muscles which belong to the lower Jaw, as the ^a Temporal Muscle, the Muscle called ^b *Masseter*, possessing the sides of the Face, shall be explained in our History of the Muscles.

The Mouth
described.

The *Mouth* therefore is a *Slit* in the Skin of the Face, necessary for breathing, speech, and nourishment of the body: for by the *Mouth* we breath, speak and receive our Food.

The Lips.
The Chins.

The extremities of this Slit are termed ^c *Lips* which are moved by Muscles in their opening and shutting.

The utmost bound of the Face is called the ^d *Chin*, as the upper extremity thereof from the Eye-Brows to the beginning of the Hairs is termed the ^e *Fore-Head*.

The sides of the Face are the ^e Cheeks. The internal parts of the Mouth, as the ^g Teeth, Gums, ^h Palate, ⁱ Throat, ^k Tongue, shall be described in order. The ^l Larynx ^m Os Hyoides, ⁿ Pharynx, and the ^o Glandules, appertain unto the Neck.

The Cheeks

The Face, besides Veins and Arteries has a notable ^p Nerve from the third pair, which is carried along between two ^q boney plates, under the pavement of the *Orbita* or Socket of the Eye, and is branched up and down like a Gooses Foot, through the whole Face, by the Nose, as far as the Lips.

The Vessels

^r T. 15. f. 3. A. ^b f. 1. between FF. T. 19. al. ^c T. 15. f. 1. GI. ^d f. 1. NN. ^e f. 1. GHI. &c. ^f f. 1. KLMN. ^g f. 1. RST. &c. f. 2. ABC. &c. ^h T. 10. f. 1. gg.

ⁱ T. 15. f. 1. PP. ^b f. 1. S. ^c f. 1. NN. ^d f. 1. n. ^e f. 3. A. ^f f. 1. O. ^g f. 6. m no. ^h f. 6. LL. ⁱ T. 13. f. 15. A. ^k f. 14. A. &c. ^l f. 9. 10. &c. ^m f. 11. 12. 25. ⁿ T. 3. f. 2. 3. ^o f. 16. 17. &c. ^p T. 18. f. 2. A. ^q f. 2. cc. &c.

The Medicinal Consideration.

The Skin of the Face, is the Looking-Glass wherein are seen the Diseases of the Body, especially of the Liver, Spleen and Lungs; for look what Humor bears sway in the bowels, the same shews it self forth in the Face. If there be a lasting Reddyneis in the Cheeks, it is a Sign of an hot Liver; if the Redness be seated upon the balls above the Cheeks, it argues an hot distemper of the Lungs. If Choler stick in the pores of the Skin, it causes Freckles; if the Colour proceed from being in the Sun, it is termed *Ephelis*. If Redness remain settled on a great Part of the Face, it is named *Gutta Rosacea*, and those who are spotted on that manner are termed *Antirrosei*.

Diseases of the Face.

Sunburning. The Rise.

Paleness is commonly seen in Virgins and such as are recovered out of some sickness.

Green-Sickness.

The Green-Sickness, is a slow Feaver in Virgins and other young Women that want their Courses.

In such as are sickly and crasie, the Colour of the Face is without blood because the whole Mass of blood is wheyish, and therefore the blood of the Face being such, must needs be of an wheyish Colour. Those that are so affected, are called *Lipbemoi*, bloodless. A bad Colour of the Face, both in sick and sound persons, is termed *Cacochroia*.

Furthermore, the Face is made rough and deformed by burning *Pustules*, *Iontbi*, *Vari*, *Fici*, *Navi*, and *Spilloi*.

An hard Push is called *Iontbos*, because it represents a branch of the flowering Violet.

Iontbos.

Varus is an harder knob, and not so red and fiery as the *Iontbus*, *Ficus* is a certain Wart.

Varus.

Lichen, *Impetigo* or *Darta*, is a roughness or Scaly Eminence of the Skin, if it be dry; if it moist, it Exulcerates and runs.

Lichen.

Navi, Warts, are smooth knobs white or blewish; which if they be of a bad Colour, they must not be tampered with, least some worse and cancerous disposition follow; and *Seneca* saies that a face without Warts or moles is not pleasing.

Warts.

It is a wonderful thing how these Warts of the Face do produce others in divers parts of the body, which answer the measure of the Face as far as the Neck. Of which subject *Ludovicus Septalini* has composed a most Elegant Book.

Black and blew Colour in the Skin of the Face, proceeding from a bruise, is called *Hypopium*.

Hypopium.

Spilloi are Sooty Excrements of the Skin, intruded into the pores thereof, which

Spilloi.

are pulled out, either by a pin, or by squeezing the Skin, or by some emollient Medicament or Pomatum, if they be hard and thick.

Pani.

Pani, are scars in the Face.

Mentagra.

Mentagra, an *Impetigo* or Dry-Scab of the Chin, which troubled the Gentlemen of Rome in *Plinius*'s time, where it was a Popular Disease; is a Malignant Scab, which remains many years and is hardly curable, and so alters the Skin of the Chin and Lips, that a Man continues Beardless all his Life Long.

Cynicus Spasmus.

The Action of the Skin of the Face being hurt is termed *Cynicus Spasmus*, The Dog-like Convulsion, or torture of the Mouth expressing the snarling of a Dog; for it is a depraved motion of the Muscles of the Face, belonging to a Palfie or Convulsion.

If it be Paralytick the Retraction is made in the sound Part, because of the dissolution of the opposite parts; if it be Convulsive, the part affected is drawn back: Those Nerves which are affected in this Symptom, do arise from the spinal Marrow between the second and third *Vertebra* of the Neck.

Galen attributed this depraved motion of the Mouth to the Muscle termed *Laxissimus*.

Besides the *Cynicus Spasmus*, there is another Convulsion very ordinary, of the upper Lip towards the Eye, by the disorder of that same Nerve of the third pair described above, which being cut asunder, below the Socket of the Eye, the said Convulsion is healed.

Painting.
Beautifying.

The particular medicining of the Face besides the universal, is twofold, the one called *Cosmetice* painting and plastering with *Fucuses* &c. The other *Cosmetice* beautifying and adorning without any thing laid on; the latter *Galen* allows to take away the ill favouredness of Women; but the former, he disallows in a Physician, and leaves it to panders, bawds and Whores.

The Use of those *Fucuses*, unless Skillfully managed does quickly wrinkle the Skin, such as are the Spanish-White, and *Purpurissus* or Lovely-Red.

The use of the Lips.

The Diseases of the Lips are very many distempers, Inflammation, Swelling, Ulcers, and others consisting in evil conformation, all which pervert the use and action of the Lips which serve to snat the Mouth, from the speech and for the easie reception of meat and drink, to contain the Tongue within the Mouth, to cast forth the Spittle out of the Mouth, for Trumpeters to make a strong blast, for Infants to Suck with, and both in Men and Women to express their mutual affection by Kissing, and to beautifie their Faces; and therefore if a Mans Lip were cut off, he would appear very deformed, just like a snarling Dog.

Diseases of the Lips.

In their Shape.

Such as have great Lips and sticking out, are called *Labeones*; such as are born with imperfect or cloven Lips, are said to have an *Hares Lip*; this defect is amended by Surgery. If the Lips be loose and wagging, it proceeds from a Palfie. He that has the insides of his Lips turned outwards is termed *Brochus*; and he that has swelling Lips is called *Cheilo*. Those are by *Arnobius* termed *Mentones*, whose Chins stick out.

Chops.

Tumors.

The Chops of the Lips are called *Rbagades*. Sometimes Tumors and little bladders break out upon the Lips, especially in Feavers, when Nature drives the virulent Humor out of the Veins and Arteries into the Lips, which *Avicen* saies is a good sign, that the Feaver will quickly cease; and experience does many times confirm the same. Yet sometimes Tumors and Ulcers in the Lips are in Diseases signes of Death, as in the two Brothers *Hermopolemus* and *Andreas* in *Hippocrates*.

Ulcers.

Bad Color.

Bad Colour of the Lips in Diseases is no good sign; in such as are well, it argues a fault in the Lungs or in the blood.

Moles and Warts.

Moles and *Warts* black and blew and Scirrhus sticking upon the Lips, are things to be warily handled, and not to be tampered with by way of Incision.

Sometimes the Lips do naturally swell, especially the lower Lip, when the Jaw is drawn out, and then the lower Teeth before are higher than the upper, and include them.

The

The principal hurt of the action of the Lips, is *depraved Speech*. But this Symptome wants a Name.

The depraved trembling motion of the Lips, happens by consent of the Stomach distempered, by reason of a Membrane common to the Lips and Stomach. Whence it is that those who are ready to vomit, have a trembling in their nether Lip; which trembling is called *Seismos*.

The opening of the Mouth is hurt, when the Jaw is become stiff and immovable; its shutting is hurt when the Jaw is Palsied, as in Feavers, by reason of the Heat of the bowels and Lungs, and difficulty of breathing.

Much spawling, and want of Spittle, do belong to the Diseases of the Mouth, though they have other remote Causes; for Spittle is necessary for chewing of meat, for speech and Tasting; but immoderate spittle is hurtful, and the voidance thereof is accounted filthy and unbecom. Touching the Cure of Lips cut off; *Tallacottius* has written.

Chap. 6. Of the Nose.

THe Nose, the Instrument of Smelling and of cleansing the brain, is placed in the middest of the Face; dividing the Eyes and Face into two even Parts.

The length and breadth thereof is uncomely, if it exceed a Mans Thumb in length and thickness.

The Figure of a Mans Nose contributes much to his healthy living; for an high Nose is better than a flat Nose, and wide Nostrils are to be preferred before narrow ones.

It is divided into two Cavities, which are called Nostrils severed by a partition, and reaching as high as the Colander-bone.

The Depth and wideness of the Nose, are greater within than they appear outwardly: for that same space which lies between the two tables or boards of the Palate and *Os Sphenoides*, divided into two Cavities by the *Os Vomeris*, reaching to the Partition of the Nostrils, belongs unto the Nose.

That space is filled up with *Spungy Bones*, which are portions of the Colander-bone. And those Spungy bones are filled with *Spungy bits of Flesh*, which drink up the Flegm which flows from the Head, that Snevil might not be alwaies dropping out of the Nose.

These bones and Caruncles or Spangy bits of flesh do likewise serve to Filtrate and strain the Air, which, the Mouth being shut, is drawn in at the Nostrils, that it may be imparted pure unto the Lungs and Brain.

The Nose therefore is compounded of Bones, Gristles, Membranes and Muscles.

It consists of *Two Bones*, which stick outwards and fashion the same. *Five Gristles* are dependant upon those bones, two being lateral placed by turnes, and movable through the help of Muscles. They are termed *Pina* and *Ala Nasi* the Wings and Pinnacles of the Nose. There is a Gristle placed between them, which is called *Septum*, the partition, and it depends upon that same boney partition, placed between the bones of the Nose, being a continuation of *Os Vomeris*.

The Nose is clothed externally with the *Cuticula* and *Cutis* under which lie the *Muscles*. The inner Parts of the Nose are invested with a Membrane sprinkled with fleshy Fibres, by the help of which, the *Pinnacles* of the Nose are contracted, when the breath is strongly drawn in; as the said Pinnacles are widened by other external Muscles, the description whereof you shall find in my History of the Muscles. *Book the Fifth*.

To the Nose do belong, the *Seive like plate* of the Colander bone, and the *Mammillary or Teat-like Productions* ending at these bones, and given out to be the Organs or Instruments of smelling.

Some would doubt whether those *Caruncles* or little bits of Flesh which are thrust into the Spungy bones, are the proper Instruments of smelling, or only some way

way subservient thereunto, because when they are overmoistened, or by any Diseases impaired, the smelling is depraved, or wholly lost.

^a T. 5. f. 2. ^b T. 15. f. 3. K.

^a T. 15. f. 6. 1. ^b T. 15. f. 1. G.H. &c. ^c T. 15. f. 5. CC. ^d T. 18. f. 1. 44.

The Medicinal Consideration.

Diseases of the whole Nose

The Griftly Parts of the Nose, are *Inflamed, Bruised, and Ulcerated*; the bony Parts are *broken*; all of them are troubled with *distempers*, but especially with organic Diseases springing from a bad *Conformation*, as when the Nose is crooked inwards like a saddle; which is oftimes caused by external Causes; but if a Child be born with a *Saddle-Nose*, it may be then raised and rectified. For as *Plato reports in his Alcibiades*, the King of *Persia* had a Daughter so born; they did thrust Pipes into the Childs Nose, and reduce it by little and little to its right shap, by widening the bones and Griftles, while they were yet *Waxy* and pliable.

An *over great and high Nose*, cannot be cut shorter without making the party more deformed. If in persons grown up the Nose be Swelled with *Tuberous Excrescencies* of *Flesh*; that fault may be mended by cutting of the said luxuriating *Flesh*.

Of the inside Tubercula Ozena

The inside of the Nose is apt to swell, and is infested with *Inflammatory bunches*, which come to *suppurations*; but far within in the spongy bones and their *Caruncles*, there is bred a filthy stinking Ulcer called *Ozena*, which is offensive both to the Patients and all that come near them, and is very hard to cure. Sometimes the little bones are corrupted and come out at the *Nostrils*. The *Caruncles* being swelled with or without an *Ulcer*, cause the *Polypus*, which falls in to the *Nostrils*, or it fills the hollow places above the *Palate*, reaching as far as the *Throat*.

Polypus

The *Polypus* is neatly described by *Celsus* in his *sixth Book, Chapter the eight*. Unless it be of a *Malignant Color* and *painful*, it may safely be cut away by the *Roots*, if possible, which is the true *Cure*, for otherwise it will grow again; if any part be left remaining after section.

A *Malignant Cancerous Polypus* must not be meddled withal either by cutting, burning, or caustick Medicaments, for if it be exasperated it eats and devours the whole *Face*.

Symptoms of the Nostrils. Smelling lost.

Symptomes of the Nose are either its action hurt, or simple affections thereof, or the Irregularity of what is voided forth. The action of the Nose is smelling, which is abolished, diminished or depraved. The Causes of the smell diminished or abolished, are the same, to wit, the obstruction of the inward passages of the *Colander-bones* and the *Mammillary Productions*, in which the smelling is exercised. If the foremost *Ventricles* be stopped, other parts of the Nose remaining intire, it is known by the perfection of speech, which shews that the *Colander* and spongy bones with the *Mammillary Productions* are free.

Diminished.

Depraved

The Smelling is depraved, when all things seem to stink, and when the Patient perceives a stink in his Nose, which is likewise discerned by the standers by. The true Cause of this Symptome, is a putrified Humor congealed in those Cavities. If the Putrefaction be within the *Seal*, the stink is not perceived by the Patient, but is discerned by those which converse with him, as *Fernelius* judiciously observes.

Spots.

Simple affections of the external Nose, are spots which are black and blew or red, and deform the same. They must be taken away, or corrected with some *Fucus*, if there be no other Remedy.

Nose-bleeding Coryza.

The Irregularity of Excretions, consists in *Bleeding at the Nose*, and in a *Flux of Serosities* therefrom, which causes the *Coryza* or *Gravedo*, or a continual *Nose-dropping*. *Hippocrates* in his *sixth Book of Aphorismes* saies, such as have running Noses are unhealthy.

In bleeding at the Nose, the blood either comes from the Nostrils opened by pricking, or from that same long Cavity of the *Dura Mater*, which reaches unto the Nostrils; if the Veins be opened by the sharpness of the blood or the abundance thereof, after it has flowed a while, it must be stopped by opening a Vein in the Arm, unless the blood flow critically.

Cause of Nose-bleeding.

Fernelius would have all bleedings at the Nose to be stopped, be they what they will, and would have a Vein opened to that end; contrary to the Doctrine of *Hippocrates*. Blood coming from the inner Parts of the Nose may be stopped: but it is very hard to stop the same when it comes from the Menings or Coates of the Brain.

Dropping of blood from the Nose in burning and Malignant Feavers is bad, both as a Cause and a sign, because it does not ease the Patient, and it shews a Plenitude in the brain, and that nature being weak is not able to disburthen her self. In such a case, great care is to be taken of the head by Revulsion, and Derivation of the blood, and by cooling of the Head, for fear of inflammation or some Sleepy Disease.

Its Cure

If bleeding at the Nose be stopped in young people accustomed thereunto, and their brains Ake through fulness, they must be let blood.

The Ancients did open the inward Veins of the Nose, which Practice is left off, because the way they did it, is to us unknown.

Fernelius writes that Wormes as long as ones Finger have been found in Saddle-Noses, being there bred; which at last made the Patients mad and killed them: those Worms were thought to have been cast out of the brain, whereas indeed they were born and bred in the Cavities of the Nose. For Wormes bred in the Ventricles of the brain, cannot come out, unless they should eat a sunder or break the Sieve-like table of the Colander-bone.

That which *Fernelius* has written, is worthy of consideration in reference to Diseases of the Head. That in Nose-bleedings, the blood comes out not from the brain, but out of the Veins of the Nostrils. The Veins (saith he) do run into the Nose not from the inner Parts of the brain, but out of the Cavities of the Mouth and Palate, which are wide and open enough, so as they seem to be the Emisseries of superfluous blood; Even as the Hemorrhoid Veins, and those which belong to the Neck of the Womb. Wherefore the brain being burthened with blood is not eased, if the blood flow not from the Cavities of *Dura Mater*. But I believe it flows out of the brain. And *Galen* and *Aretius* do write, that the Veins within the Nostrils, beneath the Colander-bone, may be opened by Art.

Sneezing may be said to belong unto the Nostrils, because they being vexed do cause Sneezing. Also Sneezing is referred to Diseases of the Head, and especially to the Epileptic or Falling-Sickness, because it is a momentary Concussion or Convulsion of the brain. So saith *Hippocrates* in the seventh Book of his Aphorismes. It is caused by heating or moistning of what is contained in the Ventricles of the brain.

Sneezing.

Chap. 7. Of the Neck.

THAT Part which is interposed between the Head and the Chest, is termed *Collum*, and *Neck*; ordained for the Service of the Wind-Pipe and Lungs, and as a Pillar to sustain the Head upon.

The Neck is.

It ought to be of an indifferent length, that it may be healthy and useful for the body; because a Neck too short consisting of but six *Vertebrae*, by reason of the shortness of those vessels which are carried into the Head, is liable to the Apoplexy or sleepy Diseases; and a Neck too long containing eight *Vertebrae*, does at length bring a Consumption; because the Lungs being shut up in so strait a place do by little and little Wax overhot, and wither away by degrees.

Its Length.

The Neck is made up of divers Parts, which are divided into *Containing*, and *Contained*. The *Containing* are common or proper, the *Contained* are manifold.

Its Parts.

There

There are reckoned two common containing Parts, the Scarf-Skin and the Skin. The containing proper Membrane is its Coat viz. The *Musculus Latius*, which seems to be a Propagation of the *Membrana Carnosa*.

The Parts contained are manifold viz. The Muscles of the ^a Head, of the ^b Neck of the ^c *Os Hyoides*, of the ^d Tongue, of the ^e *Larynx* and the ^f *Pharynx*; which being orderly dissected and taken away there comes in view the ^g *Larynx*, the ^h *Os Hyoides*, the ⁱ *Pharynx*, the ^j Tongue, the ^k Kernels, the ^l four Jugulars, the two ^m Carotick Arteries, A Nerve of the ⁿ sixt Conjugation both descending and recurrent, the Cervical ^o Veins and ^p Arteries; and the greater number of these Parts, is placed in the forefide of the Neck; in the hinder Part thereof are the ^q *Vertebrae*, and the hinder ^r Muscles ordained to move the Head and Neck.

I will reserve the Explication of the Muscles to my *Myologia* or *History of Muscles*, where the Reader may look, if he desire to know the Muscles of every Part.

^a T. 13. f. 18. T. 14. f. 4. &c. ^b T. 13. f. 18. T. 14. f. 2. 3. 4. ^c T. 13. f. 13. &c. ^d T. 13. f. 14. ^e f. 8. 9. 10. &c. ^f T. 3. f. 2. 3. ^g f. 8. 9. &c. ^h f. 11. 12. ABC. ⁱ f. 15. A. ^j f. 16. 17. &c. ^k T. 12. f. 1. cc. ff. ^l f. 2. aa. ^m T. 3. f. 8. ⁿ T. 12. f. 1. gg. ^o f. 2. dd. ^p T. 13. f. 19. ^q T. 14. f. 2. 3. 4. &c. ^r

But you must diligently observe the Kernels placed upon the ^a *Cartilago Thyroides* or Door fashion'd Gristle, which are larger in Women than in Men. In this order therefore you shall search for the Parts of the Neck, and seperate them if you can one from another, or take them out.

Its Vessels.

And first of all, the *Musculus Latissimus* being taken away, you shall search diligently for the Nerve of the ^b Sixt pair, placed between the internal jugular Vein and the Carotick Arteries. The ^c *Internal Jugular* has little valves or shutters near the Claves, but the ^d external Jugular has none.

The *Carotick Artery* at its entrance into the Skul, has two very small thin bones, which hinder and keep back the Arterial blood, when it would flow in too violently.

The *Nerves of the sixt Pair* being both of them tied in a living Dog, he cannot bark having lost his voyce, if only be tied, he barks but faintly and by halves; which is diligently to be observed.

Os Hyoides.

Then you shall consider the *Os Hyoides*, how it is suspended with strong bands and firmly fastened to the *Apophyses Styloides*; how it sustains the *Larynx*, the *Epiglottis* and the Tongue. For the *Cartilago Thyroides*, is by its Hornes annexed to the *Os Hyoides*.

And therefore the *Os Hyoides* is the Foundation of those Parts and yet is it moveable in swallowing; and *Rondeletius* saw one taken Speechless as in a Palsie, by reason of the dissolution of the Reluctancy of the Muscles of *Os Hyoides*; which is a thing to be observed in that bone.

Kern. li.

Besides those Kernels resting upon the *Cartilago Thyroides*, there are other little ones, placed all along the internal jugular and orderly disposed, into which the brain disburthens it self.

Under the lower Jaw, in the upper and former Part of the Neck, are sent two other Kernels, which do often swell, and in them the Kings-Evil is bred.

At the Root of the Tongue are the ^a *Tonsilla*, termed *Antiaedes*; certain Kernels so called. Whose pain and swelling are by *Uiptan* termed *Antiaagri*.

All these Kernels are diligently to be considered in fluxions which happen in the Neck, whether they be the *Scrophule* Kings-Evil or *Bronchocela*.

^a T. 13. f. 1. 28. ^b T. 3. f. 8. AB. &c. ^c T. 12. f. 1. cc. ^d f. 1. ff. ^e f. 2. aa. ^f T. 13. f. 11. 12. ABC. ^g T. 15. f. 6. DD. ^h f. 1. 2. 8. A. ⁱ T. 15. f. 16. and 11. ^j

The Medicinal Consideration.

The Neck is subject to Similar Diseases arising from distemper, and to Diseases Organical, consisting in bad Conformation; if it be too long, or too short, or the *Vertebrae* thereof be out of Joynt, especially the second; in Magnitude, if it be swelled, as in the *Bronchocèle*, Kings-Evil and Squinzie.

Similar Diseases
of the Neck.
The Organical
Diseases, as
Bronchocèle.

Bronchocèle is a swelling in the Neck, near the *Larynx*, arising from an humor collected in that place, or from the Kernel of the *Cartilago Thyroides* being longer than ordinary and producing superfluous flesh; or it is an Imposthume proceeding from the Tumor *Atheroma* or *Steatoma*, or it is a Dropsie. *Bronchocèle* does not proceed, as many have imagined, from immoderate Clamors and Cryings out, or by drinking of melted Snow, as the fashion is among the Inhabitants of the Alpes or other high Mountains; but from thick and clammy Flegm, which slides thither by little and little out of the Head and the external parts thereof, down behind the Eares, Which is the Judgement of *Fernsius*.

It may be questioned, whether the matter be contained between the *Musculus latus* and the Skin, or whether it lie all concealed under the *Musculus Latus*. For if the matter be collected there, it cannot be drawn out, because it is crept in between the spaces of the Muscles.

If it lie outward to the sight, it may be rooted out and cured. It is wont to begin with a wind, which distends and separates the Skin from the Membrane *Carnosa*: or the *Musculus Latus* it self, is separated from the Parts which lie beneath the same.

Into the which space the matter flows by degrees, which differs according to the various temperament and Constitution of the Patients.

It grows by little and little, and receives nourishment, not by the Veins, but by certain little Pipes which Nature creates.

Bronchocèle differs very much from the *Kings-Evil-Swellings*, which rise under the Jaw and in the Neck, of a rounder shape, distinct one from another, or clustered together. They spring from a Flegmatick clammy matter, which drenches the Kernels and makes them swell, and therefore look where there are Kernels, there the swellings arise.

Kings-Evil.

Scirrhus Tumors have in them somewhat of the Nature of the Kings-Evil-Swellings, which makes them suspected. They happen under the Jaws, in the Groins, behind the Ears, and in all Parts of the Body where there are *Glandules* or Kernels. And sometimes in certain places of the Body, a portion of Fat grows hard and makes a Scirrhus Tumor and sometime the Kings-Evil.

The Tumor *Gongroni* is mustered among the external swellings of the Neck. It is caused by an Humor, not so thick as that in the Kings-Evil, or *Bronchocèle*.

Gongroni.

Angina the squinzie, is a Tumor of the Neck either internal or external; or an internal or external inflammation of the Neck.

Squinzie.

The external is properly called *Synanche*, the internal is termed *Cynanche*. *Galen* conceives that this distinction of Names is vain and of no use in Practice. But I account the same necessary. For although general Medicines do serve for both, yet in *Cynanche* where the Patient can neither fetch breath nor speak, the danger is greater; and therefore Medicines are to be speeded with all hast possible, yea and the Wind-Pipe must be opened ere twenty four hours are past, that the Patient may by that means receive breath, till such time as the upper Part of the *Larynx* be unstopped. For in that kind of squinzie, where no outward swelling appears, the *Larynx* alone is inflamed and obstructed. In other Squinzies the Circumjacent Muscles of other Parts are affected; in the *Cynanche*, the Fluxion is in the *Arytenois* and the *Glottis*, and in other *Musculous Carnosities* of the *Larynx*, by which means the passage of the *Larynx* is stopped, and death follows unvoidably, for though there is some little passage left for Liquors, yet no man can live without fetching his breath.

A Lark thrust into the Throat, with some sharp biting Powder sprinkled upon it may do good, as also some strong drawing Medicine or a Veficatory applyed to the *Larynx*, and Scarifications made here and there about the *Larynx*. Touching the Squinzie, read *Hippocrates* in the 27. and 34. Aphorismes of his sixth Book. In the third Book of his Prognosticks, and in the 49. Aphorisme of his seventh Book.

Chap. 8. Of the Teeth and Gums.

Return now unto the inner Parts of the Mouth which are there contained, and may be seen with the Eyes, such as are the Teeth, Gums, Palate, *Uvula* and Tongue, of which in order.

Use of the
Teeth.

I will begin with the *Teeth*, the Instruments of Chewing and of speaking; for those that are Tooth-less cannot well chew and grind their Meat, neither can they pronounce their words clear and plain as they ought to do.

There is a twofold consideration of the Teeth, as they are in Infants, till they are two or three years Old, and as they are in persons of riper years.

Condition of the
Teeth in Infants

In Infants they break out by Course, first the Cutters, then the Dog-Teeth, after them the Grinders, and they have but twenty till they are three years Old, at which time the rest break forth.

These first Teeth are called *Dentes Lactei*, the milk Teeth, which have under them another branch, which will shoot forth another Tooth, if the first be plucked out, or come out of it self.

There are two seasons observed in which Children are most tormented with Tooth-breeding; the one is when they first sprout within the Gum, the other is when they break out of the Gum. And under the Term of Tooth-breeding *Hippocrates* does in a manner comprehend all Childrens Diseases, because Children are troubled with many Diseases upon that account, springing from the pain of Tooth-breeding, and bringing them to their Graves.

In grown Per-
sons.

In Persons grown up the Teeth are distributed into two ranks or rows, according to the two Jaws in which they are fixed. In each Jaw are reckoned fifteen or sixteen Teeth, and they are of three sorts. The first four placed in the forepart of the Jaw, are called ^b Cutters; next them on either side, are the two ^c Dog-Teeth, and after them on each side five Grinders. They are immovably fastned in their *Holes* called *Alveoli*, by that kind of Articulation which is termed *Gomphosis*.

They are bound and fastened both by their proper *Ligaments* and by the *Gums*.

Their Vessels.

They receive Nerves, Veins and Arteries within their Roots, which are hollow, and therefore they are pained more than any other of the bones. The external and bare Part of the Tooth, is termed its *Basis*, the internal which is covered, is called the *Riv*, which is double or triple.

^a T. 14. f. 3. ^b T. 15. f. 6. m. ^c T. 15. f. 6. nn. ^d T. 15. f. 6. oods.

The Medicinal Consideration.

Diseases of the
Teeth in Infants

Tooth-Sickneses of Infants, have two times in which they are wont to torment and kill. The first is when the Tooth first sprouts within the Gum, which is called *Odontismus*, which causes the Gums to swell and be inflamed, brings Feavers, continual Vomiting and Loosness; the other is the time of the breaking forth of the Tooth, which is called *Odontophora*, and then the poor Infants are most of all vexed and tormented with pains.

The

The teeth of grown Persons are troubled with divers Diseases, as *Distempers*, *Dryness* through Age, and *Loosness*; with *Organick Diseases* in Number Deficient, when they fall out; or in Number exceeding, when there are two or three rows of teeth, or when there is but one Bone, in the place of so many teeth.

In *Magnitude* exceeding or deficient, as when there be long gag teeth, that go out of their rank, or when the teeth are too little and worn away.

In *Situation*, when they stand not close together, or when the lower teeth are not just against the upper, or when the upper teeth fall within the lower, or when teeth grow in the *Palate* of the Mouth.

Diseases common are, when the teeth scale and moulder away with rottenness, or when they are broken.

Symptoms of the teeth, are the hurting of the proper and peculiar feeling of the teeth, which is called *Hæmodia*, *Setting of the Teeth on Edge*; or the hurting of the common feeling of the teeth, which causes the *Tooth-Ach*, which is termed *Odontalgia* or *Odontagra* for the likeness it has to pains of the Gout. Pain of the teeth is reckoned among the greatest torments which are in the world, although a tooth be so small a Part. *Celsus*, Book the sixth Chap. 9.

Simple Affections of the teeth are blackness, rustiness and a clammy glauishness (which *Hippocrates* counts the sign of a strong Feaver) also a stony Crust which grows upon them.

Symptoms in the Irregularity of things voided, are, A *Stinking* of the teeth, an excrescence and Worms, which are bred within the Cavities of the teeth, or a flux of blood immoderately flowing, after the drawing of a Tooth, which is sometimes a cause of Death. See *Duretus* in his Comments upon the Coicks of *Hippocrates*, where he explains what is the grinding of the teeth in Diseases.

Dryness of the teeth in sick people, foretels a Convulsion or Madness.

It is worth the enquiry. Whether into the place of a Tooth drawn out, another may be thrust in at the same moment, and fixed in the Room thereof, so as to stick fast and be clothed with the Gums flesh, and to abide and serve to chew the Meat with the other Teeth?

He that shall consider that the teeth have Life, do receive Veins, Arteries and Nerves; do feel, are pained; and firmly tyed and fastened with certain bands into the Gums: will never say that a strange Tooth, thrust into the place of one pluckt out, can be made so like to the other teeth, as to perform the same Office with them and stick there as long as they shall do. Yet some Physicians in favour of a *Norman Tooth-Drawer*, would periwade Men that it is possible to substitute such a Tooth, and they have upbraided me with incredulity and Ignorance, because I am not of their mind.

You are to consider the holes in the upper and lower Jaw-bone, through which are drawn the Nerves Veins and Arteries, which are inserted into the Roots of the Teeth.

In the upper Jaw there creeps an Artery which running towards the Ear, is there burnt, or seared up, and to that place and upon the Temples, an astringent plaster is laid to stop the Veins by which the Flux of Rheum does come.

There creeps an Artery in the Lower Jaw near the Corner, which is to be seared where it beates, or topicks are to be laid thereupon, to ease the *Tooth-Ach* of the lower Jaw.

Sometimes a bony Fungus or Spungy substance grows out of the hole of a Tooth, and comes to be so big as to fill the Patients Mouth, and at length to choak him, if prevention be not used, by cutting off the said excrescence and burning the Root thereof.

You shall observe that the brain hurts the Teeth by Distillation of Rheum, the stomach hurts them by Fumigation or raising fumes and steems which annoy them; and that the Lungs likewise do in some measure dammage the teeth.

That there is a Regeneration of the teeth, and that teeth grow out in every Age of Man, is most certain; yet must we not relie upon this Regeneration of Teeth,

In grown persons

Symptoms of the Teeth are;

Setting on edge
Tooth-ach.

Stinking.

Excrescence

Worms.

Bleeding.

Whether a Tooth may be fastened in the place of one drawn out?

How the Spungy excrescence is taken out of the Tooth-hole.

Whether Teeth do breed in all Ages.

so as certainly to make account thereof, and expect it after seven years are over.
To Cleanse the *Teeth* you shall find an *Admirable Water*, in the 96. *Counsel* of *Fernelius*.

Chap. 9. Of the Gums.

The natural
Constitution of
the Gums.
Preternatural.

THe *Gums* are certain parcels of *Flesh* folded about the *Teeth*, which cover the holes of the *Teeth* within and without; but without they are wider and more swelling. When this *Flesh* of the *Gums* grows *Proud* and covers the *Teeth* more than it should, it causes pain and hinders *Chewing*, also the *Looseness* of the said *Flesh* is troublesome, because it makes the *Teeth* to become loose.

Parulis.
Epulis.
Cancer.

Inflammation of the *Gums* is called *Parulis*; if the *Flesh* grow from an *Ulcer*, its termed *Epulis*. Sometimes the *Gums* are *Cancerated*, and sometimes they bleed immoderately.

The *Gums* are Eaten up by *Ulcers* called *Aphtha*; in the *Scurvy* (which the Old Physicians called *Stomachache* and *Oscedo*) the *Ulcers* of the *Gums* are Malignant.

Aphtha.

Sometimes these *Aphtha* or *Ulcers* of the *Gums* are so Malignant, that they eat into the *Tongue*, *Uvula*, and *Tonsilla*; without suspicion of the *Veneral Pox*. such are described by *Aretaus*, and such appear in that strangling Spanish Disease, which the *Spaniards* call *Garosillo*, and which is common to the inhabitants of *Naples* (who call it *Ulcus Syriacum Fancium*) perhaps by reason of their Commerce with the *Spaniards*, who are much subject to the *Kings-Evil*; and therefore the Malignant Humor of the *Kings-Evil* does Produce such Symptoms in the Mouth and *Jaws*.

Chap. 10. Of the Palate.

The structure of
the Palate.

THe *Palate* is the ^a Vaulted Roof of the Mouth, which is ^a very thin bone, clothed with ^b Nervous Skin, which is wrinkled, by reason of the *Crevesles* which are engraven in the bone; and therefore it sticks very hard to the bone, which has the *Periostium*.

Its Rottenness.

This most tender bone does many times become rotten in the *Whores Pox*, the *Palate* being bored through (if care be not taken in time) whether the infection be lodged in the Mouth, or within the *Nose*; which Hole so bored does much hinder the Patient in *chewing* of *Meat* and in *speaking* unless it be stopped with a *Plate*, *Cotton*, or *Spunge*.

Chap. 11. Of the Uvula and Isthmus.

The use of the
uvula.

AT the inner part or further part of the ^c *Palate* hangs the ^d *Gargaron* or *Uvula*, a *Fleshy Particle*, which is given to mankind to help his *speech*, and to some birds which imitate the *speech* of *Man*; it hangs therefore at the farthest end of the *Palate*, to help our *speech*, being that to the *voyce*, which the *Quail* is to the *Musical Instrument*, whose strings are estrack therewith. It is therefore called the *striker* by *Paulus Agineta* in the 51. Chapter of his sixth Book.

It hinders liquid things from running back into the *Nostrils*, and it purifies the *Air* which enters into the *Wind-Pipe*. Therefore such as have no *Uvula*, are hoarse in *speaking*, part of what they drink runs into their *Nose*, and because of the impurity of the *Air* which they draw into their *Lungs*, they fall into a *Consumption*.

Its Muscles.

It has a *Muscles* for motion, though it be moved very obscurely or rather suspended

ed in *Equilibrio*. Of these Muscles you may read in my History of the Muscles. Lib. 5.

To this Particle are adjoynd certain *Lateral Ligaments*, which being widened and spread forth by a Defluxion of Rhume, they resemble the wings of Bats or Flyter-Mice, and are very troublesome to the Patient. Naturally they ought to be dry, and drawn back toward the Palate bone; they are two, and do include the ^b Kernels termed *Tonsillæ*. Ligaments.

The Medicinal Consideration.

This Part, *viz.* The *Uvula* or *Gargareon* is *Inflamed, Swelled, Lengthened* and grows *Lank*. When it is inflamed it represents a Grape, and is termed *Staphyle*; if it represent a Pillar, tis called *Columella* and *Chion*; if it grow loose and flap by reason of the Rheume, tis called *Chalasis Gargareonis*; and then it is contracted and drawn back, by sprinkling salt or Pepper upon it, whereby the moisture thereof is dried up. Its Diseases.
Staphyle.
Columella.
Chalasis.

If it hang down too much, part of it is cut away; if the lateral Membranes are relaxed it is called *Imantis* by *Aretæus*; who elegantly describes the Relaxation of those Ligaments in his *first Book de Causis Acutorum*, Chap. 8. Of the *Gargareon* read *Hippocrates*, in his third *Progn. sent.* 31. Imantis.

^a T. 15. f. 5. LL. &c. ^b T. 13. f. 15. D. ^c S. 13. T. 15. D. ^d T. 13. f. 15. A.

^a T. 13. f. 15. BB. CC. &c. ^b T. 13. f. 17. and 18.

Of the Isthmus.

Isthmus is a place or space between the *Larynx* and *Pharynx*, seated in the Throat, like a Neck of land between two Seas, which is an *Isthmus*. Isthmus defined
Diseases of
the Tonsillæ

The Kernels there placed are called ^a *Antiaides* and *Paristhmia*. The swelling of those Kernels is called by the same names by which the *Tonsillæ* are called when they are inflamed. Sometimes they swell and grow to such a greatness, that they descend into the Throat like two Apples and hinder the Patient from swallowing and fetching breath.

They are often inflamed and Impostumated, and then they must be pricked deep in with a *Lancet*, to let out the blood or quitor, otherwise they choke the Patient. Sometimes they are infected with *Cancerous Tumors*, which are incurable.

Chap. 12. Of the Tongue.

THe Tongue, which is the Instrument of tasting speaking and swallowing; is made up of a ^b *Fleshy* and *Spongy* substance, compassed about with a thin *Membrane*. Although it seem one, yet is it divided into two *Parts*, which are so separated, although closely connexed; that one side may have the *Palfie* and the other be free, and the one side may be discoloured and the other not. The Tongue's
Substance.
Number.

It is placed in the Mouth and Throat, born up by the *Basis* of the ^c *O: Hyoides*, and tyed with a strong band. It was very conveniently thus seated, that it might discover the *Diseases* which lie hid in three *Cavities* of the Body *viz.* The belly Chest and Head. For it is soaked and tainted with the moist and fuliginous Excrements of those *Parts*, and has the Colour of that *Humor* which bears most *sway* in the *Body*. Situations

And therefore because it is the Instrument of *Tast*, of *speech* and of the *Mind*, it was requisite that it should correspond and communicate with those principal *Bowels*; and therefore as the *Urin* is in all *Diseases* lookt upon and examined, so ought the *Tongue* to be diligently considered. *Hippocrates Lib. 6. Epidem. Sect. 3.*
Text 14. The

The Tongue shews what the Urin is; which *Galen* has confirmed in his Commentary upon that place.

Magnitude. The Magnitude of the tongue is to be considered: for naturally it ought to be as long as a Mans middle Finger, but hardly so thick as the said Finger, and not broader than the breadth of two Fingers. Such is the natural greatness of the Tongue, that it may be fit to speak with, otherwise a thick, over long and over broad Tongue, doth much hinder a mans speaking.

Proglossis. The ^a pointed end of the Tongue, which smites against the Teeth, is termed *Proglossis*; the broad end which lies hid in the Throat, is called *Basis Lingua*, the bottome of the Tongue. That it may not run out too far, or wander from its bounds, it is retained by a band underneath, which is called *Franum Lingua*, the bridle of the Tongue.

Its Vessels. It has Veins from the Jugular, Arteries from the Carotick. The Veins under the Tongue are called *Hypoglossides* or *Ranula*; and two Kernels placed there are likewise termed *Ranulae*, in which, grown round and hard, the foundation of the *Elephantiasis*, a kind of Leprosie is bred, as appears by the swelling of the Lips, Puffs of the Face, and thickness of the Tongue. It has ^c Nerves for tasting and motion. For though it be of it self Voluble in speaking, yet for the more strong motions of chewing, swallowing and spitting, it stands in need of ^d Muscles of which you may read in my *History of Muscles Lib. 5.*

Muscles.

^a T. 13. f. 16. and 17. ^b T. 13. f. 14. A. & C. ^c T. 13. f. 11. and 12. A. ^d T. 13. f. 14. A. ^e T. 13. f. 14. BB. ^f T. 13. f. 14. aa. bb. ^g T. 13. f. 14. B. C. D. E.

The Medicinal Consideration.

Diseases of the Tongue. The Tongue is subject to divers Diseases, Similar, Organick, and common. For it is lyble to all kinds of distempers; to looseness or softness, hardness, Density and Rarity of substance.

Similar. It is Organically Diseased, when it is swollen in all its dimensions and cannot be contained within the Hedge of the Teeth.

Organical. It is inflamed, when the Tumor called *Batrachium* rises under the Tongue, and turnes to an Imposthume; out of which being opened, there flowes a substance like the white of an Egg and sometimes true quitor. If it be removed never so little from its place, the Cause is in the *Os Hyoides*, or in its Muscles, being either Palsied or Convulsed.

Common. It is also Ulcerated by those simple Ulcers termed *Aphtha*, and sometimes with Malignant Ulcers, which putrifie, Eat and consume the same.

whether its substance will grow againe. That the substance of the Tongue may grow again is confirmed by many Histories, and that the same being lost, a man is not wholly deprived of speech.

There have been some seen who could speak distinctly enough, so as to be understood, without a Tongue. But peradventure they had some Part of their Tongue remaining far within, which with the *Glottis* and *Uvula* did frame the Speech.

It: Symptoms. Symptomes of the Tongue, of the first kind, are two, the marring of speech and tasting. Speech is mared three wayes, by Abolition, Imminution and Depravation.

Speech Abolished. Abolition of speech is termed *Anandia*. Depravation of speech is of two sorts, *Tranlotis*, *Psallotis* or *Balbuties*. *Tranlotis* is when the Patient cannot pronounce some one letter, and *Psallotis* or *Psellismus* is, when he cannot pronounce divers letters. *Ischnophonia*, *Stammering*, is a stoppage of the Tongue, so that the Patient cannot proceed in his discourse, but repeats one and the same letter often over before he can proceed.

Tonguetied. *Anchyloglosses* and *Mogilalia* are when the Tongue is tied either too strait or too loose.

Its Vitiated. There is a threefold marring of the Taste, not distinguished by names: for it is abolished, depraved and diminished.

The

The deprivation of taste happens when the Tongue is filled with some evil Humor. So that what ever it tastes is infected with that Humor and tastes thereof. Taste is abolished when the Tongue perceives no taste in any thing.

The motion of the whole Tongue is abolished in the Palsie, diminished when the half of the Tongue is Palsied, without any hurt to the taste.

In a total Palsie of the Tongue, there is great fear that the Patient will fall into an Apoplexy, though *Fernelius* saw none to follow; but we must not be too confident, but meet the Disease when it is coming.

In a total Palsie of the Tongue the Patients are dumb; in a Palsie of half the Tongue, they speak untowardly.

A simple affection of the Tongue, is its Colour changed, which comes not only from the primary distempers thereof, but chiefly by Sympathy with the Bowels.

There is a certain trembling or wavering of the Tongue observed in Diseases of the Brain, which is a forerunner of the Phrensic, according to *Hippocrates* in his Coicks.

Chap. 13. Of the Larynx, or Head of the Wind-pipe.

The Larynx is the Head of the *Aspera Arteria* or Wind-pipe, the instrument of modulating our speech, and the Channel by which Air is breathed in and out.

It is seated in the Forepart of the Neck which is termed the Throat.

In Men it bunches out more than in Women, for the Women have two Kernels placed thereby which swell more than they do in men, and so make the Neck even, taking away that same deformed Protuberancy, which is seen in Men.

It consists of five Cartilages or Gristles, whereof the two greatest do make up the Body of the Larynx; the first is called *Thyroides*, the second *Cricoides*, and those are the two largest and hardest. The third is the *Arytenoides*, which is placed upon the *Cricoides* and shuts up the Larynx. Within there is observed a fourth, which is called *Glottis*, being the principal Instrument of framing the Voyce, which is contracted and dilated with the *Arytenoides*; but the *Arytenois* with the *Glottis*, is so firmly shut, when we draw our Breath in, that it strives against the Muscles of the Throat and Chest which resist the same, to hinder Expiration or the going out of the breath, by which all the Muscles are loosned, and Expulsion ceases from the inferior Parts. Only the *Glottis* Acts, in the Modulation of our Speech.

And that nothing either solid or liquid might fall into the Larynx, it has a cover, which is called *Epiglottis*. It stands alwayes open for Respiration sake, nor is it depressed save by the weight of what is eaten and drunk.

The whole Larynx is Moveable by way of *Ascent* and *Descent*, through help of Muscles, for to Facilitate our swallowing.

Again, two Cartilages or Gristles are moved by themselves *viz.* The *Thyris* and the *Arytenois*. The former is widened and contracted, the latter is shut and opened. For those are contrary motions, which are performed by separated Muscles, which spring from the *Cricois* an immovable Gristle, which is placed to fasten the Gristles and Muscles, as a foundation to make the Circle of the Larynx. Touching the Muscles, I shall speak in my Doctrine of Muscles.

The Larynx though it be Gristly, yet in old Men it becomes boney, and it has been found to be so in some that were to be hanged, whom the Halter could not choak; and not only the Larynx, but also the gristly Channel of the *Aspera Arteria*. Either those parts were boney or the Halter was too thick, so that it could not sufficiently force and rend the same.

Tast depraved.

Palsie of the Tongue.

Tongue discoloured.

The Larynx.

Its Scissuratiō.

Gristles. Thyroides. Cricoides. Arytenoides. Glottis.

Epiglottis

Its motion.

Its Muscles.

The Medicinal Consideration.

Diseases of the Larynx.

The *Larynx* is subject to a distemper, a Tumor and Inflammation, which when it happens, it hinders Speech and Breathing and strangles the Patient without any appearance of swelling without.

Squintie.

Within fifteen or twenty hours it kills a Man, his mind and senses remaining sound and perfect. An Horrid Symptome it is, in which besides general Remedies, if Scarrification of the Neck will do no good, we must proceed *ad Bronchotomiam*, *viz.* To open the Part by Section.

And this Disease is that most Pernicious *Angina* which *Hippocrates* makes mention of; liquid things penetrate into the Stomach, but all breathing is stopped, and consequently sudden death must needs follow.

Privation of Speech. Hoarseness.

The Action of the *Larynx* is breathing, and the forming of speech and singing. Privation of speech is termed *Aphonia*, the depravation thereof is *Rancedo* Hoarseness; the Imminution thereof is called *Iscnophonia*.

Want and difficulty of breathing.

The Interception of Respiration is termed *Apnoia*, the Imminution thereof *Dyspnoia*.

Both these Actions are hurt, either by a proper Disease of the *Larynx*, or of the neighbouring Parts, or of the Parts remote, especially of the Lungs, from whence the matter of speech is supplied and respiration proceeds. For the *Larynx* affected, does only stop the wayes of breathing.

Diseases of the Epiglottis.

The *Epiglottis* has its Diseases; either it is relaxed, or it is too much contracted and straitned, or it becomes hard, whence proceeds difficulty in swallowing.

Some there are who can more easily Swallow meat than drink, and in such the *Epiglottis* is become hard and stiff, so that it will not be born down save by the weight of solid meat, with which that which is liquid slips along.

When it becomes loose and Flaggy by reason of a Catarrh, it cannot be conveniently raised up; and when it is become straiter and narrower than it ought, it does not exactly shut the *Arytenoides*; which causes that crums of bread and some portion of what is drank, do slip into the Wind-pipe.

Nature has provided against this inconvenience, having by the sides of the *Glossitis*, which is almost always shutting, framed and set certain Cavities, which receive, such portions of meat or drink as slip beside, so that they are cast out again by coughing.

^a T. 13. f. 9. and 10. EE. ^b T. 13. f. 1. and 2. f. 8. A.

^a T. 13. f. 3. and 4. f. 9. and 10. DD. ^b f. 5. and 6. f. 10. aa. ^c f. 10. beneath A. ^d T. 13. f. 7. 9. and 10. AA. ^e f. 8. 9. 10. &c. ^f f. 9. and 10. between A. and E. ^g f. 9. and 10. EE.

Chap. 14. Of the Aspera Arteria or Wind-Pipe.

Use of the wind-pipe.

IN the Fore-part of the Neck is placed the ^a Channel of the *Aspera Arteria*, the Instrument of speech and breathing, because it brings Air into the Lungs and carries out footy Vapours; also there the Voice is formed and begins to be Articulated.

Its Gristles.

It consists of many Semi-circular Gristles, which are severed one from another, and are imperfect behind, not filling up the Circle, by reason of the *Oesophagus* or Gullet which lies beneath it, being the Channel of Meat and Drink.

Its Membrane

The *Aspera Arteria* or Wind-pipe is lined within by a Membrane, which is drawn from the Mouth into the inner parts of the Wind-Pipe and *Oesophagus*.

The Medicinal Consideration.

The Pipe of the *Aspera Arteria* is troubled with an hot or cold distemper, with an Humor flowing from the Brain, whence comes *Branchos*, *Raucedo* or Hoarseness.

The Wind-Pipe being wounded is curable and may securely be cut, unto the *Larynx*, between two Gristles, in a very choaking Squinzie.

Whether the wounds of the Wind-pipe are Curable?

May we not experiment this operation in a choaking stoppage and wheezing with rattling in the Wind-pipe, seeing that it may be as safely practised in this case as in the other; that sweet attenuating and cutting Liquors may be taken or forced in, to cut the Flegm and bring it up, if it be possible, and pain, caused by Choughing, hinder not?

^a T. 13. f. 9. and 10. EE. ■

Chap. 15. *Of the Oesophagus, or Gullet.*

The *Oesophagus* is the ^a way for the meat to pass into the Stomach. The beginning thereof is termed *Pharynx*, which is moved by the help of Muscles, ^b to thrust or swallow the meat.

What the Pharynx is.

It is made up of a proper *Fleshy Membrane*. Woven together with straight and Circular Fibres. It has another internal Tunicle which hath its original from the ^c Mouth.

Membrane of Oesophagus.

Within the Chest, that it may give way to the *Aorta Artery*, leaving the Backbone, it inclines and is wreathed a little towards to the right hand.

Two *Kernels* support that part which is so turned aside, and stay it on either hand, which being drenched and swelled with some Humor, do bring a great Impediment to the swallowing.

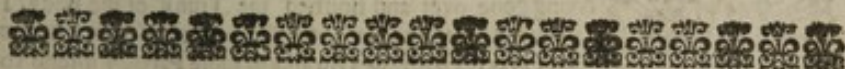
Its Kernels.

Oftentimes the end of the *Oesophagus* which is joynd to the Stomach, and is in *Latin* termed ^d *Stomachus*, is obstructed by a Tumor either proceeding from Flegm or Melancholy, which turns at last unto an Ulcer and brings Death.

Obstruction of the Oesophagus.

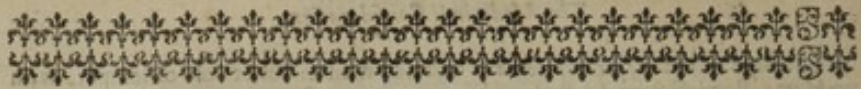
Which Disease is known by the hard descent of solid meat, into the Stomach, which sometimes staves, and many times is vomited up again.

^a T. 3. f. 2. EE. f. 3. FF. &c. ■ ^b T. 3. f. 2. and 3. ABC. &c. ■ ^c T. 3. f. 3. D. ■
T. 3. f. 3. H. f. 4. A. ■



The End of the Fourth Book.





THE
 FIFTH BOOK
 OF THE
 ANATOMY
 AND
 PATHOLOGY
 OF
 John Riolanus,
 THE
 KINGS PROFESSOR
 OF
 PHYSICK.

Chap. I. *Of the Limbs.*

*The Met's of
 bandling.*



*Parts of which
 the Limbs are
 composed.*

Having gone over and finished the Trunk of the Body, I proceed unto the Limbs, whose Muscles, Veins, Arteries and Nerves with the Diseases of those Parts, I intend to explain, which cannot be done without Anatomical dissection.

But before I proceed to that work, it will do very well to contemplate the external Conformation of the Limbs, and withal to shew you what Veins are wont to be opened, and in what places Issues may be made.

The Limbs are made up of the Scarf-Skin, the Skin, the fatty Membrane, the Flesh of Muscles, Veins, Arteries, Nerves, Bones, Ligaments, Gristles and Kernels. These I shall so divide in the Limbs, as I did in the Trunk of the body, viz. Into parts containing and Parts contained.

The Parts containing are the Scarf-Skin, the Skin, the fatty Membrane, and the common Membrane of the Muscles. All the other Parts are contained, being comprehended by these. Touching the Scarf-Skin and the Skin, I shall repeat nothing because

because

because they are the same and all alike in all Parts. The *Membrana Adiposa* or fatty Membrane, is spread out in the Arm as far as the Wrist: and in the Leg, from the Groin unto the Ankles.

After that, follows the common Membrane of the Muscles, which comprehends the Muscles in their natural Situation. In the Thigh the *Fascia Lata* supplies its place.

The Medicinal Consideration.

The Universal Diseases of the *Skin* are divers distempers, simple, or with Humors conjoined. If the distemper be with Humor it makes the Skin rough or swollen, whence springs the Scab, the Mange, the Morphea, Scurf, Leprosie, Tetter, Itch, Puffles, Blains, Water-bladders, Yellow-Blisters, Warts, Scalds, Moles, Biles, Night-Blains, Ring-worms, Lowfie-Evil, Chops, Black and Blewness, Small-Pocks, Meazles, Whores-Pox and *Elephantiasis* or a Cancerous Tumor, over the whole body. Diseases of the Skin.

The Flesh is infested with all kinds of Tumors, Inflammations, Carbuncles, Choleric Tumors, Phlegmatick Tumors, Melancholick Tumors, Cancers, Warty Tumors, Windy Tumors, Imposthumes of all sorts, *Sreatoma* the Fat imposthume, *Atheroma* the Pap imposthume, *Meliceris* the Honey imposthume, an Ulcer, a wound and a Gangrene. Of the Flesh.

An Athletick or Champion-like constitution of body, high fed, and as we say, luffy and full of Beef, is dangerous. *Hippocrates* shews the Reason in his 1. Book, Aphorisme the 3. and *Celsus* saies, that when a Man becomes Corpulent, he ought to suspect least he be fatted to the slaughter. And in *Hippocrates* his Aphorismes we are told, that fat Men are not so Long-lived as lean Men are, and there are some of cold Constitutions, who have hot Stomachs.

Veins and Arteries have Diseases proper to themselves, the Nerves have their peculiar Diseases, and the Joynts have theirs. And the bones are subject to fractures, Dryness, Disjoynting, Rottiness, &c. Which shall be explained when we come to treat of the bones. Of the Vessels.
Of the Nerves.

Chap. 2. Of the Superior Limbs.

THE Limbs both Superior and inferior are divided into three principal Parts, the Arm into ^a *Brachium* from the Shoulder to the Elbow, ^b *Cubitus* from the Elbow to the Hand, and the ^c *Hand*; The Leg into the ^d *Thigh* the ^e *Shank*, and the ^f *Foot*. And forasmuch as the whole Arm hangs upon the ^g *Shoulder-bone*, as the whole Leg upon the ^h *Huckle-bone*, and those bones are not reckoned to appertain unto the Back-bone, the best way is to begin our description of the limbs from them, viz. Of the Arm from the Shoulder-blade, and of the Leg from the Huckle-bone. The general division of the Limbs.
Special division.

Of the Shoulder-blade and the Arm from the Shoulder to the Elbow.

The Shoulder-blade ⁱ Joined to the ^k *Arm*, makes a Joynt: in the bending of which Joynt beneath, *Kernels* are placed, which are counted to be the *Close stools* of the Chest or Heart, as the *Parotides* or *Kernels* behind the Ears, are of the brain, into which those Parts do empty their Excrements: The place of these *Kernels* is called the *Arm-pit*. The Axillary Kernels.

These *Kernels* do frequently Swell, Imposthume, are infected with the *Kings-Evil*, and subject to *Buboes*, yea such as accompany the *Whores-Pox*, as in the Groin. Diseases of the Kernels

This Joynt is liable to be disjoynted, but it is more often vexed with the *Gout*, *Rheumatisme*, and other Fluxions. The strong smell of the *Arm-Holes* proceeds from these *Kernels*. Upon which *Martial* has wittily and neatly played in one of his *Epigrams*. Of the whole Joynt.

*Ladis te quadam mala fabula, qua tibi fertur
Valle sub alarum trux habitare caper :
Hunc metuant omnes, neque mirum, nam mala
valle est
Bestia.*

That is,
An ill Report your Credit (Sir,) does wound,
How that a stinking Goat has dwelling found
Within your hallow Arm-Pits shady Grove,
A beast which all Men fear, and none do love ;
And good Cause why &c.

Of the Cubit or part of the Arm from the Elbow to the Hand.

*The Diseases of
the Joints of
these Parts.*

The Articulation of the *Brachium* with the Cubit, is more hardly disjoyned ; admits Fluxions which do there breed divers Tumors hard to cure. In which case, unless diligent care be taken, the very bones are altered and the Cubit is made crooked, and such as are on that manner crook't, are by *Hippocrates* termed *Galligones*.

If such a crookedness be caused by a retraction of the Muscles, it is more easily cured, than if it come from a repletion of the Cavities by a thick, clammy, condensed and dryed Humor.

The Articulation of the Cubit to the Wrist is subject to many Diseases, the Gout, the *Rheumatisme*, the Tumor *Ganglium* which possesses the tendons of the Muscles; *Flegmatick* Knobs and other Tumors.

Of the Hand.

*Diseases of the
Hand.*

The Hand is divided into the ^c Wrist the ^d After-Wrist and the ^e Fingers. To these Parts the Diseases lately named are common. A Disease in number is here usual in Children from the Womb, *viz.* A Sixth Finger growing to the Thumb or little Finger. It is easily taken away, by the Incision Knife.

Of the Nails.

*Diseases of the
Nails.*

The Fingers are terminated and closed up by the Nails, which are liable to divers Diseases, in Figure, in Magnitude, while they grow thick, wrinkled, unequal, rough, hooked as in leprous persons ; they are also Cleft, and fall off in the time of Sickness and afterwards breed again. The Colour of the Nails is changed in time of Sickness. Also there is a sore Disease of the Nails termed a *White-Loafe* or *Felon*.

A Wheyish very sharp Humor is bred under the Nail near the bone, which causes most bitter and intollerable pains, and brings an Inflammation first of the Hand, and after of the Arm also, unless the Humor be let out, by cutting the pappy flesh of the Finger to the very bone.

The *Pappy Ends* of the Fingers are often corrupted, and putrified, and sometimes the last Joint of a Finger must of necessity be cut off, by reason of a sphacelation of the bone.

*Of the Pappy
Ends of the
Fingers.*

Paronychia Graecorum, viz. Opening of the Skin at the corners of the Nails and Issuing of blood thereat, is a slight Disease, which does not affect the tendons and Nerves of the Fingers Ends, as that *Panaritium Arabum*, a Disease of this Part described by the *Arabian* Physitians.

The

The Antient Phylosophers, and Physicians, were wont to Divine, and tell Fortunes, by the Nails of Mens Fingers: touching which kind of Divination, *Camillus Baldus* has lately written.

^a T. 21. f. 1. C. ^b f. 1. DE. ^c f. 1. FGHI. ^d f. 1. K. ^e f. 1. M N. ^f f. 1. OPQ. ^g f. 1. A. ^h f. 4. A. ⁱ f. 1. A. ^k f. 1. C. ^a T. 21. f. 1. C. ^b f. 1. DE. ^c f. 1. F. ^d f. 1. GH. ^e f. 1. I.

Chap. 3. Of the Inferior Limbs.

THe Inferior Limbs are commonly divided into three Parts; The Thighs, the Shank, and the Foot. The *Oss Ilium* is joyaed to the Thigh, and from thence we are to take measure of the length of the Leg. In the bending of the *Oss Ilii*, and the Thigh, are placed many Kernels, above and beneath; in which divers Buboës arise, both Pestilential, Venereal, and springing from common Causes; of which we have spoken in our Chapter of the *Peritoneum*.

Diseases of the inferior Limbs.

These inferior Limbs are liable to the same Diseases with the superior, which I will not repeat. Proud Flesh is often bred in the hinder parts by contusion of the Thighs, occasioned by long and hard sitting, or riding. *Fernelius* does elegantly explain the material Cause hereof.

It is not caused by afflux of Humors, but only by the nourishment of the Part, which being ulcerated within or without, if it be not stopped, it is by continual access of Nutrimient spread abroad, and swelled, and produces oftentimes as it were certain Pipes of Veins and Arteries, by which it is nourished. So, when the Skin remaining whole, the flesh underneath is bruised and torn, a mighty Swelling does arise by little and little, without any pain, but furnished with exquisite sence, and Natural Heat.

In the Joynt of the Thigh, about the Cavity of the Hackle bone, is bred the Gout called *Sciatica*. If the Humor flow into the *Acetabulum*, and cause the Head of the Thigh-bone to slip out of its place, it breeds a disease in Scituation hard to cure, and which at last causes the Patient to halt.

The Sciatica.

If a very sharp putrid Humor does corrode, and bring corruption into the Joynt, it produces a Disease called *Phthisis Coxariva*, the *Hip-Consumption*, which makes an end of the Patient by degrees. If an Humor flow into that part where the great Nerve arises, which creeps up and down the hind parts of the Leg, *Norba Ischias* or a *Bastard Sciatica* is produced.

The Hip-Consumption.

The Bastard Sciatica.

Swellings of the Knee, either springing from a Flegmatick Humor, or from Inflammation, are oftentimes very dangerous, or long-lasting; and at last do hasten the Patients Death.

Swellings of Knee.

The Foot is divided into the ^a *Tarsus*, ^b *Metatarsus*, and the ^c *Toes*. The first Bone of the *Tarsus* called ^d *Pternna*, is subject to a Disease springing from Cold or Fluxion, which is called *Pernio*, a Kibe: And because this Bone receives a very thick Tendon, if it be bruised and wounded, it causes inevitable death, by the very Convulsions thereby raised.

Kibes.

The Toes of the Feet, by compression, and straitness of Shoes or Boots, have painful *Corns* breeding upon them, the unwary extirpation whereof has sometimes brought a Gangreen into the Part.

Corns.

^a T. 21. f. 1. O. ^b f. 1. P. ^c f. 1. Q. ^d f. 5. B.

The whole Leg from the bending of the Groyn unto the Toes, is sometimes exceedingly swollen with an hard, and ill favoured Tumor, which is called *Elephantiasis Arabum*; the *Arabian* Physicians, Elephants Leg, because it makes the Leg of the Patient resemble that of an Elephant.

The Legs Elephantiasis of the Arabians

But the Shank and Foot are chiefly liable to defluxions which are caused either in such as are newly recovered out of sickness, by the Humors falling down into those parts; or primarily by the evil Disposition of the said parts.

Swellings.

The

The principal matter of these Tumors, is Wind or Water, or a clammy Flegmatick Humor, which produces the swelling called *Oedema*.

Sometimes the Toes of the Feet, as well as the Fingers of the Hand are deficient or superfluous in their Number. There is a little knob grows sometimes under the little Toe called *Genuersa*, because it makes the Patient groan.

ill shape

Diseases consisting in the Evil-shaping of the Shank and Foot are frequent. Hence arose those nick Names *Varus*, one that has crooked Legs bending inward; *Valgus*, one that has Legs bending outward; *Compertus*, one narrow between the Knees; *Scarripeda*, one that has bunching Ankles, that interfere and hinder his going; *Pansus*, one that has a broad or Splay foot; *Alta*, he that treads only on the fore part of his Feet, as it were on Tip Toes; *Plantus*, he that is Splay-footed or Broad-footed, all which Infirmities are seen in grown Persons and in Children.

Some are born with their Legs contracted, others become so by ill swadling in the time of their Infancy, and by untoward Carriage in their Nurses Arms. Sometimes one foot is longer than the other which Causes halting.

stink,
Palfie,

Sometimes the Feet do stink intollerably, by reason of their much heat and sweat, which must be helped. Oftentimes there happens a *Palfie* of the lower Limbs, by reason of a Defluxion of Humors out of the Mesentery, into the Lumbal Nerves. Many times a bastard Sciatica does possess the whole Thigh as low as to the Ankle-bone, even as far as that most thick Nerve does reach, which comes from the *O. Sacrum*. Pains of the Knees are extream bitter and make stout Men cry out. Because of the consent the Knees had with the Veins in the Mothers Womb. And *Pliny* saies that a Mans life lies in his very Knees.

Knees pained.

wounds of the
Ankle.

Fluxions of Rheum into this Joynt are longer lasting, dangerous and hard to Cure, in the Judgement of *Pardus*, which dayly experience does confirm. And a blow or wound in the Anckle, that same great Tendon being bruised or wounded, do bring Death, not without great Convulsions, so saies *Hippocrates*.

Chap. 4. In what places Issues are commonly made

Places of Issues,
in the Crown of
the Head.

NOW I will shew you in what places Issues are to be made to purge out Wheyish Humors, which flow either through the Vessels or between the Skin. I will begin at the Head.

And first of all an Issue may be made where the sagittary and coronal Sutures meet. You may find the place by applying your Wrist to the Nose of the Patient, and observing how far you can reach upon his head with your middle Finger, for there the Issue must be made.

The Hind part
of the Head.

Also in the hollow part of the *Occiput* or hind part of the Head. But if you find no fitting Cavity there, you may apply your Caustick on either side of the Additions of the *Sutura Lambdoides*.

The Fore part
of the Head.

Likewise in the hollow behind the Ears, when the Eyes or Ears are Diseased.

The Neck.

Sometimes on either side of the Neck, as far as the third or fourth *Vertebra*.

To: Arm.

In the middle of the Arm between the Muscles *Deltoideus* and *Biceps*.

The Breast.

In the Breast, two or three may be made according to the Longitude thereof, in Diseases of the Chest and Lungs.

The Thigh.

At the bending of the Buttocks, at the Ends of the Muscles called *Glanis*, where the Thigh is perceived to move upon the Joynt, an Issue may be made, in a perfect Sciatica when the Humor possesses the Cavity of the Joynt.

The Leg.

Issues are made within side the Thigh, two Fingers above the Kneé; also on the inside of the Leg, two Fingers beneath the Ham.

The Loins.

Sometimes to turn away Fluxions into the Thigh, Issues are made upon the Loins, near the Back-bone, on each side the said bone.

Chap.

Chap. 5. Of Veins usually opened.

I Proceed unto such Veins of the whole body as are usually opened. Veins which now a days are opened in the Head, are in the Forehead, the hinderpart of the Head, and in the Temples.

The Veins which are wont to be opened in the Forehead, Hind part of the Head,

The Forehead Vein is termed ^a *Praparata* or the ready Vein, because it is evident, and there is no need to Shave the Hair to come at it, as must be done in the Vein behind the Head, which is termed *Vena Puppis*, the Aftership Vein.

The Antients did open the Veins behind the Ears, but that operation is now out of use; *Hippocrates* saies the cutting of those Veines made the *Scythians* barren; perhaps he meant the Arteries in those Parts. The manner of opening these Veins *Albucasis* does teach us in his 2. Book Chap. 97.

Neither is it unprofitable to open the Veins of the Head, by reason of the external Veins, which through the holes of the Scalp have communion with the *Meninges*.

I know *Hieronimus Fabricius ab Aqua Pendente* disallows the opening of those Veins, because oftentimes they do not appear. But if the Head be rubbed, and the Hair shaved off and then again rubbed, they will be more evident, provided you throate the Neck a little with a Towel or Napkin.

The ^b temporal Vein is also cut as is the Artery, in great and continual pains of the Head.

In the Temples.

The Antients did open the inner Veins of the Nose, as appears out of *Hippocrates* in divers places, and from *Galen* his 6. Book of *Epidemicks*. The latter *Greek* writers, *Paulus Aegineta* and *Aretaus*, mention the opening of inner Veins of the Nose; and *Aretaus* himself, declares the Instruments which the Antients used, to provoke those Veins to bleed. But if the blood, according to the Opinion of *Fernelius*, do flow from the Veins of the Face, which creep into the inner Parts of the Nostrils, the Head being oppressed with plenty of blood, cannot be eased, because that same Irritation and opening of the Veins ought to be performed near the Colander bone, that the Longitudinal passage creeping unto the Nostrils may be opened, therefore I conceive those Parts are frequently to be fomented with Luke-warm Water, before we use those Instruments propounded by *Aretaus*.

In the Nose.

The manner of opening those Veins propounded by *Albucasis*, may be admitted, but it does not penetrate to the inmost Part of the Nostrils, as far as the Colander bone.

The Veins under the Tongue termed *Ranulares* are more frequently opened with good success, in Diseases of the Throat and Head. Only *Aurelianus* against *Diocles* has disallowed that Practice, alleadging that it fills the Head, and the blood cannot be stopt. *Lib. 1. Act. c. 12.*

In the Mouth.

True it is that in some the blood has Issued so plentifully, that it could very hardly be stopped, as was observed in a *Capuchin Fryer*, *Father Joseph le Clerc*, the great Politian and familiar friend of the Cardinal *Richelieu*; as *Simon Pimpernel* a most expert Surgeon of *Paris*, himself told me, he having opened the said Veins, in the Fryer aforesaid.

In the Neck the ^a external Jugular is opened. *Trallianus* in Cure of the *Squinzie* opened the same with good success *Lib. 4. Chap. 1.* And *Soranus Ephesius*, in his Introduction *Chap. 12.* Commends the opening of this Vein. In like manner *Aetnarius* commends this Practice in dangerous Diseases of the Head. *Casalpinus Lib. 2. Quaesf. Medic. Chap. 12.* Commands the opening of this Vein in a *Squinzy*, because the Jugular Veins are more filled, than the throat and Mouth of the *Larynx*.

In the Neck.

Prosper Alpinus in his 2. Book of the *Egyptian manner of healing Diseases Chap. 9.* Writes that this is a common Remedy in that Country.

^a T. 1. f. 1. H. ^b T. 1. f. 1. I. ^c T. 1. K.

Jacobus Corpus in his *Anatomical Introductions*, shews the way to open those Veins. Read *Paulus Magnus Lib. de Phlebotomia* printed in the *Italian Tongue*. And *Rondeletius* in his *Methodus Medendi*; *Ludovicus Mercatus Chap. 13. Method. Medend.* And *Albucasis Lib. 2. Chap. 97.*

In the Back.

Rondeletius tells us of a Vein in the Back *Lib. 1. Methodi Medendi. Chap. 37.* Which he saies is to be found, in the first *Vertebra* of the Back; it is seen elevated on the top of the *Vertebrae*, creeping down the back, as far as *Os Sacrum*. It seems to flow from the brain according to the Longitude of the spinal Marrow. He let us know that this vein is profitably opened, in the *Tetanus* and Falling-Sickness, and if it be not so visible as to be opened, in that place must Capping-Glasses be fastened with Scarification.

Ludovicus Mercatus in *Lib. 1. Practica Chap. 19.* Commends this Remedy against the Convulsion. *Hippocrates* in his *Book de Vasa*, burnes and pricks the Veins of the back; which Remedy is propounded by *Alexander Benedictus Lib. 1. de Morbis Carandis, Chap. 5.* And *Gastivaria* advises to open the same in his *Comment upon the 9. Book of Rhasis.*

In the Arm.

In the Arm three Veins are opened, the *Cephalick* or *Head Vein* accompanied by an *a* Artery without any Nerve, and therefore it is opened without danger. The *Basilica* and *Mediana* are opened, but the *b* *Basilica* must be opened with prudent Wariness, by reason of an Artery near the same and the Tendon of *Musculus Biceps*; which lies beneath it; neither is the *c* *Mediana* void of the like danger.

In the Hand between the Ring Finger and the little Finger, the *d* *Salvatella* is opened, the opening thereof many account superstition; howbeit *Hippocrates* opened the Veins of the Hands; and this Remedy has not been rejected by learned Physicians, especially in long lasting Sicknesses, and in the *Quartan* Ague at the Conjunction of the Sun and Moon; which I have known to have succeeded happily both to other Physicians, and to myself, in old *Quartans*, after the use of divers Medicaments.

It is not our Custom to open the Veins in the lower part of the Thigh above the Knee; yet *Lazarus Sotus* saies that they are opened in *Portugal* in his *1. Book of Animadversionis, Chap. 4. Sect. 16.* To stop gouty Defluxions into the Legs, and to diminish the deformity of the *Varices* or black swoln Veins of those Parts, the Ancients were wont to open them. And *Platerus* commends this Remedy to diminish the *Varices*. Which may be confirmed out of *Galen Lib. 2. Method. ad Glauconem.*

In the Foot.

In the foot is opened the *a* *Saphena*, which is above the *Malleolus internus* or inner Ankle bone; or the continuation thereof in *Tarso*, or the swelling side of the Foot between the Heel and the great Toe.

Sometimes the *b* *Ischiadica Vena* or *Sciatica* Vein, is opened, which is Scituate in the external Ankle. But this vein ought not to be opened without very great heed to the place where the Orifice is made, because of an Artery near, and Tendons very near the same.

'Twas usual with the Ancients to open the *c* *Ham Vein*, which is now a daies seldom performed, and quite out of use; nevertheless the opening thereof would be as beneficial as is the opening of the Arm Veins.

whether the
Foot Veins may
be opened and
how?

It might be conveniently opened if the Leg be put into a Vessel of hot Water above the Knee, and rubbed, as is usual in bleeding at the Arm; also a double Ligature may be used, one above and the other below the Knee. It is easily found and safely opened, below the hollow of the Ham, at the beginning of the *Musculi Gemelli*; and a sick Woman as she lies in her bed, may as conveniently present her Leg as the Arm, being covered with the sheet or other fitting covering.

Though the *Sciatica* Vein and the *Saphena* are branches of the Crural Vein; yet, because the *Sciatica* Vein does answer the *Basilica*, as the *Saphena* does the *Cephalica* of the Arm; certain it is, blood is drawn by a more direct way from the

the Sciatica Vein, then from the *Saphena*. Howbeit *Galen* in his second Book *Secundum Locos* Chap. 2. The Sciatica Vein not appearing admits the *Saphena* to be opened instead thereof. And if it appear not in the outward Ankle, its branch must be opened, on the *Tarsus* or pulp of the Foot beneath the Ankle, or above the Ankle, if it be visible.

Its also possible to make it the more apparent by such a kind of Ligature as the Author of the Book *de Anatomia Vivorum* has described, made with a long and broad Swath-bath brought from the top of the Hip as low as the Ankle.

^a T. 1. f. 1. L. T. 24. f. 1. BB. ^b T. 1. f. 1. M. T. 24. f. 1. CC. ^c T. 1. f. 1. N. T. 24. f. 1. ff. & c. ^d T. 1. f. 1. P. ^e T. 1. f. 1. Q. R. T. 24. f. 4. a a a. & c. ^f T. 1. f. 1. S. S. T. 24. f. 4. w. ^g T. 24. f. 4. ff. ^h

Chap. 6. Of the Arteries which are opened.

THE Ancient Physicians were wont to open Arteries as well as Veins. Howbeit *Horatius Augenus* in his Book of Blood-letting, dissuades the opening of Arteries, because he never saw any Artery opened, that could be stopped again. *Aurelianus* Favours his Opinion, in his 1. Book of Chronick Diseases Chap. 5. Howbeit *Galen* in his Book *de Vene Sectione*, commends the opening of the smaller Arteries in very bitter and old pains of the Head.

Hernius did wish, that in some part or other it might be safe to open an Artery in burning Feavers, because one Porringer of the Arterial blood drawn out, would cool the Patient more, than to lose ten Porringers of the Venal blood. And in his *Commentary upon the 23. Aphorisms of the 1. Book*, he saies that in the Hungarian Feaver, when very red blood drops out at the Nose, it would do the Patient good to draw a little blood from an Artery. But who (saies he) dares open an Artery? I desire that all learned Artists would think of it.

I say therefore, and aver, that in *Paris*, the Arteries of the Forehead and Temples, before and behind the Ears, are successfully opened in Ancient or very acute pains of the Head, in the Phrensie, Inflammations and extream pains of the Eyes and Ears.

As for the opening of the temporal Artery *Thadæus Dahnus*, in the 12. Chap. Of his *Miscellanies*, shews how profitable a Remedy it is.

Lazarus Scotus aforementioned, in the same place, observes that the Arteries behind the Ears are profitably opened in *Portugal*.

Ludovicus Mercatus a Spanish Physician suspects this opening of these Arteries, for fear it should make Men Barren. But dayly experience has delivered us from that fear.

An Artery seated in the hinder Part of the Head is opened, the Hair being first Shaven of, and the Head and hand being fomented in hot water, or rubbed with a Sponge, that it may appear. The manner of opening this Artery, is not unlike that of the temporal Artery, and therefore that same way of *Paulus Aegineta*, *Actius* and *Albucasis*, is to be rejected, who did first cut the Skin before they opened the Artery.

Galen in his Book of Blood-letting near the end, in an Inflammation of the Liver opened the 2 Artery, which Runs out between the Thumb and Fore-Finger.

Which, *Prosper Alpinus* observes to be very usual in *Egypt*, in his third Book and 12. *De Medicina Egypti*. And *Septalius* in his 6. Book of *Animadversions*, Article 122. Judges that in a Palpitation of the Heart, the Arteries which run along the Fingers may safely be opened. Which may likewise be done in the *Tarsus* and *Meta-Tarsus* of the Foot, according to the Advice of *Galen* in his 3. Book of *Anatomical Administrations*, and the last Chapter.

In other Parts Arteries may not in any wise be opened, unless they have a bone under them, that they may be pressed close down to make the Office grow together again; and therefore in a lean Body, an Artery being unawares opened in the Arm, may be closed again, if it be timely and closely tied as is fitting, to avoid *Aneurisma*.

An experiment
of *Alexander Benedi-
ctus*
for the Rheuma-
tism.

Before we think of opening the Arteries of the Head to turn away Fluxions, that experiment of *Alexander Benediictus* will not be unprofitable, to apply unto the thorn Head. Medicines that are to stop Rheums falling into the Eyes, must be applied from the Eye-brows unto the Crown of the Head; if the Eyes begin to appear dry, it is manifest that the Rheum falls into them by those Veins which are under the Skin; but if they continue moist, it is evident the Humor flows into them from under the bone.

Now the foresaid mixture of *Alexander Benediictus* which stops Rheums is this. Make a Cataplasme of course Bran, fine Frankincense, the white of an Egg, a little Vitriol and Stone Alum; and apply it as aforesaid.

Chap. 7. Of the Muscles and first of the Forehead Muscles.

The Forehead
Muscles should
rather be called
the Eye-brow
Muscles.

Intending to explain all the Muscles of the Body, I will begin at the Frontal or Forehead Muscles, which I conceive are ordained rather to move the Eye-brows, than the Forehead it self.

They have their original from the upper Parts of the Forehead, and being spread out upon the bone thereof, they end at the Eye-brows, that they might lift them up. They are severed in the midst of the Forehead, right above the Nose. And because we do at our pleasure depress and draw together our Eye-Lids into wrinkles, we must assign to each of them its Muscle, and I can find no other save the Orbicular Muscle of each Eye-Lid; for the Eye-brows cannot be drawn down without the Eye-Lids be closely shut.

^a T. 15. f. 1. EE. ^b T. 15. f. 1. FF.

Chap. 8. Muscles of the hinder Part of the Head.

IN the after Head are found Muscles, or rather fleshy Membranes, which draw backwards the Skin of the Head in such persons as have the said Skin movable. These Muscles, as also those of the Forehead, are portions of the *Musculus Latus* or broad Muscle; which *Sylvius* does neatly compare to a riding Hood, taking away only as much as is covered with a little cap on the top of a Mans Head; and therefore the broad Muscle does cover the Neck, Face, Fore and side Parts of the Head.

^a T. 15. f. 1. EE. ^b T. 15. f. 1. FF.

Chap. 9. Muscles of the Eye-Lids.

The first.

THE two Eye-Lids are moved by four Muscles, of which three are orbicular, and one is straight, belonging to the upper Eye-Lid, which arises at the internal Cavity of the Eye, and being spread out upon the Muscles, which lifts up the Eye, it reaches unto the Eye-Lid.

The second.

The first of the orbicular or round Muscles, is the *Musculus Ciliaris*, which compasseth about each of the Eye-Lids. The other is drawn out under the Eye-lid, arising from the Circumference of the *Orbita* or Socket of the Eye.

The third.

The third round Muscle being of a Fingers breadth compasses the surface of the *Orbita* or Socket, and being placed under each Eye-Lid, and reaching as far as the Eye-brow, and closely shutting the two Eye-Lids, it lifts up the lower and draws down the Eye-brow.

The fourth.

Chap.

Chap. 10. Muscles of the Eyes.

There are reckoned six Muscles of the Eye, four Straight and two Oblique, which are named from their Situation and action. One is termed ^c *Supernus* and *Attollens Oculum*, the upper, and the Eyes up lifter; another is called ^d *Infernus* and *Deprimens Occultam*, the lower and Eye Depresser; of the two Lateral or side Muscles, one at the greater corner of the Eye is termed ^e *Lectorius*, the Readers of the Students Muscle; the other placed at the smaller corner is called ^f *Indignatorius*, the Disdeigners Muscle.

They all arise from the Cavity of the Socket of the Eye and the broad Nervous production, and are inserted into the *Cornea Tunica* under the *Conjunctiva*.

The Contrariety of these Muscles pulling one against another is necessary, that the Eye might be movable to and fro, which being depraved, the Eye is drawn to some one side, and so abides in that posture.

And that the Eye might be drawn back towards the great Corner, and might be fixed in continual reading or looking upon somewhat, Nature has framed two other Muscles, which are termed Oblique, because they direct the Oblique motion of the Eye, which is none at all, neither can the Muscles themselves perform such a motion in regard of their Original and Insertion, which ought to be contrary and opposite.

The *Musculus Obliquus* ^a Major, greater Oblique Muscle, or *Trochleator*, contains in it a wonderful piece of Workmanship, which is found in Mankind, detected by *Rondeletius* and observed in some great Fishes: for taking its rise from the Cavity of the *Orbita*, it produces a thin Tendon, which being drawn through a Transverse ^b Gristle affixed unto the bone, by and beneath the *Glandula Lachrymalis* or weeping Kernel, is after widened and spread out upon the Eye.

The *Obliquus* ^c *Minor* drawn out externally by the greater Corner, and rowled athwart about the Globe of the Eye, comes as far as the Tendon of the greater Oblique muscle, that the Nervous productions of both the Oblique muscles might meet together to draw back and fix the Eye towards the Nose, that from both the Eyes beholding, one Pyramid Line may pass unto the visible Object.

^a T. 19. f. 1. AB. ^b T. 15. f. 1. FF. ^c T. 19. f. 3. A. 4. 5. A. ^d f. 3. 4. 5. ^e f. 3. 4. 5. C. ^f f. 3. 4. 5. D. ^a T. 19. f. 3. and 4. E. ^b f. 3. and 4. E.

Chap. 11. Muscles of the external Ear.

They are common and proper, which are Seldom moved, because the Ear itself is rarely moved. They are therefore rather marks and signs of Muscles, than true ones, such as are found in Brute Beasts which move their Ears.

And therefore a portion of the frontal Muscle reaching unto the Ear, a portion of the *Cutaneous* or Skin Muscle drawn unto the Pulp of the Ear, and a Part of the *Occipital* or after Head Muscle, stretched out behind the Ears, do make the common Muscles.

There is only one proper Muscle, which lurks under the Ligament of the Ear, it arises from the Mammillary Process, and is inserted into the Root of the Ear.

The latter Anatomists do make reckoning of two Muscles appertaining to the internal Ear, one of which is ^a external in the auditory passage or hole of the Ear, which draws back the membrane of the Ear; the other is within the ^b *Concha*, fastened to the Mallet or Hammer.

In Bruits the Muscles of the internal Ear are more evident than in Men,

^a T. 19. f. 3. and 4. F. ^b f. 3. and 4. G. ^c f. 3. and 4. E. ^d T. 20. f. 5. A. ^e T. 20. f. 5. CC.

Chap. 12. Muscles of the Nose.

They are common and proper.
One common, The common is only one, being the upper portion of that Orbicular Muscle which compasses the Lips, which draws the Nose downwards, when the upper Lip is drawn down.

Six Proper. Two ^d Muscles do lift up the Nose, on each side one, drawn from the space between the Eye-brows and fastened to the bone of the Nose, and so carried to the wings or battlements thereof; the motion of these Muscles, when they act together is easily perceived in the drawing up and crisping or wrinkling of the Nose.

In Persons that are largely Nosed, two ^e little Muscles are found, spread upon the extrem Griftles of the Nose, which do widen the Laps of the Nose, without any elevation or lifting up.

Within the Nostrils under the Succingent Coat, there lies lurking a little Muscle of a Membranous Nature, which does stick to the internal Parts as far as the Laps of the Nose, it is said to contract the Nostrils.

^c T. 15. f. 1. N. N. ^d T. 15. f. 1. G. ^e T. 15. f. 1. I.

Chap. 13. Muscles of the Lips.

Seeing there are two Lips, each has its Muscles, and there are two common to both.

The first of the proper ones, The upper Lip is drawn upwards, by a ^a Muscle which taking its rise from the hollow of the Jaw, beneath the Cheek bone, descends obliquely or slanting to the upper Lip.

The second, It is moved downwards by a ^b muscle brought from the middest of the lower Jaw, into the said Lip.

The third, The nether Lip is drawn upwards by a Muscle, which being drawn out of the lower Parts of the Cheek bone, does end side waies upon the nether Lip.

The fourth, It is moved downwards by a ^c Muscle, which springing out of the Chin, is inserted into the middle Lip.

The common ones The common Muscles are the lateral ones, which do draw the Lips to the right or left side.

¹ *Zygomaticus,* The first is called ^d *Zygomaticus*, being somewhat long and thin, and arising from the bone *Zygoma*, it is terminated in the meeting of each Lip.

² *Buccinator.* The one common one, is vulgarly termed ^e *Buccinator* or the Trumpeter, it were more rightly called *Bucco* the Cheek driver, because it stirs the Cheeks, while it drives the meat this way and that way, in the action of chewing.

It arises from the top of the Gums or the bones in that place near the farthest grinders, and ends in each Lip. It is loose and slack, that it may give way inwards, and perform its Office of forcing, as the Muscles of the belly do; and that it may give way, when the Mouth gapes wide.

Sphincter of the Mouth. There is added a round ^f muscle, which makes the proper substance of the Lips; by the service whereof the mouth is drawn together, the Lips are opened, go inwards, and swell. It might well be called the *Sphincter* of the mouth, or the *Pylorus*.

^a T. 15. f. 1. K. ^b f. 1. M. ^c f. 1. N. ^d f. 1. L. ^e f. 1. O. ^f f. 1. NN.

Chap.

Chap. 14: Muscles of the lower Jaw.

They are on either side six. The *Temporal* Muscle, being a very strong one lifts up the Jaw. It arises from the whole Cavity of the Temples, and being carried along under the *Os Zygoma*, it is by a very strong nervous Tendon inserted into the sharp ^a process of the Jaw-bone. *The Temporal,*

This Muscle is assisted by the *Pterygoides Internus*, arising from the Cavity of the *Apophysis Pterygoidea*, and terminated at the corner of the inferior Jaw. It is called by Galen *Masseter Internus*. *Pterygoides Internus.*

The Jaw is drawn downwards by the *Digastricus* or *Two-Belly'd Muscle*, and the *Musculus Latius* or broad Muscle. *Digastricus,*

The *Digastricus* or *Two-Belly's* being in the ^c middle Nervous and fleshy at the Ends, springs from the *Apophysis Styloidea*, and being in the middle reflexed about the *Stylo-Ceratoides*, it is inserted into the Chin, under the bending of the Jaw.

The *Musculus Latius* or *Broad-Belly*, arises from the upper Part of the Breast-bone, the *Clavicula* and shoulder point, and cleaves firmly to the Basis of the inferior Jaw, muffling the Neck and whole Face; and by reason of the aforesaid Adhesion, it is said to draw the Jaw downwards. *The Latius,*

Pterygoides Externus, the *external wing fashion'd Muscle* forces the Jaw forwards, which being swelled does lightly drive the Jaw-bone forwards; which happens in the overshooting of the Jaw-bone, when the lower Teeth are above the upper Teeth. *Pterygoides Externus.*

The Jaw is plucked about this way and that way by the *Masseter* or *Chaw Muscles* being in its Original *Two-Headed*, one of whose heads arises from the *Os Zygoma*, the other beneath the said bone; each of which being furnished with divers Fibres which Cross one another, is inserted into the Corner of the inferior Jaw. It may easily be divided into two Parts. *Masseter.*

Chap. 15. Of the Muscles of the Os Hyoides.

Because the bone termed *Os Hyoides*, is placed in the Neck to a prop and foundation for the Tongue and *Larynx*, it has obtained Muscles as well as Ligaments, by which it is held suspended, that it might be moved with the tongue and *Larynx*.

And therefore its Muscles are common to the Tongue and the *Larynx*.

The bone *Hyoides* has ten Muscles, on each side five, for I add the muscle termed *Myloglossus* (which is commonly attributed unto the Tongue) and I call it *Mylohyoides*, because, it does not any waies touch the Tongue.

^a T. 15. f. 1. PP. f. 2. AA. ^b T. 15. f. 2. aa. ^b f. 2. DD. ^c f. 1. TT. f. 2. CC. ^d T. 10. f. 1. ZZ. T. 15. f. 2. F. ^e T. 15. f. 2. EEEE. ^f f. 1. S. f. 2. BB. ^g T. 13. f. 11. and 12. ABC. &c.

The *Os Hyoides* is lifted up by the Muscle ^a *Geniohyoides*, it arises from within the Chin and is inserted into the Basis of the *Hyoides*. *The Geniohyoides.*

Assistant hereunto is the Muscle ^b *Mylohyoides*, it arises from within the Jaw in the Quarters of the Grinding Teeth, and reaches to the Basis of the Bone *Hyoides*. *Mylohyoides.*

The bone *Hyoides* is drawn downwards by the Muscle ^c *Sternohyoides*, which springs from the top of the Breast bone, and drawn out upon the Weland is inserted into the Basis or bottom of the said bone *Hyoides*. *Sternohyoides.*

The Muscle ^e *Stylocerathyoides*, from the *Apophysis Styloidea* is carryed into the Horns of the *Os Hyoides*. *Stylocerathyoides.*

Chap. 16. Muscles of the Tongue.

- Genioglossus*, The Tongue is forced forward by the Muscle ^c *Genioglossus*, which growing out of the inner side of the Chin, is terminated to the Tongues Root.
- Basiglossus*, It is drawn back by the muscle ^f *Basiglossus* which takes its rise at the Basis of *Os Hyoides*, and is carried unto the Root of the Tongue.
- Styloglossus*, It is forced side wards to the right and left, by the muscle ^g *Styloglossus*, which taking its beginning at the *Apophysis Styloides*, is extended into the middle, very near of the Tongue.

^a T. 13. f. 13. BB. ^b f. 4. EE. ^c f. 13. DD. ^d f. 1. EE. ^e f. 13. CC. ^f f. 14. BB. ^g f. 14. DD.

Chap. 17. Muscles of the Larynx.

- The whole body of the *Larynx* consisting of five *Griffles*, is moved upwards and downwards.
- Hythyroides*, It is drawn upwards by the muscle ^a *Hythyroides*, which arising from the Basis of the *Hyoides* bone, is inserted into the external middlemost of the *Thyroides*.
- Bronchius*, The Muscle ^b *Bronchius* draws it downwards, which taking its rise, from the inner side of the Breast bone, and stretched out upon the Channel of the *Aspera Arteria* or Wefand, it ascends unto the Basis of *Thyroides*.
- Two only of the *Griffles* of the *Larynx* are movable, viz. The ^c *Thyroides* and the ^d *Arytenoides*, and to procure their motion they have little muscles, which spring out of the immovable *Griffle Cricoides*.
- Cricothyroides Anticus*, The *Thyroides* is dilated by the muscle *Cricothyroides Anticus*, which begins at the outter forepart of *Cricoides*, and ends within the internal sides of *Thyroides*.
- Lateralis*, The said *Thyroides* is contracted by the muscle ^e *Cricothyroides Lateralis*, which springing from the lareral part of *Cricoides*, is inserted externally into the side of *Thyroides*.
- Thyroarytenoides*, The *Arytenoides* is opened by the muscle ^f *Thyroarytenoides*, which springing from the inner and foremost part of the *Thyroides*, ends into the sides of the *Arytenoides*; or rather it takes its else from the *Cricoides* and *Thyroides*, being placed between both.
- Arytenoides*, The *Arytenoides* is shut by one only Muscle called *Arytenoides*, which ^h compasses about and shuts the *Arytenoides*, like the Sphincter Muscle, and also with its Basis it straitens the Glottis, for to make the voyce found the better.
- The *Epiglottis* has ⁱ no Muscles to lift it up and shut it down in mankind, as it has in Brut Beasts.

^a T. 13. f. 8. BB. ^b f. 8. CC. ^c f. 1, 2, 8. A. ^d f. 5. and 6. ^e f. 3. and 4. f. 9. and 10. DD. ^f f. 9. CC. ^g p. 9. BB. ^h f. 10. BB. ⁱ f. 9. and 10. A.

Chap. 18. Muscles of the Pharynx.

- The *Pharynx* which is the begining of *Oesophagus* or the Gullet, has obtained from Nature seven Muscles, of which three have fellows, and the fourth is without companion namely that which is termed *Oesophagus*.
- Spheno-Pharyngeus*, The first is ^a *Spheno-Pharyngeus*, which arises from a certain sharp point of the *Sphenoides* near the *Styloides*, and bending a little downwards, it ends in the sides of the *Jaws*, that it may draw the *Pharynx* upwards.

The

The second is ^b *Cephalo-Pharyngæus*, which arises from that part where the Head is Joyned to the Neck, and descending is spread out into the *Pharynx*; and seems to make the very coat thereof.

Cephalopharyngæus.

The third is ^c *Stylo-Pharyngæus*, which arises from the *Apophysis Styloides*, and is implanted into the side of the *Pharynx*, to serve to widen the same.

Stylopharyngæus.

The Muscle *Oesophagæus*, does draw together and close the ^d *Pharynx*, which growing out of one side of *Thyroides*, and compassing round the hinder part of *Oesophagæus*, is implanted into the other side of *Thyroides*; or being outwardly fastened to both sides of *Thyroides*, it draws together the beginning of the *Oesophagæus* and purses the same like the *Sphincter* Muscle of *Anus*.

Oesophagæus.

^a T. 3 f. 2. and 3. BB. ^b f. 2. and 3. AA. ^c f. 2. and 3. CC. ^d f. 2. and 3. DD.

Chap. 19. Muscles of the Gargareon, Uvula, or Mouth Palate.

The *Uvula* has two Muscles ^e on either side.

The Muscle *Ptery-Staphylinus* ^f *externus*, taking its Rise from the upper Jaw under the last grinding Tooth, ends in a small Tendon ^g which passes through a chink engraven on the upper side of the *Pterygoides*; and there being turned back, as it were through a pulley, it is inserted into the sides of the *Uvula*.

Pterystaphylinus externus.

The *Ptery-Staphylinus* ^h *internus*, cast out of the nether part of the inner Skirt of the *Pterygoides*, it has a peculiar movable Gristle ordained for its original, and ascending according to the Longitude of the internal Wing or Skirt of the *Pterygoides*, it ends at the *Uvula*.

Internus.

^e T. 13. f. 15. A. ^f f. 15. BB. ^g f. 15. b. b. ^h f. 15. C. C.

Chap. 20. Muscles of the Head.

The Muscles of the Head are proper or Common.

The Common are those which move the Neck and Head both; such as are the Muscles of the Neck; the proper are such as move the Head, the Neck remaining unmoved.

Now the proper are fourteen, on each side seven, six of which are placed in the hinder part.

There is one only in the Fore part, which is called ^a *Mastoidæus*, and bows the Head; it arises from the top of the Breast bone and middle of the *Clavicula*, and is obliquely inserted into the *Apophysis Mastoides*.

Caput flexibile Mastoidæus.

Sometimes in the forepart of the Neck, there is another Muscle next the Long Muscle, which helps the *Mastoidæus* to bend the Head; and I have many times shewed this Muscle, and sometimes I have seen it wanting.

Six Muscles do extend the Head; of which two are large, the other four small. The first of the large ones is called ^b *Splenius*; which arising from the sharp points of the five uppermost *Vertebra's* of the back, and the four lowest of the Neck, it is inserted into the hinder part of the Head.

Extenders Splenius.

There comes the other large Muscle to assist the former, and is called ^c *Complexus*. It springs from the transverse or overthwart Eminencies or Apophyses of the fore-laid *Vertebra's*, and is terminated in the after part of the Head.

Complexus.

The lesser Muscles are some straight, others crooked, and of both these, some are greater, others less.

Rectus major.

The greater ^d straight Muscles, arising from the Spine or point of the second spondile, *Vertebra* or Knuckle, are inserted into the after side of the Head,

Rectus minor,

Under them the ^e two lesser arising from the hinder part of the first *Vertebra*, are terminated in the after side of the Head.

Obliquus major,
Obliquus minor,

The greater ^a Oblique ones do arise from the spine or point of the second *Vertebra* and reach unto the overthwart Eminence or Apophysis of the first *Vertebra*; and from the same place the Lesser ^b Oblique or crooked ones do arise, and are terminated in the *Occiput*, or after Part of the Head.

^a T. 14. f. 2. KK. f. 3. H. f. 4. FF. ^b f. 2. HH. ^c f. 2. II. f. 3. EF. ^d f. 3. and 4. II. ^e f. 3. i. f. 4. KK. ^a T. 14. f. 3. L. f. 4. GG. ^b T. 14. f. 3. K. f. 4. HH. ^c

Chap. 12. Muscles of the Neck.

The Neck
binders.

The Neck has eight, on each side four, being placed before and behind, to bend the Neck and extend the same again.

The Longus.

It is bent by the *Musculus Longus*, and the *Muscle Scalenus*, or the unevenfided Muscle.

The ^c Long Muscle being situate under the *Oesophagus*, springs out of the body of the third *Vertebra* or Knuckle bone of the back, and ascends laterally connexed or knit unto all the bodies of the *Vertebra's*, ending into the former part of the *Vertebra*.

The Scalenus,

The *Scalenus* arising from the ^d first Rib of the Chest, it is inwardly ingrafted by oblique Fibres into all the overthwart or transverse Eminencies of the Neck-bones; through it the Vessels are drawn, which are to be distributed into the A

The Extenders,
Spinatus.

The Neck is extended or stretched out by two Muscles.

The *Spinatus* Muscle ^e arises from the Roots of the seven uppermost *Vertebra's* of the Chest and five of the Neck; and is inserted into the Spina or point of the second *Vertebra* of the Neck.

Transversarius

The Muscle *Transversarius*, arising from the ^f transverse Apophyses or Eminencies of the six uppermost *Vertebra's* of the back, is planted externally into all the transverse Eminencies of the Neck.

^e T. 13. f. 18. AA. ^d T. 13. f. 18. BB. ^c T. 14. f. 4. DD. ^f T. 14. f. 4. EE. ^c

Chap. 22. Muscles of the Shoulder-blades.

Shoulder blades
lifter.

They are four in Number. The Muscle *Levator & Proprius*, does lift up the Shoulder-blade. It arises from the transverse or overthwart Apophyses or Eminencies of the second, third and fourth *Vertebra* of the upper part of the Neck, and ends in the uppermost Corner of the Shoulder-blade.

Trapezius.

The Muscle *Trapezius* ^a arises from the hinder part of the Head, at the Points of five *Vertebra's* of the Neck, and of eight or nine of the uppermost *Vertebra's* of the Chest, and is inserted into the Basis of the Shoulder-blade and the Spina, as far as the Shoulder tip. It causes divers motions according to the original and direction of the Fibres; that is, according to their Rise and insertion.

Serratus minor,

The Shoulder-blade is drawn forwards by one only Muscle termed *Serratus* ^b *Minor*, which arises out of the four uppermost Ribs, and ends in the *Coracoides*.

Rhomboides.

It was drawn backwards by the ^c *Rhomboides* or Lozing fashioned, or diamond fashioned Muscle, which arises from the three points of the lower *Vertebrae* of the Neck,

Neck, and the three points of the uppermost *Vertebrae* of the Chest, and is inserted into the external Basis of the Shoulder-blade.

Although by its own weight it return to the natural Situation; yet a ^d portion of *Musculus Latissimus*, running out unto the Arm, cleaves by a loop to the lower Corner of the Shoulder-blade, and is said to draw the Shoulder-blade downwards.

Chap. 23. Muscle of the Arm.

They are nine. The *Muscle Deltoides* and *Supra Spinatus* do move it upwards. The *Deltoides* ^e does arise from the middle of the *Clavicula*, the Shoulder tip, the whole spine of the Shoulder-blade, and is carried out unto the middle of the Arm.

Arm lifters.
Deltoides.

The *Supraspinatus* being thrust into the Cavity above the *Spina* or sharp point of the *Scapula*, and being conveyed under the Shoulder tip, is inserted into the Neck of the Arm.

Supraspinatus.

The *Latissimus* and *Rotundus* ^a *Major*, do move the Arm downwards; the *Latissimus* ^b springs from the sharp prominencies of the *Os Sacrum*, of the *Vertebrae* of the Loins, and of nine *Vertebrae* of the Back; it is inserted into a part of the Arm, not far below the Head.

The depressers.
Latissimus.

It is assisted by *Rotundus* ^a *Major* or the larger round Muscle, which arises from the whole lower Rib of the Shoulder-blade, and ends very near in the middle of the Arm.

Rotundus Major.

The *Pectoralis* and *Coracoidans* draw it forward. The *Pectoralis* arises out of the first sixth and seventh true Ribs, the Breast-bone and more than the middle of the *Clavis*; and it is inserted by an acute Tendon into the middle of the Arm between the *Deltoides* and the *Biceps*.

The drawers to:
The Pectoralis.

The Muscle *Coracoidans* ^c springs out of the *Apophysis Caracoides*, and ends very near in the middle of the Arm, it draws the Arm towards the left Shoulder.

Coracoidans

The Arm is moved backwards by three Muscles, *Infraspinatus*, *Rotundus Minor*, and *Immersus*.

Drawers back.

The *Infraspinatus* arising in the middle between ^d the lesser round Muscle and the *Spina*, ends into the Neck of the Arm which it muffles about.

Infraspinatus

The *Rotundus* ^e *minor* begins at that Cavity which appears under the lower Rib of the Shoulder-blade, and ends in the Neck of the Arm.

Rotundus minor.

Immersus or the ^f *Subscapularis* does possess the hollow and inward Part of the *Omo-plata* or Shoulder-blade, and is carried out unto the Neck.

Immersus.

The three last Muscles which act all at once, do carry about the Arm upwards with a sudden motion slanting outwards, so that the motion seems to be doubled.

Chap. 24. Muscles of the Cubit.

The Cubit consists of two Bones, which as they are Knit together by divers *Articulations*, so do they perform divers motions.

The *Cubitus* guides the motions of the bending and extending. The *Radius* directs the motions of Pronation and Supination, and therefore they have proper muscles for these motions.

The Cubit is bended by two muscles Scituate in the internal Part of the Arm, *viz.* The *Biceps* and *Brachialis internus*.

Cubit benders.

The *Biceps* arises from a ^a double beginning, the one of which from the extremity of the Cavity of the *Glenois* is conveyed through the cleft of the Arm, the other taking its Rise from the *Apophysis Caracoides*, they are after united and make one

Biceps.

Ff

Tendon,

Tendon, which is inserted into the inner Part of the *Radius*, there where it bunches out,

Brachius internus.

The *Brachius^b Internus*, being placed beneath the *Biceps*, takes its rise from the middle of *Os Brachij*, unto which it firmly adheres, and is terminated between the *Radius* and the *Cubitus*, in that Part where they are fastened together.

Cubit extenders.

The Cubit is extended by four Muscles, *Viz. Longus, Brevis, Brachius externus, and Angoneus* or *Cubitalis*.

Longus.

Longus, the long Muscle^c arises from the lower Rib of the Shoulder-blade near the Neck, where it has a peculiar Cavity, and it is terminated into the Elbow.

Brevis.

Brevis, the short Muscle, ^d springs from the hinder Neck of the Arm and ends likewise at the Elbow. Both those Muscles do make up one strong and sinewy Tendon.

Brachius externus.

For the third Muscle *Galen* in the first Book and last Chapter of his *Anatomical Administrations*, reckons a lump of Fleish which is confounded with the two foregoing Muscles, and inserted into the same place. I call it *Brachius externus*, because being spread upon the outside of the Arm, it is placed beneath the other two last mentioned. In the same place *Galen* does acquaint us, that any man may accurately separate these three Muscles following the rectitude of the Fibres.

Angoneus.

The fourth Muscle called ^e *Angoneus*, is Scituate in the bending of the Cubit on the hinder side, which is called *Agcoon* or *Ancoon* and answers to the *Musculus Piplians*. It arises out of the lower and hinder Part of the Arm, being Scituate between the *Radius* and *Cubitus*; and it is inserted by a sinewy Tendon into the side of the *Cubitus*, a Thumbs length below. Sometimes it cleaves so fast to the Flethy end of *Brachius Externus*, that there is no apparent difference to be discerned between them; and then it is Judged to be a portion of the *Brachius externus*, extended so far as to that place.

Chap. 25. Muscles of the Radius.

The Radius its

The *Radius* is bowed downwards by the two internal *Muscles*, so called because they are placed in the inner Part of the Cubit; and one is called *Inferior Pronator*, and the other *Superior Pronator*.

Pronator superior.

The *Superior* being a ^a round Muscle, springs from the inner Part of the inner knob of the Arm, and ends with a *Membranous* Tendon, obliquely carried unto the *Radius*.

Pronator inferior.

The *Inferior Pronator^b Quadratus*, is carried overthwart from the lower Part of the Cubit unto the lower Part of the *Radius*, and is therewith inserted, being altogether Flethy. Also it Knits the *Ulna* to the *Radius*, as if it were a Ligament.

Supinator Longus.

The *Radius* is drawn down backwards by two external Muscles.

The *Longus^c Supinator*, springs out of the top of the Arm, above the external Knob, and being drawn out upon the *Radius*, it is inserted on the inside of the lower *Epiphysis* thereof, being fleshy.

Supinator Brevis.

Brevis Supinator, arising out of the ^d outside of the inner Knob, is carried obliquely very near to the middle of the *Radius*, and turning back does straitly comprehend the same.

^a T. 22. f. 1. and 3. D. ^b T. 10. f. 1. A. B. T. 12. f. 1. E. ^c T. 22. f. 1. H. ^d T. 22. f. 3. B. ^e T. 22. f. 2. and 3. C. ^f T. 22. f. 1. B. B.

^a T. 22. f. 1. G. ^b T. 22. f. 1. II. f. 2. B. ^c T. 22. f. 3. E. ^d T. 22. f. 3. F. ^e T. 22. f. 3. & f. 4. G.

^a T. 22. f. 2. C. ^b T. 22. f. 2. D. ^c T. 22. f. 4. E. ^d T. 22. f. 4. F.

Chap. 26. Muscles of the Wrist.

THe Wrist is bended, stretched forth and laterally moved by two Muscles, the bender and extender of each side, acting both together.

It is bended by two inward Muscles, of which the one may be termed *Cubiteus*, *wrist-benderis* the other *Radiceus*, by reason of their Situation.

The *Cubiteus* ^a *internus* takes its rise from the inner part of the inner Knob of the Arm, and being fastened unto the Cubit and to the fourth Wrist bone of the first Rank, it is drawn out a lost. *Cubiteus Internus.*

The *Radiceus* ^b *internus*, having its origin in the same place, and being stretched out upon the *Radius*, is inserted into that bone of the *Metacarpium*, which sustains the fore Finger. *Radiceus Internus.*

The Wrist is extended by two external Muscles, which hold the same way with the internal, and are therefore called by the same names. *wrist extenderis*

The *Radiceus*, *externus* or *Bicornis*, takes its rise from that bony point which is in the Arm above the Knob thereof, and resting upon the *Radius*, it sends forth a double Tendon, the one of which is inserted into the Wrist bone lying under the *Radius* the other into that bone of the *Metacarpium* which is seated under the fore Finger. *Radiceus Externus.*

Some will have this Muscle to be a double one, because it appears wholly distinct in its original and insertion. For that which is carryed to the Wrist grows out of the bony point of the Arm: the other arises out of the external Knob of the Arm and extends the *Metacarpium* with the Wrist.

It has its Tendons separated and inclosed in peculiar cases and sheaths, which are of a sinewy Gristly substance, without the Ring fashioned Ligament of the Wrist.

The *Cubiteus* ^d *externus*, arising from the outward Apophysis of the Arm, and being carryed along the Cubit, it inserts its Tendon into the fourth bone of the *Metacarpium*, Scituate beneath the little Finger. *Cubiteus externus.*

^a T. 22. f. 1. N. ^b T. 22. f. 1. M. ^c T. 22. f. 3. H. ^d T. 22. f. 3. G.

Chap. 27. Muscles of the Palme of the Hand.

IN the Palm or Hollow of the Hand are found two notable Muscles, which are termed the *Palmar Muscles*, the one of which is short, the other long.

The *long Palmar Muscle* growing out of the ^a inner side of the knob of the Arm, is spread into the hollow of the Hand, as far as the first Articulation of the Fingers. *long Palmar Muscle.*

In its original it is Flethy and presently after lessens it self into a small Tendon, which passing above the Ring-shap'd Ligament of the Wrist, and not included with the rest of the Tendons, it is widened into a sinewy Membrane, which is so firmly fastened unto the Skin (to make the sense of feeling the more quick, and that the Hand may hold things the faster) that it is a very hard thing to sever it from the Skin.

Besides the *Palmar Muscle* in the hollow of the Hand, a *Certain piece of Flesh* *Short Palmar Muscle.* ^b *four Square* of a Thumbs breadth is found upon the Ring-shap'd Ligament, which is redder than the Flesh, between the Thumb and the middle Finger, and is sometimes single and sometimes double, looking like two Muscles; and being carryed under and implicated with the *Palmar Muscle*, it seems to take its rise from the Root of the Flethy part of the Hand called *Thenar*, and to be inserted into that same eighth bone of the Wrist, which is placed out of order.

Its Office is to hollow the Hand, and so to make *Diogenes* his Dish to drink out of, together with the Muscles of the Thumb and the *Hypothenar*. This Muscle shall be named *Palmaris brevis*; the short *Palm Muscle*.

^a *J. 22. f. 1. K.* ■

Chap. 28. Muscles of the Fingers.

Four Finger
benders.

THe Fingers are bended, stretched out, and moved sidewaies. There are two Muscles which bend the four Fingers, *viz.* The *Musculus Sublimis*, and the *Musculus Profundus*.

Sublimis.

The *Sublimis* arises from the inner ^b part of the inner knob of the Arm, and produces four ^a Tendons about the Wrist, which are terminated at the second Articulation of the Fingers, and have holes bored in them, to give passage to the Tendons of the *Musculus Profundus*.

Profundus.

The *Profundus* springs out of the ^b upper parts of the *Cubitus* and *Radius* and being divided into four, it is carried through the holes of the Tendons of the *Sublimis*, unto the third Articulation of the Fingers.

Do but observe the Industry of Nature, who to the end the Fingers might be rightly bended, on the inside according to their length, she has framed a Channel of most hard Membranes resembling Ligaments, which Channel does straightly infold the Tendons of the *Musculus Profundus* and *Sublimis*, lest in the bending of the Fingers the Tendons being bowed should be drawn out of their place, and like ropes rise up and lift up the Skin.

And although the Tendons be closely comprehended within the said Channel, yet have they their free course and passage, because the Channel is smeared with a fat and Oily Humor.

Lumbricales

Out of the very Tendons of *Musculus profundus* by the Wrist, do arise the four ^d *Lumbricales*, being firmly fastened thereunto, and carried to the first Articulation of every Finger, where they unite themselves to the *Interossei*.

Extenders.

The Muscles which extend the Fingers are *Common* and *proper*.

Extensory

Diagonus.

I call them common, which serve the four Fingers, such as the *Extensor magnus Digitorum* [the great extender of the Fingers] of which beside extension, do cause other motions, as the *Lumbricales* and *Interossei* joyred together.

The proper are they which belong and are attributed only to certain Fingers, as the *Extensor Indicis* [stretcher out of the fore Finger] and the *Extensor Aricularis* [stretcher out of the little Finger.]

Magnus Extensor Digitorum, the great ^a Finger stretcher arises out of the outward Knob of the Arm, and by the ^b Wrist is cloven into four ^c Tendons, which end into the two lower Joynts of each Finger.

Side way mo-
vers.

The Fingers are moved sidewaies, which motion is commonly termed adduction and Abduction.

The Adduction or drawing to, is when they are drawn towards the Thumb; Abduction or drawing from, is when they are moved sidewaies from the Thumb. And this motion is performed by the *Interossean* Muscles: of which there are three ^d External and as many ^e Internal, spread in the spaces between the Bones of the *Metacarpium*.

Interossei.

They arise from the upper Parts of the said bones near the Wrist, and in the first *Internodeum* or space between the Joynts, with a very small Tendon, they creep side long over the three bones of the Fingers, untill they come unto the Roots of the Nails; in the former and upper Part whereof, the Tendons, being first united are terminated. And therefore the *Interossean* Muscles acting together, do keep the Fingers both stretched out, and one close to another, just as we hold our hands when we swim.

Moreover

Moreover you shall observe two Muscles, which are as it were external interosseans, which are spread without, upon the first and fourth bone of the *Metacarpinum*, the one of which called ^e *Hypothenar*, is Peculiar to the little Finger, and may be divided into two.

Proper.
Abductor mini-
mi.

It arises from the third and fourth Wrist bone of the second Rank, and is sideways inserted into the Joints of the same Finger, to draw the same towards the outside.

The other belongs unto the *fore Fingers*, and lying beneath the *Antithenar*, it grows out of the inner Part of the first bone of the Thumb, and is inserted into the Joints of the Fore Finger, to draw the same unto the Thumb. So that it may be called *Musculus Abductor Indicis*.

Abductor Indis.
cis.

Besides the Tendon of the common extender, ^a has a Peculiar extensive Muscle, which may be termed Indicator the ^s Pointer, because this Muscle serves the Finger to point withal.

Proper exten-
ders.
Of the fore
Finger.

It arises from the middle and external Part of the Cubit, and is inserted by a forked Tendon into the second Articulation; and the other Tendon grows together with the Tendon of the greater extender.

There is a *Proper extender* ascribed to the little Finger. It arises out of the upper Part of the *Radius* being seated between the *Cubitus* and the *Radius*, and it is with a double Tendon planted into the little Finger on the outside thereof, but with another Tendon it is mingled with the Tendon of the greater extender.

Of the little
Finger.

Mean while you shall observe the *Lumbrical* or worm Muscles, which are sometimes three, other whiles four, seldom five; which though they are implicated with the Tendons of *Musculus Profundus*, and are constantly thought to arise there from; yet I conceive, they are bred out of the sinewy and orbicular ^a Ligament of the Wrist, that it might have a firm and stable Original.

^b T. 22. f. 1. O. f. 5. A. ^m
^a T. 22. f. 5. aaaa. ^b T. 22. f. 1. P. f. 5. B. ^c T. 22. f. 5. bbbb. ^d T. 22. f. 5.
 CCCC. ^e
^a T. 22. f. 3. K. ^b f. 3. e. ^c f. 3. ffff. ^d f. 4. IIII. ^e f. 2. ffff. ^f f. 2.
 g. b. f. 1. S. ^b f. 3. I. ^m
^a T. 22. f. 3. ζ. ^m

Chap. 29. Muscles of the Thumb.

The Thumb has peculiar Muscles, whereby it alone is bended, extended and moved sideways.

Thumb Muscles.

It is Extended by two long Muscles. One of which arising out of the ^b upper and outward side of the Cubit, goes up upon the *Radius*, and being carried beyond the Wrist, it is inserted into the first and second Joint of the Thumb, by a double and sometimes a triple Tendon.

Extenders.

The other arises from the ^c same Part of the Cubit, but lower, near the Wrist, and is inserted into the third Joint of the Thumb.

The Thumb is bended by ^d one Muscle, which growing out of the inside of the Cubit, is carried unto the second and third Joint thereof.

Bender.

It is moved sideways by two Muscles.

Lateral movers.

^b T. 22. f. 3. M. ^c T. 22. f. 3. L. ^d T. 22. f. 2. D. ^m

The *Thenar* ^a arises from the inside of the Wrist, beneath the Thumb, and is inserted into the second Joint of the Thumb, to draw it from the Fingers.

The other Muscle termed ^b *Antithenar*, draws the Thumb towards the fore Finger.

Finger. It grows out of the external side of the first bone of the *Metacarpium* which sustains the Thumb, and is inserted into the first Joynt of the said Thumb.

It is drawn to the four other Fingers by a ^c Muscle, which being Jyined unto, and seated beneath the *Tbenar*, grows out of the three lower bones of the *Metacarpium*, and is inserted into the second Joynt of the Thumb. It may be called *Hypotbenar Pollicis*, because it is spread out under the *Tbenar*.

^a T. 22. f. 4. K. ^b T. 22. f. 1. Q. f. 2. F. ^c T. 22. f. 1. R. f. 2. G. ■

Chap. 30. Muscles of the Chest.

THe Muscles of the Chest are *Proper* or *Common*.

Those are said to be *Proper*, which particularly and properly belong unto the Chest; the *Common* are such as being destinated to some certain Part, yet do assist the Breast with their help, as *Auxillaries*, such as are the upper Muscles of the Shoulder blade.

which widens
The Chest.

The Chest is widened or lifted up by five Muscles. Three of which are before *viz.* *Subclavius*, *Serratus major*, and the *Triangularis* or *Pectoralis internus*. One is hinderly Scituate *viz.* *Posticus Serratus superior*; and the fifth is the *External Intercostal*.

Subclavius.

The *Subclavius* arises from the ^d inner part of the *Clavicula*, near the Shoulder tip, being of a Fleshy substance, and is inserted into the first Rib, near the Breast bone.

^d T. 10. f. 1. F. ■

Serratus major.

The *Serratus* ^a *Major*, reaches from the inner Basis of the Shoulder blade, unto six, and sometimes seven Ribs, of which the five lowest are true Ribs, and the two uppermost are bastard ones.

Serratus Posticus Superior.

The *Serratus* ^b *Posticus Superior*, being Scituate beneath the *Romboides*, grows out of the sharp points or spines of the three lower *Vertebrae* of the Neck, and the first spine of the Back; and ends into the three upper Ribs, and sometime the fourth.

External Intercostals.

The eleven ^c *External Intercostals*, hold the place of one Muscle, which is carried Obliquely so ward from the lower side of the upper Rib, into the upper side of the lower Rib. Unto those Muscles which widen the Chest, we must add the *Diaphragme* or Midriff.

Triangular Muscle.

The *Triangular Muscle*, growing out of the middle and inner Part of the Breast-bone, is inserted into the Gristles of the lower Ribs, as far as the third or fourth bastard Ribbs.

Contracters.

Three Muscles there are which *Contract* the Breast, the *Sacro-Lumbus*, *Intercostalis internus*, and *Serratus Posticus inferior*.

Sacro-lumbus.

Sacro-Lumbus, takes its original from the Os ^d *Sacrum* and the Spiny productions of the Loins, and is terminated into the upper Ribs, near unto their Roots; bestowing upon each Rib a double Tendon or Tendinous handle or claspe, an internal and an external; and therefore it serves both to depress the Ribs and to raise the Back-bone, when it is bowed and bended forward.

Internal Intercostals.

The *Eleven internal Intercostals*, which fill up the spaces between the Ribs, are reckoned to be but one Muscle. It is carryed obliquely from the nether Rib to the upper more. It has Fibres contrary to those of the external, cross wise intersected.

Serratus posticus inferior.

The *Serratus Posticus* ^e *inferior*, growing out of the spines of the three lowest *Vertebrae* of the Back, and the first of the Loins, is *Terminated* into three or four of the lower Ribs.

This same *Serratus Posticus inferior*, is just opposite to the *Serratus Posticus superior*, and both of them by a broad and *Membranous Aponurosis*, do so grow together, that they serve instead of a band to bind and keep together the hinder Muscles of the Back-bone.

Others

Others do add eight Muscles of the Belly, because more Muscles are requisite to cause violent Expiration.

^a T. 10. f. 1. C. D. ^b T. 14. f. 2. E. ^c T. 10. f. 1. G. G. ^d T. 14. f. 1. L. L. f. 3. B. B.
^e T. 10. f. 1. H. H. ^f T. 14. f. 2. F. G.

Chap. 31. Of the Midriff.

The *Diaphragme* or Midriff is an ^a admirable kind of Muscle, both in regard of its composition and continual Action; whiles it does night and day incessantly use of the Midriff. for the Natural and Vital Parts; serving nevertheles as a Wall of partition to sever the one from the other.

It arises from the Circumference of the bastard Ribs, through which it is obliquely drawn about, as far as to the *Vertebrae* of the Loyns; the end or Sinewy Part thereof, is in the Nervous Centre. *Its Original:*

When we draw in the Air, it is contracted and bent, and when it draws the lower Ribs downwards and of convex becomes straight and even. When we blow the Air out, it is by help of the *Mediafinus* drawn upwards, and of strait is made Convex or bunching like the surface of a Back-klar. *Its Motion*

^a T. 10. f. 1. H. f. 6. and 7. the whole.

Chap. 32. Muscles of the Back and Loyns, wherewith the Back-bone is moved.

The *Back* is moved, because of the Ribs interposed, and the Penury of Muscles both internal and external; it has indeed Muscles spred upon the outside thereof, but they are for another use. So that between the Neck and the Loyns it remains immovable, whiles the extream Parts are moved. *The Back properly is not moved.*

Now the motion is made in the last *Vertebra* of the Back which is received on all hands by its neighbouring *Vertebrae*; and receives none; and because it is Contiguous with the Loyns, *The Motion is attributed to the Loyns rather than to the Back*; although it belong to the whole Back-bone.

The Back-bone therefore, as the Loyns, are bowed and extended and drawn to the sides.

They are bowed by two Muscles, on each side one. The *Musculus* ^a *Quadratus* takes its rise from the hinder Part of the *Os Ilij* and from the inner side of the *Os Sacrum*, being inserted into the transverse *Apophyses* of the Loyns as far as the last Rib, and of a Fleshy substance. *Back is bowed by the Quadratus.*

I for my Part would rather say it arises from the transverse Productions or *Apophyses* of the two lower *Vertebrae* of the Back and the last Rib, that it might together with the oblique descending Muscles and the straight ones, stir and move forwards the whole frame of the *Ossa Ilium*.

The Muscles of the *Abdomen* which serve for Inspiration or drawing in of the Air, do also further the bending of the Loyns and of the whole Back-bone; for whiles they bear down the Chest, they do withal bow the Back-bone; if lying along upon your Breech, you would lift up the Trunk of your Body; or would leap up upon your Feet, without the Assistance of your Hands.

The Loyns are distended by four Muscles, on either side two, which are so infolded all along the Back-bone, that either we must make so many pares, as there are *Vertebrae*, or we must say there is only one Pare of Muscles distributing Tendons to all the *Vertebrae*, according to the Opinion of *Galen*. *Extenders*

The *Semi-Spinatus* Muscle, takes a ^b sinewy beginning, from all the Spines of the *Os Sacrum*, and ends into the transverse *Apophyses* of the Loyns and whole back. *Semispinatus*

The

The *Musculus Sacer* with a ^c pointed Fleſhy beginning grows out of the hinder Part of *Os Sacrum* and terminates into the Roots of the Spiny points of the *Vertebrae* of the Back.

The *Spina* or Loins are laterally moved, when the muscles on the contrary ſide do act by themſelves, both the benders and extenders.

If the muscles which extend the *Spina* or Back-bone, are oppoſite to the oblique muscles of the Belly deſcendent and the ſtraight ones, which move the frame of *Oſſa Ilii*, they muſt needs grow out of the upper Parts of the Spine, that they may be inſerted into the *Oſſa Ilium* and *Os Sacrum*. And although they ariſe from the upper Parts of the *Spina*, they will nevertheless ſerve to erect the *Spina*; and they will be ever more *Antagoniſts* againſt the muscles which bend the *Spina*, viz. The *Quadratus*, and the *Musculus Obliquus aſcendens*.

For they receive Nerves, as well in their upper as middle Parts.

^a T. 14. f. 2. OO. f. 4. CC. f. 1. NN. ^b T. 14. f. 3. DD. f. 4. AA. ^c T. 14. f. 4. BB. ■

Chap. 33. Muscles of the Belly.

BECAUSE thoſe ^a ten muscles, which are found diſplayed upon the Belly, were accurately deſcribed, *At the beginning of the firſt Book*, I will not here repeat them, becauſe they are excepted from this Diſcourſe.

Chap. 34. Of the Motion of the Ilium Bones and Os Sacrum Joyned together.

By what Muscles
its moved for-
wards.

THE frame of the *Ilium* Bones and *Os Sacrum* Joyned together, is moved backward and forward in the Genial Embracements tending to Procreation.

The ſaid Conjunction of bones is moved forwards by the ^b *Right and Oblique* ^c *deſcending Muscles* of the belly, the Cheſt reſting and the Thighs remaining removed, unleſs they follow the motion of the *Ilium* Bones.

By what mov'd
backwards.

It is moved backwards by the *Musculus* ^a *Sacer* and the ^b *Semispinatus*, which ariſe from the upper Parts of the Back; which I have demonſtrated by many reaſons and experiments in my *Anthropographia*.

Chap. 35. Muscles of the Teſticles.

Proper Muſcle
of the Stones.
Cremaster.

THEY are *Proper* or *Common*.

The *Proper* is that which is peculiar to each Teſticle called ^c *Cremaster*. It grows out of the lower ^a fore Part of the Spine of *Os Ilium*; or rather it is the ſag-end of the Oblique aſcending Muſcle, bordering upon the *Os Pubis*, whoſe Fleſh is redder, thinner, and as is were ſeſeſed from the Fleſh of the ſaid oblique aſcendent muſcle. It inſolds extrinſecally the production of the *Peritonæum*, and is carried together with the Seminary Veſſels unto the Teſticle.

It draws the Teſticle upwards and retains it ſuſpended in that Poſture.

The Common
Dartos.

The *Common* Muſcle is the Membrane of the *Scrotum* or Cod termed ^d *Dartos*, being a Continuation of the Fleſhy Membrane. And this *Musculous* Membrane ſuſpends both the Teſticles.

Women have likewiſe their *Cremaster*, ſhorter than that of Men, ſituate upon the production of the *Peritonæum*.

Chap. 36. The Bladders Muſcle:

Office of the
Sphincter of the
Bladder.

LEST the Urin collected in the bladder ſhould run out of it ſelf againſt ones will; there is a round fleſhy muſcle which being roul'd back over the Proſtata, does ſhut

sh it the bladders Neck; and being made broad it expels the Urin; and by wringing or squeezing the *Prostata* or Auxiliary Testicles, it squirts out the Seed in Venereal Conflicts. Now the Neck of the Bladder being Fleshy, performs the office of an internal Sphincter Muscle, and exactly closes the Bladder.

^a T. 2. f. 8. AB. f. 9. ABD. ^b T. 2. f. 9. BC. ^c T. 2. f. 8. A. &c. ^d T. 14. f. 4. BB. ^e T. 14. f. 3. DD. f. 4. A. d. ^f T. 6. f. 2. DD. ^g T. 6. f. 2. BB. ^h T. 6. f. 5. FF.

Chap. 37. Muscles of the Yard:

THe Yard has four Muscles: two on each side.

Musculus ^a *Erector* is bred out of the innermore bunching out of the *Ischium*, and being knit unto the Ligament of the Yard, it reaches sidewares as far as the middle of the Body thereof. The *Accelerator* takes his Rise not only from the *sphincter* of the *Anus* or Fundament, but also from the internal Tuberosity of the *Ischium* or Huckle bone, and being with his Mate spread out under the *Vertebra* or Piss-pipe, it is drawn out as far as to the middle of the Yard.

It hastens the squirting out of the Seed, and forces out the drops of Urin, in the conclusion of Pissing. And because it is in its Original twofold, it may therefore be accounted a double Muscle; but because I attribute that portion which arises from the Tuberosity of the Huckle-bone, unto the Fundament, and call it *Levator externus Ani* [the external Arse-heaver] therefore the true *Accelerator*, according to mine, and other Anatomists Opinion, must arise only from the external Sphincter of the Fundament.

Chap. 38. Muscles of the Clitoris.

THe *Clitoris* in Women represents the Mans Yard, and therefore is furnished with Muscles alike, though not serving for the same Office. O; which I have treated in my first Book, in the Chapter which describes the Womb.

^a T. 6. f. 1. aa. f. 5. HH. ^b T. 6. f. 1. bb. f. 5. II.

Chap. 39. Muscles of the Fundament.

I Have described the Muscles of the Fundament very sufficiently in the 33. Chap. of my second Book.

Chap. 40. Muscles of the Thigh.

THe Thigh is extended, bended, drawn to a man, and from a Man, and oblickly wheeled about.

It is extended when we stand, our Thigh being Perpendicular to our Huckle-bone, which posture is caused by three Muscles which constitute the Buttocks, and are therefore by Authors termed *Musculi Gloutii*; that is the Buttock Muscles.

Maximus and *extimus* ^a *Gloutius*, the greatest and outmost buttock Muscle, is bred out of the spines of *O; Sacrum* and more than half of the *Ilium* Rib; and is inserted four Fingers beneath the great *Trochanter*, where a certain Eminence of the bone is discerned.

Secundus and *medius* ^b *Gloutius*, the second and middle buttock Muscle, springs out of the external Part of the *O; Ilium*, and is inserted into the great and external *Trochanter*.

Gg

Tertius

Yards Erectors

Accelerators

Extenders of the Thigh.

Gloutius maximus.

Medius.

Mimus *Terminus* and *incimus* ^c *Glottius*, the third and innermost buttock Muscle, arising from the outward and lower side of *Os Ilium*, is implanted into the Top of the great *Trochanter*.

The Thigh is bended by three Muscles.

Reclusus, *Psoas*. *Primus Lumbaris*, The first Loyn Muscle called ^d *Psoas*, spread over the bodies of the Lumbal *Vertebrae*, in the Cavity of the belly; is bred out of the Transverse *Apophyses* of the lower *Vertebrae* of the back, and being carried along upon the inner surface of *Os Ilium*, it is inserted into the small *Trochanter*.

I have in men, oftimes found a little Muscle spread over this, which in its original, being of the length and thickness of a Mans little finger and fleshy, with a small and flat Tendon is carried above the *Psoas*, and when it is come to the *Iliac*, it looses it self into a broad and very strong *Aponeurosis*, which firmly combines the *Iliac* and *Psoas* Muscles. And therefore I conceive it is added, in strong Men, that it might straightly embrace the *Psoas* and hold it firmly in its seat.

It is called *Parvus Psoas*, and is more rarely found in Women than in Men; Howbeit in the year 1631. In a very stout *Virago* or kind of *Mol Cuc-Purse*, it was my hap to see one of these Muscles, she having been hang'd for Robberies and Murthers by her committed.

^a T. 23. f. 2. B. f. 3. A. ^b T. 23. f. 3. B. f. 4. C. ^c T. 23. f. 4. B. ^d T. 10. f. 1. OO. T. 23. f. 1. A.

Iliacus. *Iliacus Musculus*, the *Iliac* Muscle, takes its rise out of the ^a internal Cavity of *Os Ilium*, and being by its Tendon Joyned with the lumbal Muscle, it is terminated between the great and little *Trochanter*.

Pectineus. ^b *Pectineus Musculus*, The Combe Muscle shootes out of the upper Part of *Os Pubis*, and is inserted a little below the Neck of the Thigh, on the fore side.

Drawer 10. The Thigh is drawn to the inside by the *Musculus Triceps* or ^c three headed Muscle, which has three originals and as many distinct Insertions.

Triceps. One of its Heads arises from the upper Part of the share bones or *Os Pubis*; the other arises from the middle of the said bones, and the third from the lowest Part of the said bones; and they are inserted into the hinder line of the Thigh, being disposed by course.

The Action of this Muscle is strong and Prævalent, drawing the Thighs inward, when we Climb Trees, ascend to the Main Mast and Ride on Horse-back.

This trebble headed Muscle is the first that receives the Excrementitious Humors of the body which fall into Legs, because of the Vessels which pass that way.

Withdraws. The Thigh is drawn to the outside by very small Muscles, because the drawing of the Thigh outwards is not very necessary.

^a T. 23. f. 1. B. ^b T. 23. f. 1. C. below b. ^c T. 23. f. 1. and 2 CC.

The *Quadrige-*
minisli. The *Musculi Quadrigemi*, are four little Muscles, interchangeably placed upon the Articulation of the Thigh in the hinder Part thereof.

First. The first and ^a uppermost of the *Quadrigemi* being longer than the rest and as it were pear fashion'd, is by others termed *Iliacus externus*. It arises from the lower and external Part of *Os Sacrum*.

Second. The ^b second of the *Quadrigemi*, arises from the Tuberosity or buncy Part of the Huckle-bone.

Third. The third which is contiguous unto the former, arises from the same Part, and these three are inserted into the Cavity of the great *Trochanter*.

These three of the *Quadrigeminal* Muscles, being included in the Cavity of the great *Trochanter*, do serve likewise to thrust downwards or lengthen out the Thigh when it is stretched a little beyond its natural length, which you may observe in a Man that lies upon his Back, with his body and Leg stretched out.

They perform this Action in the same manner as the *Pterigoides internus*, interposed between the two Jaws, does drive the lower Jaw forwards.

The Fourth. The *Quartus Quadrigemiorum* ^c *Quadratus*, is broader and more fleshy than the other three, being distant from the third of the *Quadrigemi* two Fingers breadth;

breadths; and is propagated from the inner Part of the Protuberance of the Huckle-bone, and fastened into the external Part of the great Trochanter.

The Thigh is obliquely wheeled about by the two Obturators, the *external* and the *internal*.

The *Internal*^d grows out of the inner Circumference of that hole which is in the *Os Pubis* or share bone; and being carryed along through that hollowness which is between the Knob of the Huckle-bone and its *Acetabulum* or Socket, it is by a tripartite Tendon inserted into the Cavity of the great Trochanter.

Its Tendon is folded up and inclosed by the second and third *Quadrigenial* Muscle, which resemble a purse. Its action is to direct the external wheeling motion of the Thighs.

^a T. 23. f. 3. C. f. 4. D. ^b T. 23. f. 3. b. f. 4. G. ^c T. 23. f. 3. D. f. 4. E. ^d T. 23. f. 3. E. and 4. F.

The *Externus*^a *Obturator*, taking its revolution from the external Circumference of that hole, which is in the share, and being Circumducted through the Neck of the Thigh as through a pully, it is carryed unto the Cavity of the great Trochanter under the fourth *Quadrigenial* Muscle.

It governs the internal wheeling motion of the Thigh.

When the *Quadrigenial* Muscles and the *Obturatores*, are soaked in Wheyish Humors, they cause most bitter pains, which counterfeit the true *Sciatica*, and lengthen the Thigh, as it were halt out of Joynt, which is diligently to be noted and distinguished.

Chap. 41. Muscles of the Leg.

The Leg is Joyned with the Thigh, by that kind of Articulation which is called *Gynglymus*, and therefore it is only moved by bending and extending; but because the Articulation is loose, it suffers a Man to draw his Leg sidewaies; for which Cause *Laurentius* and other latter Anatomists, will have the Leg to be turned inwards and outwards by certain Muscles ordained to that end.

It is drawn inwards or towards the other Leg, by the *Sutorius*, a very long Muscle. It is drawn outwards or from the other Leg, by a *Membranous* Muscle, or broad swath. I leave it free for any Man thus to divided the Muscles, which I distinguish into benders and extenders.

The Leg is bent by four binder Muscles.

The first of those four, is called ^b *Semi-Nervosus*, the Half sinew Muscle. It arises from the Tuberosity or bunching Part of the Huckle, and ends in the hinder and inner Part of the Leg.

The other is termed ^c *Semi-Membranosus Musculus*, the Half Membranary Muscle, which proceeds from the same bunching Part of the Hip or Huckle-bone, with a beginning which is Nervous and *Membranous*; and with a larger Tendon, is inserted into the inner and hinder Part of the Leg.

^a T. 23. f. 4. e. ^b T. 23. f. 3. GG. ^c T. 23. f. 3. HH.

The Muscle ^a *Biceps* springs from the foresaid Tuberosity of the Hip or Huckle-bone, and being carryed along the outward Part of the Thigh, about the middle thereof it becomes fleshy, which fleshyness I have seen separated as a second Muscle, as far as the Head. It is by one only Tendon inserted, into the outward Part of the Leg.

The fourth being commonly termed *Posticus*^b *Gracilis*, arises from that line which shews where the Hip-bone and the Share-bone grow together, and descending a little the inside of the Thigh, it is inserted into the inner Part of the Leg.

The Muscle called ^c *Popliteus*, is to be reckoned among the benders, it lies lurking in the Cavity of the Ham, above the Head of the *Soleum*. It arises out of the external swelling or bunching out of the Thigh, and is Obliquely inserted into the hinder and upper part of the Leg, which it closely embraces.

Oblique wheel
levs.
Obturator in.
ternus.

Obturator ex
ternus.

The station of
the Leg.

The Leg benders
The Semi-Ner-
vosus.

The Semi-
Membranosus.

The Biceps.

The Gracilis.

The Popliteus.

Extenders.
The Membranosus.
The Sutorius The Leg is extended by six Muscles. The first we meet with is the ^d *Membranosus*, which is drawn out of the upper spine or sharp point of the *Iliac* bone and carried into the fore part of the Leg, or rather of the Thigh, and girts in the Muscles of the Leg it self, like a ^e *Membranous* swath, all save the *Musculus sutorius*.

This Muscle taking its rise from the upper ^f Spine and fore Rib of the *Ilium*, and sliding down Obliquely by the inner Parts of the Thigh, ends into the inside of the Leg, which it is said to bring to and place over the other, as Tailors are wont to do when they would fit Cross-Leg'd.

Rectus gracilis. The *Rectus & Gracilis*, Springing out of the lower Spine of *Os Ilium*, and being carried right out all along the Thigh, ends on the fore Part of the Leg, beneath the *Epigonatis*.

Vastus externus The two Muscles called *Vastii* do on either side border upon the *Rectus Gracilis*; the one of which being ^h *External*, arises out of the Root of the great *Trochanter*, and is inserted into the Leg, a little below the *Patella*, on the out-side.

^a T. 28. f. 3. III. ^b T. 23. f. 3. FF. ^c T. 23. f. 4. H. ^d T. 23. f. 2. FF. ^e T. 23. f. 1. GG.

Vastus internus The other which is ^a *internal*, arises from the Root of the small *Trochanter*, and falls into the inside of the Leg, a little below the *Patella*.

Cruentus. The Muscle termed ^b *Cruentus* placed under the two *Musculi Vastii*, springs out of the fore bone of the Thigh, between the two *Trochanters*, and cleaving to the whole body of the Thigh, it produces its Tendon over the *Epigonatis*, unto the fore part of the Leg.

These five Muscles, the *Rectus*, the *Gracilis*, *Duo Vastii* and the *Cruentus* Muscle, being united altogether about the Knee, they produce one only Tendon, very broad and strong, wherewith the *Patella* is infolded.

Chap. 42. Muscles of the Feet.

Motion of the Foot.

AS the Hand is divided into three Parts, so is the Foot into the *Tarsus*, *Metatarsus* and *Phalanz* or Row of Toes. And as in the Hand, the Wrist is moved while the Parts after the Wrist remain unmoved; so in the Foot, the *Tarsus* is moved, the *Metatarsus* remaining unmoved. And therefore the *Tarsus* is bowed, when it is moved forward, and it is extended, when it is forced backwards.

In the mean while you shall observe that the bowings of the Members in the whole Leg and Foot are contrary; in the hand they are like one another, for the conveniency of taking up of any thing; in the Leg and Foot they are contrary, to make us stand firm, and for the performance of different actions. For the flexion or bowing of the Thigh is performed forwards, the bowing of the Leg is performed backwards; the bowing of the Foot is done forwards, the bowing of the Toes of the Foot, backwards.

Foot-benders. The Foot is bowed by two Muscles seated before, which are called *Tibians* and *Peronaeus*.

Tibianus anticus. The *Tibianus Anticus* taking its rise from the upper *Epiphysis* of the Leg near the *Fibula*, and cleaving to the *Tibia* all along, about the middle of the bone, it degenerates into a Tendon, which beneath the ^d Ring-fashioned Ligament of the Foot, is slit into two Tendons, the one of which is inserted into the *Os primum innominatum* or first nameless bone, and the other is lengthened out as far as to the bone of the *Metatarsus* which is placed under the Great Toe.

^a T. 23. f. 1. HH. ^b T. 23. f. 1. Cc. ^c T. 23. f. 1. K. ^d T. 23. f. 1. Z.

Peronaeus anticus.

The *Peronaeus Anticus* is in its Original joynd to the *Peronaeus Posticus*, although both the Tendons are drawn through the cleft of the external Ankle, yet in their end and insertion they are separated. The *Anticus* has its rise from the middle and

and external part of the *Perone*, and being led through the cleft of *Malleolus externus*, it is inserted on the fore-side into the bone of the *Metatarsus*, which sustains the little Toe.

The Foot is extracted by the after Muscles. The first and outmost are the ^b *Gemelli* or *Twins*, so called because they are equal in Bulk, Strength and Action. They are also termed *Gastrocnemij*, because they make the Belly or swelling of the Calf of the Leg; and the one of them is *internal*, placed in the inner side of the *Tibia* or Shank, the other is *external*, and possesses the outside thereof.

Extenders.

The internal *Twin-Muscle*, arises from the inner knob of the Thigh; the external *Twin-Muscle* arises from the external knob of the said Thigh. They are severed in their beginning, but grow together at last into one Belly, which by a strong Tendon is lengthened out unto the hinder part of the Heel. *Vesalini* was the first that observed that, to several beginnings of every one of them, there are several little Bones placed like unto Sesamine Seeds or like Taxes or Vetches, to the end that with their smooth and slippery surface, being placed between the Muscles and the Bones, they may hinder the Muscles from being hurt, when the leg is turned this way or that way.

Gemelli interna-
mus.

Extensus.

Plantaris ^d *Musculus*, which lurks between the *Twins* and the *Soleus*, arises from the external knob of the thigh, being fleshy on the upper part, and quickly ending into a very small and longish Tendon, it is drawn under the Heel, by the inner Ankle-bone, and diffused into the sole of the Foot.

Plantaris.

It performs the same office in the Foot as in the hand; that the Foot might answer to the hand, and that whilest the Foot is hollowed, the Skin, by the Tendons lying under, might be firmly fastened.

^a T. 23. f. 1. LL. ^b T. 23. f. 1. dd. f. 2. DD. f. 3. KK. ^c T. 23. f. 3. 00. ^d T. 23. f. 3. M. ^e

The ^a *Soleus*, a broad and thick Muscle, takes its original from the upper part of the Leg, or from the upper and hinder closure of the *Tibia* and *Perone*; and is inserted by a Tendon mixed with the *Gemelli* or *Twins*, into the hinder part of the Heel.

Soleus.

Under the Muscle *Soleus* remarkable vessels have their passage, both Veins, and Arteries and Nerves; whence it comes to pass that the pains of the Calf of the Leg are deep and lasting.

Of the *Twins* and the *Soleus* mingled together in their inferior parts, is made that same common Tendon, which is so exceeding thick and strong, which *Hippocrates* termes the *Chorda magna*, the Hurts, Bruises and wounds whereof, do cause death.

The Chorda of
Hippocrates.

The foot is extended by two hinder Muscles, the *Tibialis posticus* and the *Peroneus posticus*.

Tibialis posticus;

The *Tibialis posticus* does arise from the upper part of the *Tibia*, and being affixed to the whole body thereof, through the cleft of the inner Ankle bone, it produces two Tendons, the one of which ends at the *Scaphoidean* Bone, and the other is carried as far as to the *primum Os innominatum*.

The *Peroneus posticus* does arise from the upper and hinder part of the *Perone*, and being carried with the *Peroneus anticus* through the cleft of the external ankle bone into the bone of the *Metatarsus*, which sustains the great Toe, under the sole of the Foot, it transmits its broad, hard and gristly kind of Tendon, under the Tendinous head, of that Mass of flesh, which does produce its internal interosses-
ans.

Peroneus
posticus.

The Muscles *Peroneus anticus* and *Posticus*, as they are distinct in their original, so are they also distinct in their insertion, although they are drawn through the pulley of the external ankle; but the Tendon of the *Peroneus Flexor*, is inserted into the outside of the *Os Metatarsi* which sustains the little Finger.

The Tendon of the other *Peronean* Muscle, whose office is to extend the part,
being

being scituate behind, is carryed further and more inwardly under the Muscle called *Padus*. These two Tendons are separated one from another, being inclosed in two distinct sheaths or scabbards, of a nerve-grittly substance.

^a T. 23. f. 3. LL. ^b f. 2. EE. ^c f. 23. f. 2. FF. ^d

Chap. 43. Muscles of the Toes.

The Anular
Ligament.

THe Toes have their proper Muscles, fitted to procure their bending, extending, and lateral motion from one side to another; also their tendons are comprehended with a Ring-fashioned or circular and *transverse* ^a ligament, which does inclose them beneath the Ankles, just as we see in the Wrist.

Toe stretchers.

They are extended by the *Musculus longus* and *Brevis*.

Cnemodactylus.

The *longus*, or ^b long-Toe-stretcher called in Greek *Cnemodactylus*, takes its rise from the fore and inner side of the *Tibia*, there where it is joyned to the *Fibula*, lurking close under the *Tibialis anticus*, and goes down-right all along the *Fibula*, till having passed the Ring-fashioned ligament, it ends into the three Articulations of the ^c four Toes that it might at once and by one motion, move the three joyntings of the four Toes aforesaid.

Pedians.

Brevis Digitorum tensor, or the ^d short Toe-stretcher, or *Pedian* Muscle, springs out of the Heel and the external and upper part of the neighbouring *Astragalus* or bone so called, and being spread under the Superior, it is with its Tendons inserted into all the Joynts of the Articulation.

The Tendons of these Muscles, as well the long as short, do pass cross-wise one over another, above the *Metatarsus*.

The Toe benders

The Toes are bowed by two Muscles, the *Brevis* and *Longus*; which answer to these Muscles of the hand which are called *Profundus* and *Sublimis*.

Peroneus

Longus ^e *Digitorum flexor* the Long Toe-stretcher called also *Peroneus*, arises out of the hinder and upper part of the *Perone* or *Fibula*, and being carryed along under the inner ankle, through a peculiar cavity of the Heel, it is divided into four Tendons, which are drawn through the slits of the short Toe-bending Tendon (as we see likewise in the Hand) and then inserted into the third Joynt of four Toes.

^a T. 23. f. 1. g. ^b T. 23. f. 1. MM. ^c T. 23. f. 1. ff. ^d T. 23. f. 2. G. ^e T. 23. f. 4. II. f. 6. C. ^f

Pedialis
intimus.

Brevis ^a *Digitorum flexor*, or the *Pedialis internus*, or short Toe-bender, springs from the inner and nether part of the Heel, and being parted into four, it is terminated into the second Articulation of the Toes.

The Tendons of this Muscle have holes bored in them for the Long Toe-benders Tendon to pass through.

The oblique
movers.

Moreover, the Toes are drawn sideways by the Interossean Muscles. They are eight in number, four internal and as many external, which are otherwise disposed in the foot than they are in the hand.

The Interosseans.

The external arise from the spaces of the Bones of *Metatarsus*; the internal, being scituate in the ^c Hollow of the foot, and knit unto the bones, and seem to take their original from that lump of ^d Flesh, which possesses and fills up that same Cavity of the Bones of the *Metatarsus*; but the membrane being taken away, they are seen to arise from one nervous pointed or acuminated Original, fixed on the inside near the Heel, and divided into four tendons, and to end into the second Articulation, whereunto the worm-fashioned or lumbrical Muscles do cleave.

And therefore the external interossean Muscles, do fill up the empty spaces of the Bones of *Metatarsus*.

The Lumbrical or worm-fashioned ^e Muscles, do not arise from the Tendons of the long Toe-bender, as in the Hand, but from a fleshy lump, which lies hid underneath the short Toe-bender; and that has its original from the Heel.

Chap. 44. Muscles of the great Toe.

The *great Toe Bender*, being scituate near the *long Toe stretcher*; and of a fleshy substance, arises out of the upper Part of the *fibula*, where it is Joyned with the *Tibia*, and passing along under the inner *Ankle bone* and the Sole of the Foot, it is inserted into the first bone of the *Great Toe*; and before it comes unto the second bone a little *Sesamoidean Bone* is preposed; and the Tendon for securitys sake is intercepted, with two greater *Sesamoidean Bones*.

^a T. 23. f. 4. L. f. 6. A. ^b T. 23. f. 2. aaaa. ^c T. 23. f. 5. Addd. f. 6. ffff. ^d T. 23. f. 6. DD. ^e T. 23. f. 6. esse. ^f T. 23. f. 4. K. f. 6. B.

Sometimes under the sole of the Foot, it is divided into two Tendons, the one of which is transmitted to the great Toe, the other to the second of the little Toes; and then the great Toe-bender is divided only into three.

Extensor Pollicis the *great Toe-stretcher*, arises from the external side of the *Tibia*, where it is separate from the *Fibula*, and creeping along the surface of the Foot, it is inserted into the whole great Toe, in its upper side. The other ends into the Bone of *Metatarsus*, which is spread beneath the great Toe.

The *great Toe* and the *little Toe*, have two notable Muscles, externally scituate, which draw these Toes outwards from the rest; so that one of them, being externally fastened unto the bone of the *Metatarsus*, which is placed under the great Toe, is termed *Abductor Pollicis*, the Drawer aside of the great Toe.

The other being externally spread upon the first Bone of *Metatarsus*, may be called *Abductor minimi digiti*, the drawer aside of the little Finger. It answers to the *Thenar* and *Hypothenar* of the Hand.

Furthermore the *Great Toe* has in the sole of the Foot another *Transverse Muscle*, like the *Anti-thenar*, which arising out of the Ligament of that Bone of the *Metatarsus* which is placed under the least or next Toe, and going obliquely upon the other Bones, it ends with a strong Tendon into the first Joint of the great Toe, beneath the same.

This Muscle is opposed to the *Abductor*, that it might draw the *great Toe* back again.

The flesh being taken away, we find a threefold or fourfold Membrane, I suppose it is that Mass of flesh which fills the Cavity of the sole of the foot.

^a T. 23. f. 1. N. ^b T. 23. f. 3. O. f. 5. bb ^c T. 23. f. 3. P. f. 5. c ^d T. 23. f. 5. a.

In the lowest part of the Foot which is termed *Vestigium*, there is contained a Lump of flesh which fills up the Cavity and empty space of the first Joints; from whence writers say Tendons are drawn to several Toes.

I conceive the use of this flesh is rather to strengthen the Toes and to combine their first Articulations, than to move the same, also like a soft Cushion, it is spread under the Tendons of other Muscles.

Chap. 45. An Introduction to the Art of Muscular Dissection, shewing an Accurate Method to cut up the Muscles of the whole Body.

Whosoever has perfectly learned the History of the Muscles, will easily understand the Art of their Dissection, and be able of himself without any help, to administer this part of Anatomical section, which many account the hardest of all, provided he diligently observe the Method which I here deliver. And therefore having finished our *Myologia* or History of Muscles, *Myotome* or the Art of their Dissection, will seasonably follow.

The Frontal Muscle.

The frontal
Muscle.

The Skin of the forehead, being circularly cut off above the Eyebrows, and drawn away as far as to the Coronal Suture, or to the beginning of the Haires, you meet with the two frontal Muscles, which are most exactly to be separated from the frontal or forehead bone which lies beneath, beginning from above and cutting all away into the very Eye-brows. They are in the middle of the Forehead distinct one from another.

^a T. 23. f. 6. DD. ^b T. 15. f. 1. E.

The Orbicular Muscle of the Eye-Lids.

The Orbicularis.

The Skin of the Eye-brows and of the whole face being industriously dissected, there appears a double ^a orbicular Muscle, which does circularly cover the socket of the Eye a Fingers breadth on all sides, and is spread under each Eye-lid. Also, you shall find the *Musculus Ciliaris*, stretched out orbicularly under the *Tarsus*.

The Ciliaris.

Muscles of the Lips.

Zygomaticus.

Afterwards, the whole Face being made bare and the Skin flaid off, a little below the Eye-hole, we meet with a little lean longish Muscle, placed athwart and called ^c *Zygomaticus*. For it is produced from the *Zygoma* unto the opening of the Lips. This Muscle must be separated from the Fat; for much Fat (which is also crowded into the Muscles) does cover the whole face, which you shall pluck away with your Nails or with a pair of Pincers, or with a very sharp Pen-knife, that the Muscularous flesh may more evidently be distinguished.

Lip elevators.

From the *Zygoma* towards the Lips, you shall search for five *Muscles* besides the *Zygomatick* muscle; and you shall find two above the upper Lip; each of which is exactly to be separated from the other. That Muscle which is nearest the *Zygoma*, belongs unto the neather Lip, which is lifted up thereby. The other being very near to the ^e Noftrils, is reckoned to belong to the upper Lip. The *lateral f* Muscle broad and Flethy which opens and forms the Cheeks, and therefore is called *Bucco*, must not be stirred out of its place.

Buccinator.

Lip depressors.

In the neather jaw, as far as to the middle of the lower Lip, you shall search for two Muscles, having first taken away the Skin.

^a T. 15. f. 1. FF. ^b T. 19. f. 1. CC. ^c T. 15. f. 1. L. ^d T. 15. f. 1. K. ^e T. 15. f. 1. H. ^f T. 15. f. 1. O.

That ^a which is nearest the Chin, does depress the lower Lip. That which lies ^b beyond next the *Masseter* or fastened to the Corner of the mouth, draws the upper Lip downwards. These two *Muscles*, though most exactly united, are yet distinguished one from another by the various posture of their fibres; namely, in as much as the Fibres of the former Muscle, do seem to go upwards from the Chin to the Lip, and do as it were constitute a pyramidal Muscle, whose Basis rests beneath, and its top reaches to the Lip; the Fibres of the other Muscles do ascend unto the Meeting of the Lips.

Muscles of the Nose.

Nose-lifters.

The Skin of the Nose being cutiously taken away, two Muscles discover themselves being fastned unto the bones and laps of the Noftrils, which arising out of the space between the Eye-brows, are carried into the laps of the Noftrils.

Noftril-wideners.

Other Anatomists add (but only in such as have great Noses) two little ^d *Muscles* spread athwart upon the ends of the *Nose laps*, which widen the Noftrils, as the former do lift them up.

Other Anatomists add (but only in such as have great Noſes) *two little* ^d *Muscles* spread *atwart* upon the ends of the *Noſe-Laps*, which widen the Noſtrils, as the former do lift them up. Noſtril wideners

In the interim you ſhall obſerve, that all theſe *Muscles* are ſo ſtrictly conjoined, that one of the Lips, or the Noſe cannot be moved without the motion of the Neighbouring parts.

The *internal Muscles of the Noſtrils* are ſeldom found, and only in ſuch as have jolly toating Noſes.

The Temporal Muſcle.

That ſame thick and fibrous *Fleſh* which is ſituate between the ſmaller Corner of the Eye and the Ear, is called the ^e *Temporal Muſcle*; whoſe tendon being drawn along under the *Zygoma*, is ^f terminated into the Top of the lower Jaw. Temporaliſſi

^a T. 15. f. 1. n. ^b T. 15. f. 1. M. ^c T. 15. f. 1. G. ^d T. 15. f. 1. I. ^e T. 15. f. 1. PP. f. 2. AA. ^f T. 15. f. 2. aa.

The Maſſeter Muſcle.

From the lower part of the *Zygoma*, ariſes the *Muſcle* ^a *Maſſeter*, which makes up the fleſhy ſides of the Face. It is inſerted into the Corner of the Lower Jaw; and it may be divided into two, the internal and external fibres being *crois-waies* interſected. Maſſeteri

The Parotick Kernels.

Above the Joynt of the lower Jaw, behind the Ears, there are ſcattered certain Kernels, of which one great Kernel is made, called *Parotiſſi*. This cannot be ſeen unleſs the broad *Muſcle*, which reaches unto the Ear, be torn away. This Kernel being plucked out, you may proceed to the *Muscles of the Ears*. Conſtitution of the Parotiſſi

Muscles of the Ears.

Although the Ears in Man-kind remain firm and immoveable, yet have they their proper *Muſcle* placed behind them. The *firſt* is a very little one, divided into two or three fleſhy fibres, very friendly imbracing the ligament of the Ear; you muſt ſearch for it at the root of the Ear.

The other *Muscles of the Ear*, are only portions of the *frontal muſcle*, the broad *Muſcle*, and the *Hinder-Head Muſcle*; all which are bred out of the fleſhy pannicle.

The Muscles of the Eye.

Within the Eye-hole are contained ſeven *Muscles*, ſuch as are the *Attollens Palpebram* the Eye-lid liſter, Four ſtraight ones and two oblique, Six of theſe ariſe out of the deepeſt part of the Eye-hole. The Eye-lid liſter.

^a T. 15. f. 1. S. f. 2. BB. ^b T. 15. f. 1. Q. R. T. 20. f. 1. Hl. &c.

You ſhall find two above the globe of the Eye, of which the one being firſt in ſituation, is the ^a *Liſter-up* of the upper Eye-lid; and the other is called *Attollens Oculi* the Eye-liſter. You ſhall ſearch for three other ^c ſtraight *Muscles*, every one in its ſituation ſuitable to the action which it is to perform. Four right Muscles of the Eye.

But you ſhall diligently obſerve the ſixth ^d large oblique *Muſcle*, which at the great corner of the Eye, or by the ſpace between the Eye-brows above the *Teare-pipe*, or *foramen lachrymale*, runs back about the Cartilage or Griſtle, as about a pulley, or as a bridle about the Annular or ring-faſhioned ligament. Obliquus major

Be very careful that you do not break this Conjunction. For which cauſe you ſhall begin your Anatomical adminiſtration of the Eye, in that place, that is to ſay from the greater corner of the Eye, that you may preſerve entire the ^e *Pully* and the

Insertion of the Tendon, which is inclosed within a small nervous Ligament which receives the Tendon it self, and accompanies the same unto the Eye. The flesh of that Muscle is fixed to the boney sides of the Eye-Hole at the greater corner.

Obliquus minor.

The *Septimus Musculus Obliquus minor*, seventh Muscle, being the lesser of the crooked ones, is bred out of the inside of the lower part of the Eye-hole, near the Tear & Kernel and taking its revolution above the *Muscle humilis*, but below the *Indiguatorius*; it is terminated aloft upon the Globe of the Eye, by the Muscle called *superbus*.

In the Anatomical Dissection of the Eye, this Muscle is to be lookt after in the second Place, and to be warily preserved, lest we tear it in pieces, while we seek for the rest.

If with the point of your Pen-knife you pluck back the Coat of the Eye called *Conjunctiva*, you shall see that all the Muscles of the Eye, do Terminate by a fine Membranous *Aponeurosis* (conjunction or contexture of many Nerves) into the *Tunica Cornea*. But they do not make a peculiar Membrane, as *Columbus* imagined, because the *Aponeurosis* (nervy contexture) of every Muscle, is distinct by it self.

^a T. 19. f. 1. A. A. ^b f. 3. 4. 5. A. ^c f. 3. 4. 5. B. C. D. ^d f. 3. and 4. F. ^e f. 3. and 4. G. ^f f. 3. and 4. E. ^g f. 1. D. ^h f. 3. 4. and B. ⁱ f. 4. E. and D. ^k f. 3. 4. C. A.

But you cannot see or demonstrate the Muscles of the Eye, unless with a pair of Scissers you take away the fat placed about them; and after that you have shewn the Muscle which is the Up-lifter of the upper Eye-lid, with the four straight Muscles and the little crooked one.

That you may plainly discover the *Obliquus major* or greater crooked muscle, with its revolution to the pulley, you shall take out the Eye, leaving that greater oblique muscle, but cutting the rest away with your Scissers.

Muscles seated in the Neck.

Latus.

The Neck which we make account reaches from the Basis of the Head unto the shoulder-blades, comprehending seven spondils or *Vertebra's*, has divers Muscles in its foreside; of which some appertain unto the Head, to the *O's Hyoides*, some to the *Larynx*, others to the tongue, and others to the *Pharynx*.

And first we meet with the *Musculus latus*, the broad Muscle, which infold the whole Neck. It breeds out of the *Clavicula* and Breast-bone, and being fastened to the *Basis* of the neather jaw, it is laterally carryed forth unto the Ear; it must be very exactly separated from the fleshy parts which lie beneath it, because it is an exceeding thin Muscle.

Mastoides.

The *Musculus Latus* being revell'd or drawn back, in the fore part of the Neck under the chin you shall find nine as far as to the *Larynx*, and beneath the *Larynx* six.

Towards the outward part of the Neck, there appears the thick and round Muscle *Mastoides*, which ascends slanting from the *Clavicula* to the *Mastoides*. This Muscle ought to be separated at its original, that the others may be seen. But observe by the way, that this Muscle is very often broken asunder by the Halter in such as have bin hanged.

Coraco-hyoideus.

Under the *Mastoides* there lies lurking the *Coraco-hyoideus*, a lean and longish Muscle, obliquely stretched out from the *Scapula*, to the *O's Hyoides*, for the retraction whereof, it is ordained.

^a T. 15. f. 2. F. T. 15. f. 1. gg. ^b T. 14. f. KK. f. 3. G. ^c T. 13. f. 13. FF.

Then you shall see afterwards the *Carotick Artery*, and the *internal Jugular Vein*, and the *Nerve of the sixth Conjugation*, interposed between the said two Vessels. And then you shall pass unto the Muscles seated beneath the *Larynx*.

The first which presents it self is the *Sternohyoideus*, which is bred out of the top of the *sternum* or Breast bone. Under this lies the *Bronchicus* which belongs to the *Larynx*.

Then

Then you shall dissect and shew the Muscles placed above the *Larynx* and under the *Chin*.

The first is *Digastricus maxilla interna*, or the *Two-bellied Muscle of the lower Jaw*, which is small and nerve in the middle thereof, that it might be turned back about the *Styloceratoides*, and ends into the *Chin*, inwardly.

Digastricus.

There are two *Glandules* or *Kernels* under the *Chin* near neighbours to this Muscle, which in rheumatick defluxions do often swell. They are termed by *Vesalius*, I know not why, *Animelle*. You must remove these *Glandules* that the rest of the Muscles may be discovered, also you must separate the *Digastric* or *Two-belly* from the *Chin*.

Under it lies the Muscle ^d *Mylohyoides* with his Mate most straightly tyed and united, but a line drawn from the notch of the *Chin* as far as to the middle of *O: Hyoides* within, will shew you how to dissect.

Mylohyoides.

Under this *Mylohyoides* are found two remarkable Nerves, Branches of the Seventh *Pair*, and the Muscle ^e *Geniohyoides*, rising from the inside of the *Chin* and ending into the *O: Hyoides*, but so closely liukt with his Mate, that it is distinguished no otherwise, than by a white line which is manifest within.

Geniohyoides.

Under these lurks the ^f *Genio-Glossus*, by the outer side whereof lies the *Meloglossus*; under which lies the ^g *Cerato-glossus*, or rather *Basiglossus*.

Genio-glossus.
Basiglossus.

^a T. 13. f. 13. DD. ^b T. 13. f. 5. CC. ^c T. 15. f. 1. TT. f. 2. CC. ^d T. 13. f. 14. EE. ^e T. 13. f. 13. BB. ^f T. 23. f. 13. CC. ^g T. 13. f. 14. CC.

Afterwards you shall come unto the hollow of the Neck under the lower corner of the *Jaw*, where the *Kernel* was situate, which was formerly taken out. In this place is found the ^a *Styloglossus*, which is inserted into the *Ceratoglossus*.

Styloglossus.

Beneath there appear two Muscles, the one of which being lean and altogether fleshy, is called *Stylohyoides*, the other which is next unto it and touches it, being fleshy in its original at the *Styloides Process*, and small as a string in its middle, is called ^b *Digastricus* or *Two-belly*. The first was observed in the Neck under the *Chin*.

Stylohyoides.

Under the *Styloglossus* lies sculking the *Stylo-Pharyngeus*. Under the corner of the lower *Jaw* bone, there is internally and immediately fattened the *Pterygoideus internus*; which taking its rise from the Cavity of the *Pterygoides*, ends into the Corner of the lower *Jaw*, on the inside. You must not remove it from its posture.

Stylopharyngeus
Pterygoideus internus.

From the *Basis* of *O: Hyoides* on the outside, presents it self the short Muscle ^e *Hyothyroides*, which is inserted into the middle of the *Thyroides*. This whole Muscle, is commonly found broken by the *Halter*, in such as have been hanged.

Hyothyroides.

All these Muscles having been shewed and taken away, there appears the ^f *Oesophagus*, a broad and membranous Muscle spread under the *Oesophagus*, which it embraces, and is externally terminated in the *Wings* or *Skirts* of the *Cartilago Thyroides*, or *Gristle* so called.

Oesophagus.

Muscles of the Larynx, Pharynx and Gargarion.

The *Oesophagus* being shewed and separated, take away the whole *Larynx* that you may see those little Muscles which are proper to it. You shall observe eight or ten of them, of which some are ordained to move the *Thyroides*, and others pertain to the *Arytansides*.

In the foremost and lowest part of the *Thyroides*, are placed the two Muscles called *Cricocarytanidei antici*.

Cricocarytanidei.

^a T. 13. f. 14. DD. ^b T. 15. f. 1. TT. ^c T. 3. f. 2. and 3. CC. ^d T. 15. f. 2. DD. ^e T. 13. f. 8. BB. ^f T. 3. f. 2. and 3. DD. ^g T. 13. f. 8. DD.

By the sides and lower Corners of *Thyroides* are situate the Muscles called ^a *Cricocarytanidei Laterales*. In the hindermore and outward side of the *Cri-*

Thyroarytoides.
Arytenoides. *coides*, you shall find the two Muscles called *Cricothyroidei*. Having separated the *Tyroides*, inwardly and towards one side, you shall see the Muscle *arytanoideus*. To these is added the ^d circular Muscle infolding the whole *Arytanoideus*. But all these Muscles cannot be seen unless the *Oesophagus* be taken away, and the ^e *Paristhmian* Kernels pluckt off, with which the Cartilage *Thyroides* or Gristle so called, is covered.

The *Epiglottis* ^f in Mankind, has no Muscle; in Brutes, two pretty ones are found, which you may see in the *Larynx* of an Ox. But in Mankind, we find only a sinewy Ligament, which keeps the *Epiglottis* continually erected, unless it be depressed with the weight of the Nutriment passing by.

Afterwards you shall search for two other Muscles of the *Pharynx*, viz. the ^g *Sphenopharyngeus* and ^h *Cephalopharyngeus*.

The Pharyngi. And then you may easily find the other two ⁱ Muscles of the *Gargarreon*, if you have learned their Originals and Insertions out of the *History of the Muscles*.

The Muscles of the hinder part of the Head and Neck.

The Skin being removed, and the Fat of the hinder part of the Neck ^a and of the whole back as far as *Os sacrum* being pluckt away, you shall observe many Muscles, the first of which is called *Trapezius* or *Scapularis*, which with the *Latissimus* does cover the Neck, Back and Loynes, as it were a Cloak.

Trapezius.

Now the *Scapular* ^k Muscle, which belongs unto the shoulder, its broad end reaching out as far as the *Occiput* or Hinder part of the Head, does compass all the Muscle of the Neck, and must in the lower part thereof be separated from the ^l *Latissimus Musculus*, and wholly plucked up from the roots of the spines or pointed bones of the whole back bone as far as to the hinder part of the Head, from which it must be separated, and only left sticking to the shoulder blade.

^a T. 13. f. 9. CC. ^b f. 10. CC. ^c f. 9. BB. ^d f. 10. BB. ^e f. 16. and 17. ^f f. 7. 9. and 10. A. ^g T. 3. f. 2. and 3. BB. ^h f. 2. and 3. AA. ⁱ T. 13. f. 15. BB. CC. ^k T. 14. f. 1. and 2. AA. f. 2. AA. ^l f. 1. CC.

Rhomboides.
Serratus minor. This Muscle being taken away, the ^a *Rhomboides* a muscle of the shoulder blade, must be cut from the spines of the back bone. Under these lies the ^b *Serratus Spermus minor posticus*, the upper and smaller Saw-muscle behind.

The Splenius.

These muscles being plucked away as far as to their insertion, the muscles of the Head do shew themselves. And the first that occurs is the ^c *Splenius*.

Levator scapulae.

Near unto which is placed on the side of the Neck, *Levator* ^d *propria Scapulae* or the Muscle appropriated to pluck up the shoulder, whose original cannot be discovered, unless the *Mastoides* having been shewed, be taken out of the way.

Complexus.

The *Splenius Musculus*, towards the Roots of the spines of the Neck, being taken away, there lies under it the ^e *Complexus*, near unto which at the side of the Neck, lie certain portions of *Musculus Spinatus*, and the *Sacro-lumbus* arising as high as the second *Vertebra* of the Neck.

Transversarius.

The *Complexus* being taken away, below the second *Vertebra* of the Neck, are seen two Muscles which owe their service to the Neck. The first of these is ^f *Transversarius*, interposed between the Transverse and Spinic *Apophyses* of the Neck and Back.

Semispinatus.

Under this is spread the ^g *Semispinatus* immediately covering the Bodies of the *Vertebrae*.

Obliquus major.

Upon the first and second *Vertebrae* of the Neck, are seen eight small Muscles, in each side four, of which the two Greater ^h *Oblique* Muscles, are carryed from the Transverse *Apophysis* of the second *Vertebra*, to the Transverse one of the first. The two ⁱ *Recti Majores*, do begin at the *Spina* of the second *Vertebra*, and end into the *Occiput*.

Rectus minor.

Under their upper ends are situate the two *Musculi minores*, or lesser Muscles, the

the *Straight* and the *Crooked*, or the *Rectus* and *Obliquus*. The ^k *Minor Rectus* hid under the *Major Rectus*, which you shall unloose at the Head and pluck it aside, that the *minor Rectus* may appear.

^a T. 14. f. 1. BB. f. 2. B. C. ^b f. 2. E. ^c f. 2. HH. ^d f. 2. DD. ^e f. 2. II. f. 3. BF. ^f f. 4. EE. ^g f. 4. DD. ^h f. 2. L. f. 4. GG. ⁱ f. 3. and 4. II. ^k f. 3. 1. f. 4. KK. ^l

The Muscle called *Obliquus minor*, is carried from the hinder part of the head by the *Minor Rectus*, into the Transverse *Apophysis* of the first *Vertebra*: But you must free and lay bare of fat these Muscles, as well the straight as the Oblique or crooked ones, that they may be the more apparently seen. And you shall begin your Section of the Muscles of the Head and Neck at the respective *Spines* or pointed *Eminencies* of the *Back bone*.

When you have viewed the Muscles aforesaid you shall then make diligent search after one that lies closely sculking, above the *Articulation* of the inferior jaw and under the *Zygoma*; it is situate upon the external wing or Lap of the *Pterygides*, and being altogether fleshy and round in a manner, it is inserted into that same slit which is interposed between the *Coronis* and the knob of the lower Jaw bone.

It may be termed the *Pterygoides Externus* to difference it from the *Internus* described before.

Muscles of the Arm.

These Muscles being administered, you may proceed to others. And first you shall separate the ^e *Pectoral Muscle* either from the *Breast bone*, or from its lowest part, by which it is joyned to the *Serratus major*.

Mean while observe that the *Serratus minor* or ^d *smaller Saw-Muscle*; lies under the *Pectoral* or *Ribs*; least you should tear the same, whiles you dissect the *Pectoral Muscle*, which you must cut up, as far as to the middle of *Clavicula*. To which place being come, you shall separate it from the *Deltoides* or *Delta-shaped Muscle*, unto which it is fastened by a firm, but obscure band. Then you shall separate the *Deltoides* from its original.

From thence you shall proceed to the Muscles which are spread out upon the shoulder-blade. One lies upon the *Spina* or *Back bone*, three are seated beneath the same. That which is next the *Spina*, is called ^e *Infra Spinatus*.

Next therunto, is the *Rotundus minor*.

^a T. 14. f. 3. K. f. 4. HH. ^b T. 15. f. 2. EEEE. ^c T. 10. f. 1. A. B. T. 22. f. 1. E. ^d T. 10. f. 1. E. ^e T. 22. f. 3. BB. ^f T. 22. f. 1. and 3. C. ^g

Beneath that, you find the ^a *Rotundus major*, stretched out beneath the lower Rib of the *Oms-plata* or shoulder blade.

Under the *Scapula* you shall find the Muscle called *Immersus* or ^b *Subscapularis*; it fills the Hollow of the Shoulder blade.

You shall leave the Original and insertions of those Muscles untouched, only you must separate the sides of one Muscle from another, that they may be distinguished asunder, one from another.

Muscles situate upon the Back and Loins.

From the *Oms-plata* or shoulder-blade, descend unto the Back and Loins; which parts are covered with a Muscle called *Amplissimus* and *Latissimus*, or the ^c largest and broadest Muscle. This Muscle must be separated from the *Os Sacrum* and the external Rib of *Os Ilium*, as far as to the lower Angle or Corner of the shoulder blade, and its insertion at the *Os Brachij* a little beneath the Neck.

You must while you cut it up at the *Spines* of the *Vertebra's*, take heed of spoiling a Muscle which lies beneath it, and is termed *Serratus posterior inferior*, the hinder and lower *Saw-Muscle*, being a little one.

Which after you have pluckt off, from its original by the *Ossifacrum*, as far as its infertion, you shall shew three other Muscles, stretched out from the *Ossifacrum*, all along the *Spina* or back bone.

Sacro-lumbus.

Of which the first being lateral and seated towards the Ribs, is called *Sacro Lumbus*. You shall begin your dissection of this Muscle at the upper part by the Root of the Ribs. A white line of fat will guide you from the top to the bottom, where you may separate it from the *Musculus quadratus* which belongs unto the Loins, but in its original it is exceeding hardly separated from the *Spinatus*.

Quadratus.

Note by the way that the *Sacro lumbus* does reach as far as the hinder part of the Head; and that it does bestow a double Tendon upon every Rib.

^a T. 22. f. 1. and 3. D. ^b T. 22. f. 1. B. ^c T. 14. f. 1. CC. DD. T. 22. f. 1. F. ^d T. 14. f. 2. F. G. ^e T. 14. f. 1. LL. f. 3. BB. ^f T. 14. f. 2. OO. ^g

Spinatus, Sacer.

Now you shall separate the *Spinatus* from *Ossifacrum*, by easily and gingerly taking away the hard *Aponerofis* which is spread out over the *Musculus sacer*; which being taken off, if you lengthen out your section above, you will discern the difference between the *Spinatus* and the *Sacer*.

Which when you have attained, thrusting your Pen-knife straight in, as far as to the transverse *Apophyses*, you will easily separate those Muscles.

The *Spinatus*, goes as high as the second *Vertebra* of the Neck, being in the midst between the *Transversarius* and the *Complexus*.

The *Spinatus* being fastened to the transverse *Apophyses*, does also arise as far as the Neck.

Muscles of the Breast.

Serratus major

The Body being turned and laid with the face upwards, you shall sever the *Serratus Major* laterally, and putting in your hand underneath, you shall find it stretched out under the *Ossiplata* or shoulder blade as far as to the *Clavicula*. And then you shall see the *Muscle subclavius* placed between the *Clavis* and the first Rib.

Subclavius.

Triangularis.

You shall look for the *Pectoral Muscle internal* or the *Triangular Muscle*, in the inner part of the Breast bone pluckt off. Afterwards you shall carefully and gingerly separate the *external intercostal Muscle* from the *internal*. The fibres Cross-waies interposed, will distinguish the one from the other.

Intercostalis.

^a T. 14. f. 3. DD. f. 4. A. ^b T. 14. f. 4. BB. ^c T. 10. f. 1. CD. ^d T. 10. f. 1. F. ^e T. 10. f. 1. GG. ^f T. 10. f. 1. HH. ^g

Muscles of the Cubit.

When this is done, you shall return unto the Arm to make observation of the Muscles of the Cubit, which are seated in the Arm.

Five Muscles do infold the whole Arm, two in the fore parts, and three behind. You shall separate the two Benders of the Cubit, on the former and inner part.

Biceps.

The first which presents it self is the *Biceps* or Twi-headed Muscles, which from its Original to its infertion, may very easily be divided into two. But you must mark, that one Head of the *Biceps*, which grows out of the *Coracoïdes*, has a certain flesh adjoynd to it, which creep along the side of the *Pectoral Muscle*, as far as to the middle of the Arm, unto which it is fastned most firmly, and this Portion of Flesh makes a Muscle, which is ordained to draw the Arm towards, which from its original I call *Coracoïdenm*, the *Coracoïdean Muscle*.

Coracoïdenm.

I have observed the *Biceps* or Twi-head in a very strong and brawnie Man to be a *Triceps* or Tri-head, being exquisitely separated into three parts, both in the Original and end thereof. The third Head sprung out of the Tendon of the pectoral Muscle.

Brachieus internus.

Under the *Biceps* is placed the *Brachieus internus* or inner Arm Muscle, whose original is at the end of the Muscle *Deltoides*. This Muscle must be separated fidelongs from such as border upon it.

In the outer part of the Arm three Muscles are placed, viz. the *Longus*, *Brevis* and *Brachii externus*, and beneath the Elbow, the *Angonaeus* is seated.

The external are the *Longus* and *Brevis* which embrace that Mass of flesh which makes the *Brachii externus*. In their original they are distinguished by the Tendon of *Musculus latissimus* which comes between them; but at their Insertion they grow together by a firm and sinewy Tendon. And therefore they are easily, in their upper part, separated from the *Brachii externus*; but in their lower parts towards the Elbow, they are very hardly divided from the *Brachii externus*.

Longus Brevis.

Brachii externus.

Now thus you shall proceed, you shall curiously take away the nervous Tendon near the Elbow, and going upwards by little and little, you shall gently cut on the one side and the other, also inwardly; diligently observing the line which separates the long Muscles from the short, untill you have separated the *Brachii externus*, from the Muscles which are placed above it. Then you shall see it arise from the Bone of the Arm, a little beneath the Neck thereof, with a fleshy substance.

T. 22. f. 1. G. b T. 22. f. 1. H. c T. 22. f. 1. II. f. 2. B. d T. 22. f. 1. A. e T. 22. f. 3. E. f T. 22. f. 3. F. g T. 22. f. 3. above E.

The Muscle *Angonaeus* cannot be seen till you have pulled away the sinewy membrane wherewith it is covered. It arises at the lower part of the Arm near the Elbow, lying hid between the *Radius* and the *Cubitus*, and it is inserted into the Cubit. It is of the length and thickness of a Mans fore-finger.

Muscles of the Radius, the Wrists, the Fingers, and the Thumb.

In the Cubit you shall find the Muscles of the *Radius*, the *Wrists*, the *Fingers*, and the *Thumb*. And in the inside of the Cubit as far as to the wrists, you shall find *Nine Muscles*; on the outside you shall meet with seven.

In the inside you shall find them disposed in this Situation and order following. The first that presents it self is the *Longus Supinator Radij*, which arises from the external *Apophysis* of the Arm, and is stretched out upon the *Radius*.

Longus Supinator radij.

Next to this, is the *Radiens Flexor Carpi*, after which follows the *Palmaris* Remarkable by a very small and very long Tendon.

Wrist-benders.

By the *Palmaris* is seated the *sublimis Digitorum Flexor*; and next to it, so as to touch the same, you have the *Cubitus Flexor Carpi*.

On the upper part of the Cubit, near the Joynt, between the *Longus Supinator* and the *Radiens flexor*, the round Head of the *Pronator Radij* shows it self; which is a very short Muscle, arising from the internal *Apophysis* of the Arm and obliquely carried to its insertion into the *Radius*.

Pronator Radij.

Under the *Radiens*, lies the *Flexor Pollicis*.

Beneath the *Sublimis*, lies the *Profundus Flexor Digitorum*, and in the lower part of the Cubit, by the wrists, lies the *Quadratus* spread under the Tendons of the Muscles, being three Fingers broad, and immediatly fastened cross waies, into the *Radius* and *Cubitus*.

Finger-benders.

T. 22. f. 3. a. f. 4. G. b T. 22. f. 4. E. c T. 22. f. 1. M. d T. 22. f. 1. K. e T. 22. f. 1. O. f. 5. A. f T. 22. f. 1. M. g T. 22. f. 2. C. h T. 22. f. 2. D. i T. 22. f. 1. P. f. 5. B. k T. 22. f. 2. D.

On the outside of the *Cubitus* above the *Radius*, the *Extensor Carpi* is stretched out.

Extensors of the wrist.

Next to it, is the *Alter Extensor*, which is carried obliquely to the Cubit, and being fastened thereunto, takes its course downwards.

Between the *Radius* and the Middle part of the *Cubitus*, the *Extensor Digitorum* is placed, which has a parcel of flesh annex unto it, spread under the Muscle of the *Extensor Pollicis*.

Of the fingers.

Under it, near the Cubit, lies the *Extensor parvi Digiti*, by the Wrist.

Under the Tendons of the *Extensor Digitorum* you shall find two other small Muscles, the one of which is the *Extensor Pollicis*, the other is the *Indicator* ordained to wait upon the *Index* or *Fore-finger*, whose Tendon is united by certain Fibres with the Tendon of the *Extensor Digitorum*.

The

The best way
to dissect these
Muscles.

Muscles of the
Hand.

Obliquus
inferior.

The division of all these Muscles is *easy on the upper part* of the Cubit, both on the inside, and on the outside, and in the said upper part, you must begin your section. For if you should begin at the *Tendons* you would multiply Muscles, and make as many Muscles as you find Tendons. Thus therefore, near the Wrist, on the inner side of the Cubit, you shall distinguish the *Tendons* of the *sublimis* and the *Profundus*, allotting four Tendons to each Muscle, and then take your course upwards.

Radiens Externus extensor Carpi, is termed also *Bicornis* two-horned, by reason of its double Tendon. You may divide this Muscle into two Muscles, distinct in their original and insertion, but you shall do better to make but one of it.

In the Hand, you shall find *Seventeen Muscles*.

In the Palm or inside of the Hand there are Thirteen; viz. the four *Lambricales*, the *Hypobena*, the *Thenar*, the *Anti-thenar*, the *Abductor Indis*, the *Massa Carneæ*, and the four *Interossei interni*.

^a T. 22. f. 3. H. ^b T. 22. f. 3. G. ^c T. 22. f. 3. K. ^d T. 22. f. 3. M. ^e T. 22. f. 3. I. ^f T. 22. f. 5. CC CC. f. 2. ffff. ^g T. 22. f. 1. S. f. 2. b. ^h T. 22. f. 4. K. ⁱ T. 22. f. 1. R. f. 2. G. ^j T. 22. f. 2. ffff.

In the outside of the Hand you shall find only the four *Interossei externi*; with the *Tendons* of the *Fingers stretchers*, or of the *Thumb stretchers*, and of the *little Finger stretcher*.

Muscles of the Abdomen or Belly.

In your anatomical Administration of the Muscles of the Belly you shall thus proceed. The first you meet with, which must be plucked out, is the *Musculus Obliquus descendens*, which you shall see joyned with the *Serratus major*, a tooth within tooth, as if the Edges of two Saws were put together, and joyned one within another, or as some parts of the Skull are coupled by the sutures. You shall know the difference of the *Serratus* and *Obliquus* one from another, by certain white lines and by the different posture of the Fibres. You shall separate the *Musculus Obliquus* from its intanglements with the Teeth of the *Serratus major*, with help of a very small and sharp Pen-knife.

The first tooth is interposed between the *Musculus rectus*, and a portion of the *Serratus*; the second and the third are very hardly separated. The other four lie lurking under a portion of the *Latissimus*, not receiving the fleshy Productions of the *Serratus*.

To bring them therefore into sight, it will be convenient to pluck up a portion of the *Latissimus*, as far as to the hinder spine of the *Os Ilium*; and then you shall take those four Teeth off from the Ribs, and in conclusion you shall cut off the Muscle, from the whole Rib which appertains to the *Os Ilium*.

If you be indutrious and can endure to take pains, you shall observe that the second, third, and fourth Tooth [or Finger] of this Muscle, do creep higher up under the *Serratus*, than vulgar Anatomists imagine, and that this Muscle does there attain a sinewy tendinous Head, which cleaves fast to the lower side of the Rib.

A tendinous Head receives a portion of the intercostal nerve.

^b f. 2. III. ^c T. 1. f. 2. HH. T. 2. f. 8. A. ^d T. 2. f. 8. aa. ^e T. 1. f. 2. FF. T. 10. f. 1. C. D.

For the nerve, when it is come thither, it is divided into two parts, the one of which does inffuate it self into the sinewy Head of the Tooth of the Muscle; the other sticking fast unto the Rib, does make the nervous intersections of the *Musculus Rectus*. The Muscle being thus cut up, must be turned back upon one side of the Belly.

You shall in the mean while observe, that the *Aponerofis* of this Muscle, is bored through near the *Os Pubis*; as the *Aponerofis* of the *Obliquus ascendens*, and of the *Transversus* are perforated, near the foremost and lowest Spine of the *Os Ilium*; and therefore the Holes of the two oblique Muscles are not set just one against another, but at a distance one after another, that the Gut might not be so apt to fall down into the Groin or Cod.

The

These Holes are broken in Ruptures into the Cod, or else dilated, which are diligently to be observed, in reducing of the Gut when it is strangled in the Groin.

And if at any time an Incision be made in the Groin, to reduce the Gut; that hole ought to be made wider by Incision, that the Gut may more easily return into the Belly.

Above the *Obliquus ascendens* towards the Hypogastrium, you shall find a little Nerve which insinuates and winds it self into the Apophysis of the Peritonæum that it may be carried to the Testicle, because it penetrates the transverse Muscle. It arises from the Nerves of the Loins, and is a portion of those nerves which are disseminated into the *Oblique Ascendent* and the transverse Muscles.

When you have cut the *Obliquus Ascendent* from the Rib of *Os Ilium* to which it cleaves very fast, you shall bring it to the Loins, where it may be separated from the Transverse. Then you shall separate it from the Ribs themselves as it returns upwards. And it will be convenient to turn back the Muscle to the contrary side, after the manner of the *primus Obliquus*; and when you shall come unto the *Musculus Rectus*, you shall observe that this same oblique muscle does embrace the *Musculus Rectus* or streight Muscle above the Navel, and below the Navel it transmits a single Tendon under the *Rectus*, which notwithstanding by the Edge of the *Rectus* does cleave so obstinately to the Aponeurosis of the *Oblique Descendent*, that it is not possible by any Art to separate or pull them asunder, without rending them.

^a T. 2. f. 9. d d d. ^b T. 2. f. 8. bb. ^c T. 2. f. 8. B. ^d T. 2. f. 9. A. ^e T. 2. f. 8. d d. f. 9. bb. ^f T. 2. f. 8. B. c c.

While you cut the Tendons of the oblique muscles from the share bones, be very carefull lest you mangle the Apophysis of the ^a Peritonæum which is carryed through those Tendons, and tear the ^b Muscle *Cremaster* placed upon the said Apophysis, and also lest you tear the Tendon of the Transverse Muscle being beneath.

You shall know the *Muscle Cremaster* by its colour and consistence. For it is a piece of red flesh, thin, sprinkled with streight fibres, severed some space from the flesh of the *Oblique Descendent*, and according to the length of the Groin, inclosing the Apophysis of the Peritonæum. You shall find such a parcel of flesh in women, but shorter and narrower, placed upon the production of the Peritonæum.

How the Cremaster is inserted

Between the oblique ascendens and the transverse muscle towards the Loins, many veins are seen, which are the off-spring of the Lumbal and the Hypogastrick Veins. But you shall take precise notice of two remarkable nerves or sinews, which besides the little intercostal twigs inserted into the Teeth of the oblique descendens Muscle, do arise out of the inner Vertebra's of the Back, and creeping obliquely upon the bastard Ribs, are by the last Rib dispersed into the flesh of this *Oblique* and the *Transverse* Muscles.

You may conveniently separate the ^c *Musculus Rectus* following the white Line, but not meddling with the ends thereof. If you shall diligently and leisurely pare off the extremities thereof opposite to the *Linea Candida* or white Line, you will find the intercostal Nerves which bore their way through the Peritonæum, that they might come unto and constitute the nervous ^a intersections of the Muscle, which now and then are wanting, as I have observed in some Bodies. I have often found two imperfect ones above the Navel; if a third be found, it is alwaies directly opposite unto the Navel; you shall very rarely find a fourth Intersection.

Musculus rectus.

^a T. 2. f. 9. EE. ^b T. 6. f. 2. DD. ^c T. 2. f. 8. e e. f. 9. C. ^d T. 2. f. 9. dd

Towards the end of *Rectus Musculus*, on the inside you shall observe the *Epi-gastrica* ^b ascendens and the *Mammaria* ^c descendens to ^d meet together about the middle of the Muscle, where they grow into one by a close Anastomosis.

which is the true Linea candida.

That which separates right Muscles is a real ^e white Line stretched out from

the xiphoides as to the Conjunction of the Share-Bone; and it is simply done of them, who call the growing together of nervous conjunctions or Aponeuroses of the Obliquus descendens, the *White-Line*, seeing the Aponeuroses themselves are united continually and not disjoyned by any apparent Line.

In big-belly'd Women when their Bellies are very much distended, in the last months of their going with Child, by reason of the Drawing of the Musculi Recti asunder, a certain black-blewish Line remains for two or three months after the woman is delivered, which begins at the *xiphoides* and reaches unto the place where the share-bones grow together, which vanishes away by little and little, the Right Muscles being reunited and growing together again.

Pyramidalis

Over the lower end of the right Muscle lies a small Muscle called ^f *Pyramidalis* which you must curiously part into two, and having taken away one, you shall see a most strong sinewy Tendon of the Musculus Rectus, fastened to the Os pubis or Share-bone.

The *Left Pyramidal Muscle* is oft times shorter and narrower than the right.

Transversalis

The *transverse* ^g *Muscle* which cleaves to the Peritonæum, is not easily drawn off, yet if you are desirous to take it away, you must cut it from the Loins, and then gently separate it from the Peritonæum with your fingers alone.

^b T. 2. f. 8. e. ^c T. 2. f. 8. d. ^d T. f. 8. f. ^e T. 1. f. 2. K. K. ^f T. 2. f. 9. D ^g T. 2. f. 9. A. a. & c.

Muscles of the Yard.

The Yard-Erector.

In a Mans Yard on either side in the Groine and the peritonæum you shall search for two Muscles, having first removed a great deal of fat wherewith they are covered. The one of these Muscles is ^a *Erector Penis* the *Raiser* of the Yard, which arises from the Sphincter Ani or Arse-muscle so called, and is inserted into the hollow and spongy Ligament of the Yard.

The Accelerator.

The other being placed upon the Urethra or Piss-pipe is called ^b *Accelerator* or the *Speeder*, it arises out of the same Tuberosity beneath the spongy ^c ligament of the Yard, although it be fastened by a bit of flesh to the foresaid Sphincter or Arse-Muscle, that it may bear up the fundament. Which fleshy portion or bit of flesh forementioned I am wont to shew for the Levators exteri ani, or externall Arse-Heavers.

Muscle of the Fundament.

The Sphincters of Anus Levatoris ani.

The Fundament has six externall Muscles belonging unto it. The *Sphincters*, and four *external Lifters*, for the *Levatores interni* or *inner lifters* do lie out of sight. In Women there is a *fifth Muscle* which belongs to the Coccyx or Crupper-Bone.

In the first place you shall anatomise and shew the *Sphincter* ^d *Cutaneus*, then another larger red Muscle, and then the side-muscles before and behind, the ^e *Levatores* which arise out of the tuberosity of the Huckle-bone, you shall seek for them behind the Crupper-bone and above the acceleratores on the fore-side, putting your hand in beneath, or putting in a little knife made of boxe-wood. But you shall more evidently discern the largeness of the *Levator Ani*, if you shall take away the Bladder, the *Intestinum Rectum* or Arse-Gut and the womb of a Woman, and withall shall sever the Conjunction of the share-bones.

For then you shall see a broad but thin piece of fleshy, drawn out from the Os Sacrum as far as to the Spine of the Os Ischij, underpropped with a firme ligament, which is in that space, and produced as far as to the Os Ischij it self; which fleshy Membrane ought to be taken for the *Levator*: for under it the *Obscurator Internus* is situate.

The Muscle peculiar to the Coccyx in woman.

Besides those Levatores there is another found to arise from the farthest extremity of the Os Sacrum and the Crupper-bone, viz. a thin and sharp pointed piece of flesh strewed with right fibre; enclosing the lateral parts of the Crupper-bone or

Coccyx

Coccyx on either side, which folds up the Sphincter, and so the external Orifice of the Privy Parts in Women are widened, this muscle drawing the Crupper-bone backwards, that in Child-birth the passage may be more free for the Infant.

I have seldom seen such a Muscle in the Bodies of men, and the use of it when it is extant in men, is, to render the avoidance of Dung more easie, by drawing back the Crupper-bone when men are at stool.

^a T. 6. f. 1. A A. f. 5. H H. ^b T. 6. f. 1. b b. f. 5. I I. ^c T. 6. f. 5. K K. ^d T. 3. f. 4. O. ^e T. 6. f. 3. N N.

The *Internal Sphincter* (if we must needs admit, and allow of a third) is no other than a membranous parcel of flesh, somewhat black and blue, which comprehends the *Rectum Intestinum*, or Arse-gut, like a sheath or Scabbard, being adorned with freight Fibres, and interwoven with a few circular ones; which if the Coat of the Guts is fleshy, it differs from that common coat of the Guts, which covers their inside. So the *Rectum Intestinum* is distinguished from the rest, neither is the Situation of the membranes, or Coats, varied.

The internal Sphincter.

The Bladder-muscle.

The *Bladder-muscle* ^b *Sphincter*, is placed in a Man above the *Prostata*, which it embraces for the Space of two fingers breadth, and is easily found without the Channel of the Pis-pipe: If you shall cut up the Pipe with a pair of Scissors from the Nut of the Yard, as far as to the *Prostata*.

The Bladder-muscle in men.

You shall examine if you can find two Sphincters of the Bladder, one beneath and the other above the *Prostata*, which I never observed.

^a T. 2. f. 5. Q. ^b T. 6. f. 5. F F.

Now that part of the Neck of the Bladder, which respects the Bones of the Share, is manifestly fleshy, between the two Kernels called *Prostata*; and there a two-fold Sphincter may be allowed; one fleshy, placed upon the *Prostata*, and in that fence above them; but under the *Prostata*, is the Membranous muscle of the Neck of the Bladder: the other broad muscle above the *Prostata*, and turned back under the same, will be the Second Sphincter muscle, because it does circularly imbrace the *Prostata*, above and beneath.

Demonstration of the Double Sphincter.

The Neck of the bladder in women, is very neer as long as ones Thumb, being Nervous, Spongy, and black within, like the Pispipe, or Urethra in men, and compassed about with reddish flesh, which is taken to be the sphincter; and while the Neck of the Bladder in women swells, if you put your finger within the water-gate, you shall perceive an hard and long tumor or swelling. and the uppermost carnositie of the Privie Part, which closes and stops the end of the Bladder, is both in Girls and women alwaies found larger than the rest, and the other glandules being by frequent child-bearing torn and defaced, this alwaies remains to the End of their lives.

The Bladder-Muscle in women.

Muscles of the Clitoris.

You shall seek the *Muscles of the Clitoris*, after this manner; having leisurely taken away much fat till such times as ruddy flesh appears, you shall sever the *Laxissimus Musculus* which lies very low, growing out of the Sphincter of the Fundament, and inserted into the very Lips of the Water-Gate or female Privy, for the moving or straitening whereof, I conceive this muscle is ordained. The other is the *Gracilis Musculus* fastened to the *Ligament* of the Clitoris.

Lax.

Gracilis.

Musculus of the Thigh.

In the cavity of the Belly, when the Entralls are removed, you shall observe above the *Loyas* the *Musculus longus and rotundus*, the long and round Muscle which is termed a *Psoas*, which you shall separate from its original to its insertion which is in the small Trochanter.

Psoas.

^a T. 10. f. 1. O O. T. 23. f. 1. A.

I have oftentimes in men, and sometimes in Vir go's or manly Women, observed another *lank Muscfe* placed over the Psoas aforesaid. It seems for this Cause added, that as a Ligament or Band it might strengthen, and as it were gud in the soft and loose flesh of the Muscfe Psoas.

Iliacus. The Cavity of *os ilium* is filled by the *Musculus latus^a Iliacus* or broad *iliak Muscfe*, which together with the Psoas being conveyed along upon the Os Pubis and by its tendon united to the Psoas, is terminated in the small Trochanter.

Having turned the Body, you shall proceed to the *muscles which make the Buttocks*, called *Gloutii* that is Buttock Muscles. There are three of them resting one upon another.

Gloutius major. The first and greatest ^b *Buttock muscfe*, you shall separate towards its tendon, both before and behind, having first made it cleane and freed it from the fat.

Then you shall proceed in your section upwards till the whole is on all sides cut off, till you come to its insertion, which is in the great Trochanter, and there you shall leave it, or having first taken away the broad band, you shall cut off the said Muscfe in the fore part.

Medius. Under this lies the *Gloutius^c medius* or middlemost *Buttock muscfe*, which may easily be separated in its upper and lateral part towards the *Os sacrum*. But beneath the middle part of the *Gloutius Secundus* the ^d *third* is placed, immediately fastened to the *Os Ilium*; this muscle you must not cut off.

Minimus.

Between the middle and the lesser Buttock Muscles there are *two remarkable veins*, which from the *Hypogastrica* do creep over the *obturator Internus^e* with an Arterie, Hand in Hand, and a portion of the *Nervus major pofficus*, they spread themselves into numerous branches: and there arise *most cruel pains in the inmost parts of the Buttocks*, which counterfeit the *sciatica* or *Hip-gout*. Would not drawing blood from the *Hæmorrhoid Veins*, serve well to disburthen these parts?

^a T. 23. f. 1. B. ^b T. 23. f. 2. B. f. 3. A. ^c T. 23. f. 3. B. f. 4. C. ^d T. 23. f. 4. B.

Quadrigemini.

In the next place you shall proceed to the *Quadrigemini* and the *Obturatores*, which are seen beneath, the greater Buttock muscle being taken away. The *Uppermost* being the first and longest of all, is called the ^a *Pyramiformis* unto which the *two^b Parvi* or little ones do follow in order, coupled together, that between them and in their Bosome as it were, they might contain the Tendon of the *Obturator internus*.

To these two there is orderly adjoynd the ^c *Quartus Quadrigeminus* being broader and more fleshy than the rest.

Obturator internus.

The *Obturatores* are two, the ^d *internall* and the ^e *externall*, the Internall has its original out of the Circumference of the Oval hole; and its tendon being carried along between two Ligaments, and being hid in the bosome or hollow of the second and third Quadrigeminal Muscles, it is carried into the Cavity of the great Trochanter. And therefore you must pull asunder the second and third Quadrigeminals, before this muscle can come in sight.

Now the Ligments through which the tendon of the *Obturator Internus* is carried, are two; the one being *externall* is carried from the Os sacrum to the tuberosity of the Os Ischii: the other being *internall* and placed beneath the externall, is carried from the same Os sacrum, into the spina of the Os Ischij.

Externus.

The *Obturator externus* cannot be discovered unless the fourth broad Quadrigeminal muscle be plucked back, and that the Propagation thereof may more evidently appear, you shall take away the *musculus Triceps* or three-Headed Muscfe.

Sometimes I have observed above the *Primus Quadrigeminus*, the *Iliacus externus Gracilis*, which from the lower and transverse spines of the Os sacrum, did end into the top of the great Trochanter. You shall therefore anatomise and shew eleven Muscles of the thigh, placed above the Os Ilium.

In the hinder part are nine, Three *Gloutij* or *Buttock muscfe*s, which being drawne aside, there appeare four *Quadrigemini* and two *Obturatores*. In the fore-part

part and hallowness of the Os Ilium are found *two Muscles*, the Psoas which indeed has its original higher than from the Os Ilium, and the *Iliacus*.

^a T. 23. f. 3. C. 4. D. ^b T. 23. f. 3. ^b f. 4. G. ^c T. 23. f. 3. D. f. 4. E. ^d T. 23. f. 3. E. f. 4. F. ^e T. 23. f. 4. E. ^f

Muscles of the Leg,

In the Thigh from the Haunch to the Knee and Ham you shall observe and shew eleven Muscles.

In the fore part you shall find seven, the *Longus*, the *Fascia lata*, the *Rectus gracilis*, the *Duo Vasti*, the *Crureus* and the *Triceps*; which are so situate, that in the first place you meet with the *longus* or *sutorius*, then the *Membranosus* or *Fascia lata*. According to the straightness and length of the thigh the *Rectus Gracilis* is drawn out. Near and bordering upon this are the *Vasti duo*, under which lies the *Crureus* which immediately covers the Os femoris, or Thigh-Bone, Adjoyning to the vastus internus is the *Triceps*, which hes crouching within the Thigh.

Sutorius.
Membranosus.
Rectus.
Vastus.
Crureus.

In the hinder-part of the thighs you shall find *four*, disposed after this manner. Unto the *Triceps* on the Inside is fastened the *Gracilis Pectineus*: bordering upon it, is the *Seminervosus*, with the *Semimembranosus*, and between this and the vastus externus is the *Muculus Biceps* placed.

In the forepart of the thigh, you must begin at the ^a Long Muscle; which being cut off, you shall cleverly take away the *Fascia lata*, either all of it or as much as you can, and you shall bring it as far as to the knee.

Then you shall cut off the *Gracilis* & *Rectus*.

Afterwards you shall proceed unto the *two vasti*, which that you may more easily separate from the *Crureus*, they are distinguished one from another by a line running between them, which you shall cut up.

Then you shall dissect the *Vastus* ^d *Externus* by the *latus externum*; but it is harder to separate the *Vastus* ^e *internus*.

^a T. 23. f. 1. II. ^b f. 1. E. c c c. ^c f. 1. F F. ^d f. 1. G G. ^e f. 1. H H. ^f

And you shall begin to separate the same at the lower part near the Patella, and thrusting in your hand, and neatly managing your pen-knife, you shall cut it towards the upper parts: and so the two *Vasti* shall be severed from the ^a *Crureus*.

From these, you shall come unto the ^b *Triceps*, which may more truly be termed *quadriceps* or rather *quadrigeninus*; because of four Heads and as many distinct Insertions.

Triceps.

It is placed in the inner part of the Thigh; and its first and upmost portion growing out of Os Pubis, seems to be a *Distinct Muscle*, which in regard of its situation may be termed *Pectineus*.

Pectineus.

I have sometime found *four other portions perfectly distinct one from another*, besides the *Pectineus*, and the last portion was very long, like a semi-nervous Muscle, and was carried on with a sinewy tendon as far as to the Leg.

I conceive this is the *Muscle*, which has been in women observed distinct from the rest, in the hinder part of the thigh, and is wont to be joynd *as a fifth*, unto the four *Postici*. For it arose from the Tuberosity of the Ischium and was inserted into the hinder part of the Tibia.

It is found in *Women*, because they were to have broader Buttocks and larger Thighs than Men.

It is an easie matter to separate those *four Muscles* placed in the hinder part of the thigh, viz. the ^c *Seminervosus*, the ^d *Semimembranosus*, the ^e *Biceps*, and the *Gracilis* ^f *internus*. I have often found the *Biceps* distinct both in its Original and Insertion.

Seminervosus.
Semimembranosus.
Biceps.
Gracilis.

^a T. 23. f. 1. & c. ^b T. 23. f. 1. & c. C C. ^c T. 23. f. 3. G G. ^d T. 23. f. 3. H H. ^e T. 23. f. 3. I I I. ^f T. 23. f. 3. F F. ^g

Muscles

Muscles of the Tarsus.

Gemelli.
Popliteus.
Plantaris.
Soleus.

Foot-benders.

Extenders.

The separation
of these
Muscles.

In the Leg from the Knee unto the Tarsus are found 13. Muscles; in the hinder part you shall find five placed after this manner.

The first are the ^a Gemelli; under their Heads lies the ^b Popliteus hidden; between the Gemelli and the Soleus, the ^c Plantaris hides it self.

The Soleus lying beneath the Gemelli, does immediately cover the shin-bone.

In the lateral and external Part of the Tibia, by the Spina, there appears the Peroneus ^e Flexor pedis, Neighbour to which is the Longus ^f Extensor Digitorum.

After which follows the Extensor Pedis, tibius posticus. Under the Extensor longus Digitorum, lies the Extensor ^h pollicis; and beneath the Flexor pedis Peroneus, lies the Extensor ⁱ Peroneus.

The Flexor ^k pollicis does take up the internal and latest part of the Tibia. In the lower part of the Tibia, between the flexor pollicis and the Tibius posticus the Flexor ^l digitorum medius holds its place.

It is easie to separate the Muscles which infold the Tibia on all sides, provided you do first pluck off the fascia ^m lata, which is carried out as far as to the foot. Having divided the Heads of the Gemelli, you shall diligently search for the Popliteus or Ham-Muscle, situate obliquely over the Head of the Soleus. Then you shall observe the fleshy Head of the Musculus Plantaris, which lies lurking between the Gemelli and the Soleus. The Plantaris is like the Palmaris.

In the fore part of the Tibia the Peroneus externus and Peroneus internus seem to make one Muscle, because they arise from one and the same part, and are carried through the Cleft of the external Ankle-bone.

But the one is internally inserted into the Os Metatarsi, which sustains the little Toe: The other being drawn under the sole of the feet, is carried into the Os Metatarsis which sustain, the Great Toe.

^a T. 23. f. 1. dd. f. 3. KK. ^b f. 4. H. ^c f. 3. M. ^d f. 3. LL. ^e f. 1. LL. ^f f. 1. MM. ^g f. 2. EE. ^h f. 1. N. ⁱ f. 2. FF. ^k f. 4. K. f. 6. B. ^l f. 4. II. ^m f. 5. C. ⁿ f. 1. E. ccc. ^o

In the Foot you shall take notice of seventeen Muscles. In the out side of the Foot there are five, viz. the ^a Pediculus and the four interossei ^b externi.

In the sole of the Foot you shall observe twelve, viz. the Brevis Digiti ^c Flexor or little Toe bender, the three ^d Lumbricales, those which are made out of the Massa ^e Carnis, the four external Interossei and as many ^f internal.

Upon each side of the Foot is placed one Muscle, viz. the Abductor ^g Pollicis; and Minimi Digiti abductor.

In the hollow of the foot, there is placed another Massa carnea, spread under the first, and cleaving immediately to the Bones. It may be perfectly divided into four or five portions, although in the middle spaces of the Bones of Metatarsus, the Musculi interossei are contained.

Furthermore in the Sole of the Foot you shall find that same Internal Muscle which is opposed to the Abductor Pollicis or Great-Toe withdrawer, like unto the Antibrachiar in the Hand. It may be called ^h Musculus Transversalis.

Chap. 46. Of the Veins, Arteries and Nerves belonging to the Limbs.

The Veins of
the upper
limbs.
Axillaris.

The Veins of the Limbs begin in the Arm at the Arm-pit, and in the Feet they take their Original from the Groins.

The Vena ^k Axillaris near the Arm-pits does produce the Humeralis, which is called the ^l Cephalica or Head-Vein. It has no Artery to accompany the same, and it holds its Course through the whole Radius.

A little

A little after it sends forth the ^m *Tboracia* which is expanded into externall *Tboracia*.

It is afterward termed ^o *Basilica*, and by the bending of the Arme it is divided into two branches. The ^p one of which creeps all along the inside of the Cubitus; the other being ^a external descends beneath the Skin unto the Hand. *Basilica*.

^a T. 23. f. 2. G. ^b f. 2. a a a a. ^c f. 4. L. f. 6. A. ^d f. 6. e e e. ^e f. 6. D. ^f f. 5. d d d d. ^g f. 3. O. f. 5. b b. ^h f. 3. P. f. 5. v. ⁱ f. 5. b b. e. ^k T. 24. f. 1. A. ^l f. 1. B B B. ^m f. 1. I. m m. ⁿ T. 12. f. 1. a a a a. ^o T. 24. f. 1. C C. ^p f. 1. e e. &c. ^q T. 24. f. 1. x. y. &c.

The *Ramus internus* or inner branch is called *Mediana* ^b *Vena*, and it receives a branch of the ^c *Cephalica* below the bending of the Arme, where it is called the *Cephalica* or *Basilica*. These three Veins are opened beneath the Bending of the Arme. *Mediana*.

But the *Basilica* has an ^d Artery under it or very near it, and a ^e Nerve and the Tendon of *Musculus* ^f *Biceps*, which bends the Arme: which parts must [in the opening of a vein] be avoided, for if they happen to be cut, they bring great Inconveniencies to the Arme.

The *Cephalica* being stretched out upon the ^g *Radius* near the wrist, diverts to that part of the Hand termed *Metacarpium*, that it might with its twigs water the hollow of the Hand.

Between the Ring-finger and the little finger, they place the ^h *Salvatella* vein, which is wont to be opened; between the thumb and the fore-finger, there is another opened, which is called *Vena* ⁱ *pollicis* or the thumb vein. *Salvatella*.

The *Mediana* ^k *Vena* is totally external and runs under the Skin, into the pulse of the Hand.

The *Basilica* creeps through the ^l internall and externall parts of the Cubit, with a two headed branch.

Now the Veins have one thing peculiar to them in the Limbs, viz. that they manifestly do communicate with the Arteries. This *Galen* proves in his third *Book of Naturall faculties, the last Chapter*, And up and down in other parts of his works. Which thing is so manifest that it ought not to be called into question. *Anastomosis of the Veins and Arteries*.

Moreover the veins in the ^m Limbs and internall *Jugulars* have *Valves*. In the greater channels and in the division of the lesser ones there are ⁿ two on each side one opposed to the other and placed interchangeably. *The Valves of the Veins*.

^b 1. et. &c. ^c f. 1. f f. ^d f. 2. A. by L. ^e f. 3. 1. 1. &c. ^f T. 23. f. 1. G. ^g T. 24. f. 1. i i. &c. ^h f. 1. a f. k. ⁱ f. 1. e ^j f. 1. o o. x. y. &c. ^k f. 7. the whole ^l f. 8. the whole

Now we may doubt of their use since the circulation of the blood has been found out, for the common opinion was that they were placed in the Limbs and in the internall jugular to stop the exceeding flux of blood into those outmost parts which are in continual motion. But those that hold the Circulation of the blood, do say their use is to hinder the flowing back of the Blood which ascends upwards unto the heart, according to the opinion of *Dr. Harvey*, unto which I willingly give my Assent. *Their Use*.

Let us pass on from the Veins to the Arteries of the Arme. The *Ramus superior* proceeding to the Arme-pits, is termed ^a *Axillaris*. It accompanies the *Vena Basilica*, whereas there is no *Arteria Cephalica*. *The Arteria Axillaris*.

Neare the Arme-pits it produces the ^b *Tboracia* and in its progress bestowes certain twiggs upon the bordering Parts, and being lengthened out as far as to the bending of the Arme, it is divided into two ^c branches, which are carried on, to the inside of the Hands. *Tboracia*.

For the outside of the Hand above the *metacarpium*, is void both of muscles and Arteries.

The

Rami minores.

The other ^d Branch being drawn out upon the Inside of the Radius, is felt to beat in the wrist.

The other running streight along the Ulna is with its Coffin spread out into the hand according to the length of the Thumb and of the little Finger, so as to bestow of their twigs upon every Finger.

The Nerves.

I shall in the same Method dispatch the Nerves of the whole Hand.

Out of the Holes of the four lower Vertebra's of the ^f Neck, and the two first Vertebra's of the ^s Back, ^h five or six Nerves take their Original, which being overwhelmed under the Muscle Scalenus, they are brought under the Clavicula, as far as to the Arm-hole, where they are ⁱ twisted one within another, like the strings of a Cardinals Hat.

^a f. 24 f. 2. A. ^b f. 2. c. dd. ^c f. 2. C. B. ^d f. 2. B. ^e f. 2. C. ^f f. 3. 4. 5. 6. 7. ^g f. 3. 1. ^h f. 3. a. b. c. d. e. ⁱ f. 3. XX.

Afterwards the four superior ones are under the Deltoides scattered over the internal part, accompanying the Vena basilica and the Artery of the Arm, and creeping between the muscles Biceps and the Brachizus externus.

The ^a fifth and sixth ^b Nerve, being bowed back under the scapulary Muscle Rotundus major, they are disseminated into the hinder Muscles of the Head.

There remain then the Quatuor Primi already described, which being carried through the Arm and Cubit; they are dispersed into the said Cubit and the Hand.

Primus.

The Primus ^c Nerve beneath the head of the shoulder is over-whelmed in the Caracoidans, and drawn along under the inner side of the Biceps, and lurking under the Tendon of the said Muscle, it joins it self to the Vena Cephalica, where it grows small: also it is placed beneath that Vein, below the bending of the Arm.

Secundus.

The Second ^d Nerve being undivided and thicker, does descend to the bending of the Arm, being covered only with fat, and at the bending of the Arm it is placed beneath the Arteria and Vena Basilica.

Howbeit the Vena Basilica a little below the Cubit does, towards the interior part, recede a little from that Nerve, that it may be united to the Vena Cephalica.

But four fingers beneath the bending of the Arm, being alwayes superintendent to the Basilica, it passes unavoided along, unto the wrist, the vein appears above.

At the Wrist it is cleft into ten small branches affording two little twigs to every Finger, which creep along the sides of the said Fingers.

You shall observe by the way, that three fingers breadth beneath the bending of the Cubit, it is covered by the Muscles which bend the Wrist and Cubit, which arise out of the internal Tuberosity of the Arm.

Tertius.

The third ^e Nerve is carried along undivided unto the Angona, where being conveyed through a cleft which is between the Elbow and the inner Condylum or Tuberosity of the Arm, according to the length of the Cubit, and being drawn out over the Cubitans externus, it is carried unto the wrist, towards the little finger. And therefore by leaning on the elbow, the whole Arm is benumbed. Being divided near the Hand into four branches, it is spread into the out-side, of the Hand or Back of the Hand.

^a T. 24. f. 3. ff. ^b T. 24. f. 3. II. ^c T. 24. f. 3. gg. ^d T. 24. f. 3. KK. ^e T. 24. f. 3. bb.

Quartus.

The fourth Nerve is the thickest of all interwoven with Veins and Arteries, and sunk deep in the Brachizus externus; it is carried from the forepart of the Arms into the Hinderpart, and descending there through unto the Radius, and being carried all along the same, it is joined to the vena Cephalica, and loses it self at last into the wrist.

The veins of the lower Limbs. Poplitea.

I proceed unto the vessels of the Inferiour Limbs. The Crural ^b vein, does in the groin produce a remarkable branch, viz. The ^c saphena, which according to the longitude of the sutorius Musculus descends unto the Ham. Beneath which, is the Ankle, it constitutes the vena poplitea, which was opened in times past. There it transmits the branch which is in the upper part recurrent, above the Ham, unto the crural veins, or the saphena receives that same branch, from those crurals.

Afterward

Afterward being divided into two parts it slips down unto the two external Ankles, but the greater portion takes its course unto the internal Ankle, where it formes the true ^c *Saphena* which is usually opened.

It is termed corruptly *Saphena*; as if one would say *Saphaia* because of the Appa- *Saphena*
 rency, which is a new name brought into use by the late *Greeks*, unknown to *Galen*.

When the crural vein has produced the *Saphena*, it is soon after divided into four branches, of which, the two ^f external and lateral ones which are the shortest are disseminated into the superior Muscles of the Thigh, both the internal, namely the *Biceps*, and the external *viz.* the *vasti* and the *Musculus Cruralis*.

^a T. 24. f. 3. ii. ^b T. 24. f. 4. A. ^c T. 24. f. 4. aaa. ^d T. 24. f. 4. fff. ^e T. 24. f. 4. a. beneab ^f T. 24. f. 4. bb. &c.

The *Ramus tertius* which penetrates into the inner parts, is termed ^a *Isohiadicus*, *Isohiadicus*,
 The fourth is called ^b *Muscularis*. *Muscularis*

These branches being propagated, the Trunk of the *Vena cruralis* being split into two, descends unto the knee, being attended with the crural Artery branched into two: But one of the ^c branches is a loft and waters the external parts, the other is more ^d deep; both of them do afford twigs to the neighbouring parts, and when they have reached unto the Ham, being spread along between the *Soleus* and the *Gemelli*, they descend to the two Ankles. *The lesser branches.*

But the external Ankle is principally watered from the low-laid crural vein, yet so that in the compass of the Ankle two notable veins are observed.

That which quarters upon the *Malleolus internus* or inner Ankle-bone, is the branch of the *Saphena*. That which takes its course beneath the *Malleolus*, being spread out above the *Tarsus*, is a branch of the crural Vein.

Neither of these Veins can be safely opened unless they swell, by reason of the neighbouring arteries, which the *Vena Saphena* placed in the inner Ankle is free from. And this vein is opened in all diseases as of Men as well of Women. Yet nevertheless in the *Sciatica*, the vein beneath the *Malleolus externus*, is more advantageously opened, because it has greater communion with the part affected, namely the Coxend x or Hip.

The Distribution of ^e *Arteria Cruralis*, is not equal to the *Vena Cruralis*, because it produces no *Saphena*. For a little lower than the Groin, it transmits two ^f within the *Musculus triceps*, which are lengthened out as far as to the *Gloutij*. *The Arteria Cruralis*

Afterwards it sends forth ^g two, into the former parts of the Thigh.

^a T. 24. f. 4. cc. &c. ^b T. 24. f. 4. dd. ^c T. 24. f. 4. bb. ^d T. 24. f. 4. gg. ^e T. 24. f. 5. AA. ^f T. 24. f. 5. &c. ^g T. 24. f. 5. dd. &c.

And then the *Cruralis* descends undivided as far as to the Ham: Where it is divided into two Branches; the ^a one of which does laterally creep all along the outside of the Leg upon the *Musculus Peroneus*. The other being thrust into the Muscle *soleus*, and sliding down unto the Heel, is disseminated into the sole of the foot; and the other is branched forth into the outside of the Foot. *Its branches.*

The *Vena Saphena* has no Artery to attend it, and there is not any nerve near it, and therefore it may safely be opened.

The Nerves of the fore-side of the Thigh are two, distinguished in their original, but so as they soon grow together and become one cord, which is carried entire without any division, unto the Groin. Where it is distributed into five ^c branches, commonly wrapped up in a Membrane, which being dispersed on every hand into the Muscles of the fore part of the Thigh, they are branched out as far as to the whirl-bone of the Knee. *The Nerves of the fore part. The first.*

Now the Rise of these Nerves is in the ^d three lowest *Vertebra's* of the Loynes, neither is it visible, unless the Muscle *Psoa* be torn asunder, within which they lie hid.

The second.

Then besides those fore-mentioned, you shall see another *Small Nerve*, drawn through the oval hole of the *Os Pubis* and spent upon the neighbouring muscles *viz.* the *Triceps*.

Of the hinder part.

The first.

A *great and very thick Nerve* does glide along the hinder part of the Thigh, which in its Original is made up sometimes of three, oftner of four portions, which are bred out of three or four of the upper holes of *Os sacrum*, and being carried along through the cavity of *Os Ischii*, which is seated between the spines of the said *Os Ilium* through the internal and hindermost muscles of the Thigh, undivided, sometimes doubled and solitary without the society of a vein and Artery, as is ordinary in other Nerves of the Body, it is carried into the Ham; where being divided into two, sometimes into \approx four, it bestows little small twigs (considering its bulk) upon the neighbouring Parts.

^a T. 24. f. 5. ii. ^b T. 24. f. 5. II. ^c T. 24. f. 6. B. C. D. & c. ^d T. 24. f. 6. 3. 4, 5. ^e T. 24. f. 6. EE. ^f T. 24. f. 6. 6. ^g T. 24. f. 6. i. k. l. & c.

Its branches.

The other ^a Branch descends through the Calf of the Leg to the Heel, dealing out little Nerves in its passage, and being drawn through the cleft of the inner Anklebone, it is distributed into the sole of the Foot in as many Branches as there are Fingers.

Another is carried into the ^b fore part of the Foot, fastened unto the *Perone*, and so slipping down along unto the external ankle, and when it is come thither, it is spread abroad into the upper side of the Foot, as was said of the former.

A Bastard Sciatica what?

This exceeding great and thick Nerve being ill disposed or diseased, a Bastard *Sciatica* is thereby caused, which consists wholly therein; there is a grievous pain, which afflicts not only the Hip, but reaches into the Thigh, the ankle and foot, namely to all places whether the Nerve which comes from the diseased Hip does reach, *Fernelius* in the 18. Chap. of the 6. Book of his *Pathology*: And therefore in his Bastard *Sciatica* *Cautsticks* are to be applied, and Issues made at the bending of the Buttocks, also those parts must be anointed and smeared with an *Epispastick* or drawing Plaster.

You shall observe by the way in a bastard *Sciatica*, that those nerves are watered by the *Hypogastrick* veins and the Arteries above the same; and therefore the nerves cannot be dried unless the *Hypogastrick* veins are emptied, by many times letting blood in the Arms and Feet, and by Horse-leeches often applied to the veins of the Fundament.

Now *Galen* in the 8. Chap. of his 16. Book of the use of the parts of our Body shews the reason why this same nerve is not mixed with other four nerves as it is in the nerves of the Arm, but is carried behind the thigh; *viz.* Because the joynt of the Arm stands farther from the *Vertebra's* of the Neck, than the joynt of the Thigh does from the *Vertebra's* of the Loins and *Os sacrum*.

The second.

About the beginning of this great nerve, there is another adjoynd, which rising out of the third hole of the *Os sacrum*, and being carried along above the spine of *Os sacrum*, it is branched out into the *Musculi Glontij* and the *Flexores Tibiæ*, as far as to the Ham.

The Medicinal Consideration.

Varices what they be?

Their Cure.

Whether a vein cut off will grow again?

Diseases of the veins belonging to the Limbes, especially to the Leg and Thigh, are the *Varices* which are knotty dilatations, in which the Blood is collected, as it were in certain Satchels. Now they are cured with astringents with a close and convenient ligature. Or the veins are pricked and the blood let out, or at the beginning of the varix the largest vein which gives nourishment to the rest, or the beginning it self, is tyed up and cut off. Many conceive that the veins cut off are bred again; they bring for an example the veins which are seen in a very great *Sacroma* or fleshy Excrecence; but *Fernelius* has rightly observed, that they are not veins, but channels between the Skin which nature has framed as gutters to water and nourish the *Sacroma* or fleshy Excrecence.

Many

Many think that the Veins which are cut, being tied together with a string do grow again, which I do not believe.

Hippocrates calls the Veins *Spiracula Corporis*, the vents of the body or the breathing holes thereof, which being opened, the Body is aired; and he saies that when the Veins are dried, they draw sharp and choleric humors in burning feavers. Also the same Author saies, that the Veins do draw more than the flesh Lib. 1. de *Morbis*. Especially if they be more hot and dry than ordinary.

When the Veins being debilitated through Sickness of the Liver, become nauseant and enclined as it were to vomit, they suffer the Blood to run out, not only through the moathes of the upper and lower Veins, but also through the Skin of the whole Body, in manner of a bloody sweat, which I have observed two or three times.

Bloody sweat
whence they
proceed?

A stoppage of the Veins and Arteries, does often happen in Plethorick bodies, so that in all places in which the pulse is wont to be felt, the motion of the Arteries is abolished; in which case *Hippocrates* commends blood-letting, as a means to put the Vessels into motion again.

The motion of
the vessels here
abolished?

Sometimes the Pulse of all the Arteries is intercepted, not excepting the Groin or Crural Arteries, the motion of the Heart still remaining, which disposition if it continue long it kills the Patient. But if the motion of the Heart be perished likewise, the Patient dies suddenly. I have seen two that had no pulse at all, only their heart continued beating, who lived sixteen years, but in extrem weakness. *Baldwinus Rosseus* saw one in the same condition, as he affirms in his *Medicinal Epistles*.

Hereupon, a question may be raised, how the pulsation of the Arteries can be stopped while the Heart beats after its wonted manner, though slowly; whether it be not necessary in such a Case that the Aorta be obstructed near the Heart, and that the irradiation and influx of the arterial blood be by that means intercepted. And then the Blood of the Veins approaches the Heart, being drawn thither in the diastole or dilatation thereof, that it may receive the Seal of Vitality in the right Ventricle; and being afterwards driven forth by the Systole or Contraction into the Vena Cava, the vital spirits are forcibly carried into the length of the channel, and by the mutual anastomoses of the Veins and Arteries, they are communicated to the said Arteries with the blood. I have in some persons observed that the motion of their Arteries hath been frequently intercepted or became very unequal for some daies together, afterwards the impediment being removed which was near the Heart, I found the same inequality in the *Celiac Arterie*, which did beat vehemently, although the pulse appeared equal and well ordered in the rest of the body. This, I conceive happened by reason of a little bit of flesh or fat, which ascending to the Gates of the Heart did cause such a pulse so inordinate, and being repelled or drawn back unto the *Celiac Arterie* which is a branch of the Aorta, it did produce such an irregularity as aforesaid.

How the motion
of the pulse in
the Arteries
can be stopped,
while the Heart
moves.

The *Crural Arterie*, seeing that it is evident in the Groin, and subject to our feeling the pulse thereof is easily discerned, being vehement in regard of the greatness of the Arterie, and the last which remains after the pulse is extinguished in other extrem parts of the Body, wherein it is usually felt to beat. And therefore when no pulse can be felt in the other usual places, it must be sought for, examined in this Crural Arterie, not only in Men but in Women also, provided the Rules of Honesty be not broken. And if when a disease is at the Heigh, we can feel no pulse in this part, death is near at hand.

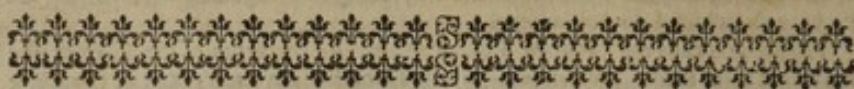
The Pulse is last
felt in the
crural Arterie

The *Dilation or Section of an Arterie* happens chiefly in the external parts, where the lesser Arteries reside which are branches of the great Trunk. And this disease is termed *Aneurisma*. It is seldom seen in the trunk of the Aorta because of its thickness.

Aneurisma,
what it is?

The End of the Fifth Book:

Kk 2



THE
SIXTH BOOK
OF THE
ANATOMY
AND
PATHOLOGY
OF
John Riolanus,
THE
KINGS PROFESSOR
OF
PHYSICK.

A new *Osteologia* or History of the Bones.

Wherein he Treats of the Bones, Ligaments and Gristles of the whole Body, by which the frame of the Body is compacted together, the Muscles being removed, handling all the Diseases and Symptoms which happen unto the Bones.

Chap. I.



The Method.

THE Scope of Nature and of the Physitian about the Body of Man its Fabrick, are contrary, the one unto the others Nature intending to make up the Body of Man, begins at the most simple parts, and so proceeds by little and little to the more compounded ones, untill she finish her work. But the Physitian, that he may attain unto the knowledge of this workmanship of Nature, proceeds gradually from the more compound unto the most simple parts; so that in his Analysis or Resolution, these parts are last which were first in the

the Composition. So when we pull down an house, first we throw off the Ceiling, then we demolish the walles, and lastly we dig up the foundation. We in like manner in our taking asunder this House of Mans body by Anatomical Administration, do now in the last place treat of the Bones which are the foundation of the whole body, and placed before all other parts. We shall consider of them in the way of a new kind of *Osteologia* or History of the Bones, which is no less necessary than the doctrine of the Skeleton of the Bones.

Why we treat of the Bones in the last place?

Having therefore explained and demonstrated the softer parts of the Body by way of Analysis, I proceed to the last and more solid parts thereof, which according to the Synthetick method, or order of composition, are the first, such as are the Bones, which are now otherwise considered than when they are boyled and dried and so demonstrated.

Chap. 2. Of the great Profit of this new *Osteologie*, or Doctrine of the Bones.

There is a two-fold Doctrine of the Bones; one is demonstrated in dried Bones, which have been prepared by boyling; the other is shewed in the Bones of the Body, while they remain naturally fastened one unto another. both these Doctrines are useful in the Art of Healing, and for such as would have a perfect knowledge in the Body of Man.

The Doctrine of Bones demonstrated in a dead body, is better and more necessary.

For in the dried Bones, in which commonly this Doctrine is taught, nothing is learned, saving the external shape, posture, and composition or frame of one with another: But if a diligent observation of the Bones, while they are knit and fastned one unto another, is more conducing to practice. Because the fastenings of the Bones one unto another by Gristles and Ligaments, also by the several sorts of Articulation, or joynting, are in some dried Bones quite different from what they are in such as be moist; for in dried Bodies you would think that some Cavities are hollow, and Cup-fashion'd, the Cavities being empty, and bereaved of their Cartilages, which notwithstanding appear shallow in a fresh Body, the Cavities being full of Gristles; and contrary-wise, you would in a Skeleton say, that some Cavities are shallow, which are deep in a fresh Body, the hollownes being encreased by a Gristle brim.

For the perfect knowledge of Mans body.

Moreover, The external Conformation and Quality of the Bones, is more evidently discerned in the Bones of a Carcase, which loses much in Bones that are prepared by boyling; as for example, the Gristly incrustations of the extremities, the Membrane which is about the Bones, and the Muccous, or slimy substance lodged between the Bones; also the internal substance, or marrow, or marrowish Juycce, are manifestly discovered in the Bones of a fresh body, which are not at all in dry and withered Bones.

Aid

And therefore in respect to the Practice of Physick, and the Cure of vitiated bones, and such as are broken, or out of Joynt, it is necessary, diligently to look into, and carefully to examin in a dead Body, the Natural Conformation of the Bones, and their conjunction one with another. I do not dislike the use of dried Bones, to teach and demonstrate the Vulgar *Osteology*, or Doctrine of bones, at which we must begin, as we have done in this Treatise; provided the Demonstration of the bones in a dead Body be afterward added to the former.

For the Practice of Physick.

Than the Vulgar.

For by this Repetition, and Representation of the bones we shall imitate the Order and Design of Nature, which in the Generation of the Parts of our Body, is wont in the first place to form the Bones; but she finishes, and perfects them after all other parts, for they grow as long as the body encreases, according to *Aristotle*. And if we believe *Hippocrates* in his Sixth Book of his *Epidemics*; Women have their Courses, till their bones have attained their utmost perfection.

where notwithstanding we ought to begin.

Chap. 3. *What is to be observed in the Bones of a dead Body not boyled.*

The Natural
Condition of
a Bone is what
it consists?

IN the first place, you shall observe the Natural Constitution of the Bone, that you may discern the fault of a bone which is out of Order.

In what the pro-
ternatural.

A bone in a living Body naturally disposed, ought to be, 1. Hard, to procure the bodies stability. 2. It ought to be Oily without, because it is nourished. 3. It must be covered with the Periosteal Membrane, that it may have sence; for if it lose the Periostium, it becomes senceless. 4. It must be white structured, with a moderate redness, because it is a Spermatick part, and is nourished with the dewy vapor of the blood. 5. It must be hollow or spongy, that it may continue the substance of Marrow, or a Marrowy Liquor to nourish it self withal. 6. It must be at the ends crusted with Gristles. 7. It must be anointed as it were with an oily moisture, to facilitate its motion. 8. It must have a continued and even substance. And therefore you shall know that a Bone is misaffected, if it be soft, as *Ruellius*, *Fernelius* and *Holierius* have observed, that in some persons the Bones of their Bodies were by sickness become so soft and flexible, that you might bend them which way you pleased, like wax. *Aristotle* in the third book of his History of Animals, saies that bones are not flexible, neither are they apt to splight, but only subject to break. *Scaliger* in his commentary adds; I have seen the thigh-bone by reason of the venereous disease, or by use of I know not what medicaments, bowed like an horn. Geographers write that in a Country of *Ethiopia*, the inhabitants have naturally from their birth bodies so flexible, that they can turn and wind them into any posture. I have read in *Hippocrates* of a Boy that was born without bones, having the Principal parts of his body otherwise distinct. *Forestus* saw a Boy made after the same manner in some of his members.

Wherefore if a bone shall be dry without, it declares a distemperature of the part; if it be white it argues want of heat, if red, inflammation; if black, rottenness, and blasting. If a bone be sensible, there is some secret fault in its substance, or in its periosteal membrane. If it be solid and concrete without cavities or parts, it renders the body heavy and sluggish, and can contain no marrow. *Plinie* relates that there are some that lived having solid bones and without marrow, which are very rare and are termed *Cornei*. The sign of such a Constitution is never to thirst and never to sweat. They are called *Cornei* from the Cornel or Dog-tree; because the male Cornel has no pith or marrow. See *Rhodiginus*. Such a one the *Syracusan Lygdamus* is reported to have been, who in the three and thirtieth *Olympiade* was the first who at the *Olympick Games*, became Victor at all Exercises and won the *Paneratian Crown*; his bones were found to have no marrow in them, as *Solinus* relates in his fourth Chapter. *Antigonus* in his Book of wonders Chapter 8. Writes that the bones of a Lion are so solid that you may strike fire out of them as out of a flint; howbeit *Columbus* denies that such bones are void of marrow. Which *Epicurus*, contradicting *Aristotle* maintaines, as possible in the 8. Book of *Athenus* his *Deipnosophists*. *Aldrovandus* has observed that among Fowles the *Estrich* has solid bones, void of marrow. But in case a bone should be deprived of its Gristly Crust and of its periosteal Membrane, it is moved with difficulty; and has no feeling at all. If a bone become uneven and prominent so as to have bunches upon it, it is termed *Exostosis*, which is an effect and concomitant of the Venereous Pox when it is of long standing and confirmed, howbeit it may spring from some other cause. Finally being depraved and mishapen, or disjoynted, it hinders and marris the Action of the whole body or its parts; and being divided in its substance, it argues solution of Continuity by some cleft or fracture. And although a broken bone by the mediation of a *Callus* becomes sodered together on the outside; Yet does it still remain divided within.

Chap. 4. Of the Nourishment, Sence, and Marrow of the Bones.

While the Bone did live and was nourished, it had a twofold sustenance, the one remote, the other conjunct or immediate according to *Aristotle*, in his Book of the parts of live wights. The remote sustenance of the Bones, is the thicker and more earthy part of the blood. The next or immediate is the marrow, or marrowy liquor, which is contained in the hollowness and porosity of the bones. *Hippocrates* in his Book *de Alimento*, saies that the marrow is the Nutriment of the bones, and therefore it is that they are joyned together or foddered up by a *Callus*. How can it be (may some men say) that the blood should nourish the bones, seeing they have no veins, which are the channels to conveigh blood to all parts? *Hippocrates* saies in his book *de Ossium Natura*, that of all the bones, the lower Jawbone alone has veins. *Galen* indeed in his 8. Book *de Placitis*, attributes unto every bone a vein greater or lesser according to the Proportion of the Bones; and in his *Comment upon the first Book of Humors*, he saies that there is a Vessel distributing blood allowed to every bone. But he confesses in the *last Chapter of his 16. Book de Usu Partium*, that the veins of the Bones are so small and fine, that they are not so much as visible in the larger sort of Animals or Live-wights, because nature according to the necessity and indigence of the Parts, bestows upon some greater, upon other lesser veins, moreover the little holes which are found about the extremities of the bones, do manifestly declare that somewhat there is which goes into the said bones, now their is nothing goes into the bones but little Veins. If we believe *Platerus*, the Arteries do no where enter into the bones, seeing the spirits can easily penetrate into any of the bones without the service of the Arteries to carry them. Neither do I conceive that there are little nerves diffused through the substance of the Bones to give them the sence of feeling, because all the feeling they are capable of, is by means of the *Periosteal Membrane* which does compass them. Nevertheless *Nicolas Massa* calls God to witness that he saw a Man, who had an Ulcer in his thigh, so that the bone was bare, in which bone there was a sence of pain, so that he could not endure to have it touched with a rough instrument in regard of the pains it caused, and it was freed from the *Periosteal Membrane*. Yea and he bored the bone, and found that it had the sence of feeling within the same, which he therefore thought good to declare; that Anatomists might be moved to consider, whether some branches of nerves do not penetrate into the substance of the bones.

We cannot look into the Cavities and Marrows of the Bones, unless they be first broken. I observe a threefold Cavity of the bones and a threefold marrow.

In the greater Cavities of the larger Bones, the Marrow is reddish; in the lesser Cavities of the smaller bones the marrow is white; in the spongy bones there is contained a marrowy Liquor.

In the mean while you shall observe, that the marrow within the Cavity of the Bones is compassed with no membrane, neither is it made sensible by any little nerves penetrating the substance of the bone, as *Paracelsus* does imagine. *Hippocrates* himself, in his Book *de Principiis* was the first that noted this. The Marrow of the Back bone is not like that marrow which is in other Bones, for it alone has membranes, which no other marrow has besides it.

The remote matter that nourishes the Bones.

The immediate matter.

Whether the Bones have Veins?

Whether they have Arteries?

Or Nerves?

Three-fold Marrow of the Bones.

Whether the Marrow of the Bones be compassed with a Membrane.

To the Articulation of the Bones there concurs As Heads.

Chap. 5. Of Articulations or Joyntings of the Bones.

LET us proceed to the Joyntings together of the Bones. There does concur to the Articulations of the Bones, the head, the Cavity, the Gristle, the slegmatick moisture, and the Ligament.

Every Head is in its own nature and original an *Epiphysis*, but in process of time it degenerates into an *Apopophysis*.

The

The Head is within of a Light spongy and porous substance, being filled with blood or with a marrowy Juice, on the outside it is covered with a very hard shell or bark, very thin and compact, which is crufted over with a smooth and polished gristle.

Now the Head of a Bone is ^a great and long, or short and flat, which is termed ^b *Candyles*.

A Cavity.

The Cavity of the Bone which receives the Head, is also crufted over with a *Gristle*, which if it be deep, it is called in *Greek* ^a *Cotyle*, if shallow, 'tis called ^b *Glene*. It is sometimes encreased with a Gristle brim, lest the bones should too easily slip aside, and fall out of their places.

A Gristle.

A Slegmatick Humor.

And in the Cavities themselves, there is contained a clammy, thick, and Oily, *Pituitous Humor*, to procure a more easie, and expeditious motion of the Bones, so we grease the Axle-trees of Coaches and Carts, that the wheels may turn more easily and quickly. Through want of the foresaid Humor in such as have the consumption, and are extreemly dried, while they go and stir their Limbs, one may hear as it were their bones knock one against another, and rattle in their Skins: As is proved by a memorable History, recorded by *Symphorianus Campegius*, in the *Medicinal Histories of Galen*; and as I my self have oftentimes seen.

A Ligament.

Now that the bones might be so knit together, as to make a Joynt, there is need of a Ligament or Band, whose substance is broad and round, its colour white or bloody, such as is the round Ligament which fastens the ^c Leg, and the ^d Thigh, and that which unites the ^e *Astragalus* with the ^f *Pterna*, and that of the *Astragalus* with the three Bones of the *Tarsus*, which are termed ^g *Aneiformia*. For these bloody, or bloodyish Ligaments, are alwaies interposed between the bones, and are very hard; but those which are drawn about the Articulations, do alwaies appear white. So the Nerve-gristly Ligaments, which are interposed between the *Os Sacrum*, and *Os Ilinn*, are observed to be bloody in a Woman newly delivered of her Child.

Why the bones are articulated.

Now every Conjunction of the Bones is made by Nature, either for *Motions sake*, or for *Perspiration*, or for the *Passage of some certain Substance*, or for the *differencing of Parts*, or for *security*, and to *preserve from violence*.

^a T. 21. f. 1. dd. f. 4. a. ^b T. 21. f. 1. and 2. 11. ^c

^a T. 21. f. 4. ^b T. 21. f. 4. F. ^c T. 21. f. 7. aa. ^d T. 21. f. 8. a. ^e T. 21. f. 5. A. ^f T. 21. f. 5. B. ^g T. 21. f. 5. EEE. ^h

Conjunctions of the bones for motions sake, are seen in the Fingers, Wrists, Elbows, Shoulders, Hips, Shanks, Ankles, Ribs, Spondyls; in a word, in all movable Articulations.

For Perspirations sake, we see bones joynted together in the Sutures of the Skul.

For to give passage to some substance or other, we see the like conjunction at the production of the *Pericranium*, and at the throw-fare of some certain Vessels, which go partly out, and partly in; to which intent the Sutures of the Skul were contrived.

For securities sake, and to avoid the violence of breaking, &c. we see the said Conjunction, in all such bones as are compounded of divers smaller ones.

For the differing of parts, certain conjunctions of bones seem to have been contrived in the Bones of the upper Jaw.

Having laid this foundation out of *Galen* 11. Book, *de Usu Partium*, Chap. 18. it is an easie matter to prove the sorts and differences of Articulations, out of the Doctrine of *Galen* himself.

Two-fold conjunction of bones.

The Bones are joynted one with another, some by Articulation, or joynting; others by *Symphysis*, or cleaving together.

What a joynt is.

A Joynt termed *Articulus*, is a Connexion of Bones, ordained either for motion, or for some other Cause.

Sorts of joynts.

In respect of motion, there are two sorts of Joynts. The one is contrived for manifest and strong motion, which is called *Diarthrofis*: The other is ordained for an

an obscure and difficult motion, or for none at all, and it is called *Synarthrosis*.

Of the former kind of conjunction of bones, viz. *Diarthrosis*, there are three sorts; *Enarthrosis*, *Arthrodia*, and *Gynglymosis*. Particulars of each sort.

Of the second kind of Articulation, viz. *Synarthrosis*, there are in like manner three sorts, *Enarthrosis*, *Arthrodia*, and *Gynglymosis*; because *Synarthrosis*, and *diarthrosis*, do differ only in the quantity of the motion; as *Galen* does teach in his Book *de Ossibus*, which also he manifestly declares in his Book *de Disselt. Muscul.* Chap. 22. near the end, and in the 13. Book *de Ossibus*.

But because a *Synarthrosis* is ordained not only for motion, but for some other cause, as namely for perspiration, the transmission of some substance, the differing of Parts, and to save from harm by streis and violence; it comprehends three other sorts under it, viz. *Sutura*, *Harmonia*, and *Gomphosis*.

These six differences of *Synarthrosis* or joynting may be proved by sense and by example. The ^a Ribs are joynted to the ^b Breast-bone by an *Arthrodia*, which in regard of motion may be referred to a *Synarthrosis*. The ^c Bones of the wrist are coarticulate with the bones of the ^d *Metacarpum* (*Galen de usu partium, Lib. 2. Chap. 8.*) but that *Synarthrosis* is made by the way of *Arthrodia*. The ^e *Astragalus* is joynted to the ^f *Scaphoides* with an obscure motion, which is *Enarthrosis*. *Lib. de Ossibus, chap. 24.* *Gynglymosis* is found in the Vertebra's of the ^g Back, which is to be counted as a kind of *Synarthrosis*; the *Gynglymosis* of the other Vertebra's, is a kind of *Diarthrosis*. *Galen* in his 26. Book *de Compos. Med. secundum locos*, and in his 12. Book *de usu Partium*, calls the Sutures ^h of the Head *Synarthroses*. Also he calls the harmonia of the ⁱ inferior Jaw-bone, *Synarthrosis*, in his Comment upon the Ninth part of the second Book *de Fracturis*. The bones of the Sternum or Breast-blade ^k being immovable, are joynted together by a *Synarthrosis*. From *Galen* in his Book *de Ossibus* and other places of his Writings, I could prove, that the Jaw-bone and the bones of the Breast-blade are joynted together by *symphysis*, because they grow together as the Person comes to years, so that no marks are remaining of their former distinction. So *Galen* in his Book *de Ossibus*, calls the Conjunction of the inferior Jaw-bone with the Chin, *Symphysis*.

Examples of the sorts.

Symphysis is an immoveable union of the Bones, which is performed either with somewhat intermediate or without. Symphysis, where it is?

In regard of the threefold Medium, some *Symphysis* is called *Symphondrosis*, from the Cartilage Gristle which is the Medium of the Union, a second is termed *Synerodis*, from the nerve which is the medium, a third is called *Syffarcodis* from the fleshy Medium. To which we may add a fourth termed *Neurochondrosis*, because the Union is made by a Medium which is of a mixt nature, being partly nery, and partly gristly. But more may be seen of this in *Galen* his Doctrine of Bones.

Its Differences.

^a T. 19. f. 2. l. 2. 3. &c. ^b f. 2. A. A. ^c T. 21. f. 1. & 2. F. ^d f. 1. H. H. f. 2. G. ^e f. 5. A. ^f f. 5. C. ^g T. 10. f. 3. ^h T. 15. f. 1. a. a. &c. ⁱ T. 8. f. 4 D. ^k T. 10. f. 2. A. A.

The differences of *Symphysis*, do appear in the bones of the ^a lower Jaw, in the Bodies of the ^b Vertebra's, in the bones of the ^c share one with another, and in the conjunctions of the ^d Ilium bones with the ^e *Os sacrum*, in the growing together of the vertebra's of *Os sacrum* one to another, and of the epiphysis; and in the conjunction of the *Os Sphenoides* with the Occiputs bones, and in the conjunction of other bones, which in children were divided, but in persons come to years, they are found growing together by *Symphysis, sive Medio*; such as are described by *Galen* in his Book *de Ossibus*. Its differences exemplified.

The Ligaments which knit the bones together and that flegmatick humor where-with the bones are smeared, and the Gristles, both such as are common to divers bones articulated together, and likewise such as are proper to the particular bones to crust the ends of each of them: All these shall be treated of in our particular Muster and Survey of the Bones.

General diseases of the Bones, Caries.

The General Diseases of the Bones are, *Caries* or rottenness, and putrefaction, which

The Medicinal Consideration.

which proceeds from a common, or extraordinary Cause, such as is the Venereal Pox.

Exostosis. *Exostosis*, or a swelled knot upon a bone, which arises from the foresaid Causes.

Kedmata. *Kedmata*, mentioned by *Hippocrates*, which are Chronical Diseases, proceeding from defluxions, common to all Joynts, but especially infesting the Hip-bone. Of these kind of Diseases, read the *Medicinal Definitions of Gorrans*, and *Foesius* in his *Oeconomia Hippocratis*.

Hydatrosfis. Of kin to this, is *Paracelsus* his *Synovia*, or *Hydatrosfis*, which is a continual Flux of wheyish or blood-watry Humor, out of exulcerated Joynts, especially if the Nerves or Ligaments be diseased. *Hildanus* in a peculiar Book on this Subject, proves that this Disease *Synovia* (which was first so called by *Paracelsus*) is the same with that Disease which is termed *Meliceria*, by *Cornelius Celsus*, *Lib. 5. Cap. 26.*

A sure thing it is, that the bones being diseased, do drop blood, and *Galen* observed as much.

Fracture. The bones are likewise subject to *Fracture*, or breaking, and *Luxation*, *Dislocation*, or disjoynting. Now a *Fracture* of a bone, is a Division made in a bone by some external Cause, cutting, or bruising the same.

Its kinds. There are two sorts of *Fractures*, a straight one, and an oblique, or crooked one. The former is according to the length of the bone, or overthwart.

The latter, or oblique is (if we believe *Galen*) too curiously differenced by the latter Physicians which have succeeded *Hippocrates*; for it is said to be Nail-fashioned, when the *Fracture* is partly straight, and partly circular; another sort is called *Alphibedon*, when the bone is broken all to shivers.

Another sort there is, which is called *Apotrausis*, or *Detractio*, whereby a Fragment of the bone is so taken away, that there remains a mark in the surface of the Bone.

Another sort of *Fracture*, *Hippocrates* mentions, which he calls *Apoclasma*, and *Galen* terms *Hapagma*, when a bone is broken there where it is joynd with another bone.

Luxation. *Luxation*, or disjoynting, is a disease of the bone in Situation, when it is removed out of its place.

There is a twofold *Luxation*, or disjoynting of a bone; the one compleat, when the head of the bone is slipt out of its socket, and this is called *Exarthrema*, a being out of Joynt.

Its sorts. The other is Incompleat, and termed *Pararthrema*, when the bone is in some measure only removed, and lengthened as it were, which is mostly seen in the subluxation of the Thigh. In an *Exarthrema*, the Leg seems shorter than it was wont to be; in a *Pararthrema* it seems longer than usual.

Causes. The Causes of *Luxation* and *Subluxation*, that is to say, of perfect, and imperfect disjoynting of any Member, are external, or internal: The External are, a blow, a violent distortion, or wrenching, a fall, and extention of a Member. The Internal causes are, a thin Humor, which does relax the Ligaments, or a thick Humor which by little and little, fills the Cavity of the Joint, and at last thrusts out the bone, by reason of an *Anchylosis*, which is bred.

Anchylosis. Now *Anchylosis*, is a fault in the Articulation of bones, whereby the Cavity of a bone, which ought to receive the head of another bone, is filled up; be it what kind of Articulation it may be, either *Enarthrosis*, *Arthrodia*, or *Gynglymos*.

Hereupon the bone thus diseased, either is held bowed in, or remains stretched out, and stiff. And in case without the foresaid *Anchylosis*, the Tendons of the one side shall in the Limbs be cut in sunder, the streight or crooked bones do no longer serve to bend or stretch out the said Limbs.

Chap. 6. Of the Bones of the Skull.

HAVING diligently considered the Articulations, or joynting of the Bones one unto another, let us now take notice what is observable in every particular bone being fresh, which is not to be seen in the Skeleton, or in dried bones. I will proceed from Head to Foot, according as I am wont to do in my Dissection, and Demonstration of these parts. Now my Demonstration of the bones is two-fold; the one I call the *Osteotome*, or Bone-Dissection, in which the bones are separated each from other; the other I term *Ossifragium*, in which the bones are broken, that their inner structure may be discerned.

And in the first place, let us contemplate the two-fold Table of the Skull, or the double Skull-board which is thinner in Women, than it is in Men.

The uppermost is thicker and harder, and more smoothly polished than the neather: but the lower is rough and furrowed as it were; that it might afford place for those Vessels which creep along the *Dura Mater*, from which some notable Vessels arise, which by the Ears do insinuate themselves between those two plates, or boards of the Skull, for to irrigate the immediate space.

Now that same intermediate space, is a certain spongy substance, which receives and contains a marrowy Juice, serving for the nutriment of those bones. The which marrowy Juice is reddish, by reason of blood flowing out of the smal Veins situate in those parts; which is wont then to flow out when the Skull of a living man is boared through with a Wimple, or other boaring Instrument. Now the Skull, according to *Hippocrates* in his Book *de Vulneribus Capitis*, is double in the middle of the Head, that is to say, hollow between two plates and boards, that it might contain a marrowy Juice to nourish the bones. *Hippocrates* adds, The whole Head, a small part excepted, resembles a sponge full of small Caruncles, or little bits of flesh, which if you press, and squeeze with your finger, you shall perceive blood to drop out of them: also you shall see small Veins running up and down, which abound with blood.

Out of the said Caruncles, being bruised with a vehement blow, the blood is squeezed, which putrifying does corrupt the bone, which in the mean while appears found on the outside: but the Sanies sweating out from the inner plate or Skull-board, does corrupt and putrifie the very brain it self. And if so be when the Skull is razed, you see blood come forth, do not therefore conclude that the Fracture penetrates the inner plate; because that blood flows out of the space which is between the two plates, or boards of the Skull.

That same spongy *Hypercarosis*, or breeding of proud flesh, which grows up in wounds of the Head, is bred out of the foresaid Duplicature of the Skull-bone, as *Hippocrates* has observed. Touching the Fungous Excrecences of the Brain, whether they are bred from the broken bone, or from the *Dura Mater*, see *Sennertus* in the first Book of his Practice.

But *Hippocrates* his Caruncles, are vainly sought for in this intermediate space, whatever *Fallopins* pleads to the contrary in his Book of the Wounds of the Head, unless a man would call the spongy substance of the bones *Sarica*, or Caruncles, in regard of their Function.

This intermediate space interposed between the two plates of the Skull, is called by *Hippocrates*, *Diploe*. Howbeit, *Galen* contrary to the Opinion of the Antient Physicians, calls the second, and inmost plate of the Skull, *Diploe*, in the sixth Book of his Method of Healing.

The Use of this *Diploe*, Duplicature, or spongy substance, is three-fold: First to receive blood for the nourishment of the Skull: Second, That the fleshy Excrecence in the Fractures of the Skull, might grow out of it: Thirdly, That the Fumes of the Brain might more easily be exhaled.

Sometimes an Humor is collected between the two plates by way of transcolation, which

which being in process of time corrupted, does cause most excessive pains, which often happens in an inveterate Venereal Pox, when the Skull is knobbed, and bunched with a certain *Exstosis*.

This double plate or board of the Skull, has been made by a wonderfull contrivance of Nature, lest in all blows upon the Head, the wound should penetrate the whole substance of the bone. Hence it comes to pass, that sometimes one plate is cleft while the other remains unurt.

The Whore-masters Pox does oftentimes eat through the external plate, and sometimes through both the plates, without killing the Patient, who lives a long time after; as *Palmarinus* avouches in Chap. 4. of his Book *de Luc Ventrea*. The like Example you may read in the 18. Chapter of *Benivenius* his Book *de Abditis Morborum Causis*. And I my self have often observed the same.

The Sutures.

The Sutures, although they are ^a very closely united in living Persons, yet are they sometimes very apt to gape, and to move pain, as *Galen* reports, towards the end of his third Commentary in *Officinam Hippocratis*.

^a T. 15. f. 3. a a. b b. f. 4. b b. &c.

Whether an Issue may be made in the Crown of the Head?

But they seem not at all inclined to any looseness, or gaping about the meeting together of the *Sagittal* and *Coronal Sutures* in Persons come to ripeness of Age, where a Fontanel is ^a made; and therefore I have often found by Experience, that this part may without any detriment have a Caustick applied thereunto. Which kind of Practice, *Fabricius* commends in his Chyrurgery; others dislike it as dangerous, viz. *Mathens de Gradis*, *Vesalius*, Lib. 1. Cap. 6. of his Anatomy. *Baptista Montanus* in his 36. Counsel. *Zechius* in his Counsels. And *Baptista Carcannus* in his Book of Head-wounds. See *Claudius* his Counsels. I confess, that sometimes in children, this part being soft and gristly, is long ere it grow hard over that it is in grown persons; and *Galen* has seen it in such Yonglings to move and pant, *Gal. Lib. 13. Method. Cap. 22.* And in such a case to apply a Caustery, were dangerous. The *Africans* did burn an Issue in the Crowns of their childrens heads; as *Mercurialis* shews from *Herodotus*. They did burn the Veins of the Crown of their Heads with scalding *Oesypus*, or Sheeps Grease; and in case any Convulsion happened, they did Remedy the same by the sprinkling of Goats piss thereon.

Whether Black-moors have Sutures in their Skulls?

It is written by *Herodotus*, *Aratus*, and *Arrianns* in the Life of Alexander the great, that the Heads of the *Æthiopians* and *Egyptians* had no Sutures, which gave *Parvus* occasion to write, That the *Æthiopians* and *Moors*, and those which inhabit not Regions towards the South, and the *Æquinoctial Line*, have Skulls harder than ordinary, having none, or very few Sutures in them. The falsity whereof did plainly appear, When I dissected a very swarthy Black-moor publickly in the Medicinal Schools, whose Skull was in all things like one of ours.

Cavities of the Head.

In the Head there are many remarkable cavities, which the Anatomists call *Sinus*. These you shall diligently search for, that you may know whether they are void and empty, covered with a thin Membrane, and what communion they have one with another.

Now the cavities are, on each side four. The *Maxillary Cavity*, which lies concealed within the upper Jaws. The *Frontal Cavity*, seated in the Forehead, by the Eye-brows. The *Sphenoidean Cavity*, which lies hidden under the Seat or Saddle of the *Sphenoides*. The *Mastoidean*, which is contained within the *Mastoides*. They are all empty, and covered over with a thin Membrane, only the *Mastoidean*, is hollow indeed; but has no Membrane, but is distinguished into seven, eight, or nine little Cells, as we see in a Bee-hive.

The Entrance of the *Maxillary Cavity* within the cavity of the Nostrills, is to be seen on the side of *Os Spongiosum*.

The Entrance of the *Frontal Cavity* is seen in the highest and inmost parts of the Nostrills.

The Entrance of the *Sphenoidean Cavity* we find to be deep. Within the nostrills the spongy bones being taken away.

The

The Ingress of the Maxillary Cavity, is evident without cutting the Bones. The Ingress of the Frontal Cavity is evidently perceived, the frontal bone being cut in sunder above the Eye-brows: The Ingress of the Sphenoidean Cavity, is discerned, as soon as the inner plate of the Sphenoides is taken away. The entrance of the Mastoidean Cavity, is contained in the left side of the *Concha*, near the Apophysis Mastoides, and cannot be seen unless the arched Vault of the *Concha* be broken, or the porus auditorius pulled in pieces.

Sylvius conceives and demonstrates from *Galen* that flegm being transmitted through the little holes of the upper plate, is collected and heaped up within the Sphenoidean cavity, and thence conveyed into the Palate: which way of the passage of Excrements, is by *Vesalius*, *Columbus*, *Falopius*, and *Waverda* rejected: who contradict *Galen* in this point, and maintain that this excrement is voided through the neighbouring holes which rest upon the *Sella Sphenoides*.

Whether flegm may be collected within the Cavity of the Sphenoides.

The reason of *Galen* and *Sylvius* is, that it is better the excrements should be strained, and kept up for a season in those Cavities, than that a man should be continually spitting, and holding his mouth evermore open. For although the Sphenoidean Cavities, are in the dissections of dead bodies empty, and appear not to be full either of flegm or serosities: probable notwithstanding it is, that the serous humour which flows and distills out of the Choana, through the sieve-like plate of the *Sella equina*, is transcolated into the Cavities which are beneath, and from them poured back by certain oval and sufficiently wide holes, and voided forth into the spongy bones of the Nostrils: neither do they deny, that a part of the serosities, does sweat through the porosities of the inferior table or plate, into the palate. But the serous humor received in the spongy bones of the Nostrils, does by little and little sweat out and pass away, when by its quantity or quality, it provokes nature to an excretion. For to what purpose think you has Nature framed those cavities? Has she done it to make the skull so much the lighter? or that they might be conduit heads or storehouses of air, which is of necessity breathed in, for the Generation of animal spirits? But they cannot be storehouses, because they are a fingers breadth distant from the frontal cavities, nor have they any continuation or conjunction with them. Again the Air which is required to be exceeding pure, would be defiled by passing to and fro through the spongy bones. Furthermore in the many dead bodies which I have dissected, some of which might be snotty and flegmatick, I never found the mamillary Processes any larger than usual. But by those passages flegm ought to be derived unto the *Ossis Sphenoides* or Colander Bone; or fluctuating unto the Basis of the Brain, it ought of its own accord to flow unto that place, because the foremost Ventricles of the Brain, are seldom perforated before, so as to have a through-fare into the Nostrils.

The use of the Sella Sphenoides

Wherefore I conceive that all the snot and flegm of the nostrils is not strain'd through the Colander bone, but that it flows down into the Palate through the four pipes or channels of the Choana, or that being collected in the cavities of *Ossis Sphenoides*, if it pass through the little holes of the Plate of *Ossis Sphenoides*, it may be derived into the spongy bones of the Nostrils.

By what ways the flegm of the nose passes?

The said spongy bone is full of holes being distinguished, with bony Cells, in which small *Caruncles* or bits of flesh are contained, which being swelled, the disease *Polipus* is bred.

Afterward you shall consider the Passage of the Nostrils into the Palate, by these cavities which are distinguished by the *Ossis Vomer*. At the root of the pierygoidean Apophysis, there appears an hole compassed with a Gristle, which is the extremity of that passage, which reaches from the Ear to the Palate, by help whereof Deaf persons hear, if a man speak into their mouth when it is wide open. Also by help hereof the Ear is most easily purged with masticatories.

The passages from the Nostrils to the Palate. From the Ear to the Palate.

The Medicinal Consideration.

Primary dis-
eases of the Skull.
Tumors.

In the Skull, by reason of the space contained between the two plates thereof, hard tumors are bred, and almost of a bony nature; yea, and some are truly bony such as are horns. An hard, full and oblong tumor is called *Iestudo*, of kin to which is the Tumor *Talpa*, which is also called *Topinaria*.

There is another tumor which is termed *Natta*, and grows sometimes chiefly in the Back, which hangs by a small root. This threefold tumor, if timely care prevent not, is wont to grow to a greater Bulk. Horns are wont to grow out in the Skull, the forehead, and elsewhere; yea and upon other bones. I have seen an Horn a finger long, which grew out of the lower part of the Leg, like a spur. Of these kind of Horns *Sennertus* has neatly treated, in the fifth Book of his *Practice*.

Fracture.

Besides these Tumors the *Fracture* of the Skull is frequent, which proceeds from a Violent and external cause. And it is either without or with Contusion.

There is a threefold fracture without Contusion, the first is termed *Diacoep*, when an Arrow or Dart falls upon the Head and pierces deep, the second is called *Apocheiparnismos*, which is a kind of planing and shaving as it were, when a piece of the bone is pared away: the third is termed *Hedra* which is a gap or rafe made by the cut of a weapon.

Kinds of fractures.

A fracture with Contusion, if it be strait and in the bone smitten, and immovable, it is termed *Fissura* or *Rima*, by the Greeks *Rogme*: if it be in another bone besides that which was smit, it is termed a *peichema*, that is to say, a resulting cleft, like the rebounding of an Echo. If the bone be moved and broken, there is a threefold fracture reckoned; *viz.* *engeisoma*, which is a depression of the skull to the Membrane or *Meninx* of the Brain; *Ecpiesma* which is a depression of the said Skull divided into thinner and smaller bits: *Camatoosis* which is a vaulted Elevation of the broken Skull. *Enthlasis* so called, is indeed a contusion but without fracture, being as it were a flexure or bowing of the soft Skull. Which kind of contusion is seen in brazen vessels, as pans and kettles, &c. when they are Battered only and not broken.

Caries
Exostosis.

In the Bones of the Skull we often find a *Caries* and *Exostosis* proceeding from a common cause, but more often from the Whores Pox.

^a T. 15. f. 6. 1.

Chap. 7. Of the Inferior Jaw-Bone.

Its substance.

The inferior ^a Jaw-bone is such as are of years one continued bone, without any shew of division, as far as to the Chin.

Articulation.

Its *Articulation* is very loose, being fastened with an orbicular Ligament.

A *movable Gristle* is spread over the knob thereof, to procure the freer motion.

Within the Jaw-bone there is a crease or Channel cut out, ordained to contain the Vessels, which is separated from the cavity which contains the marrow, that it might afford a small portion of the vessels to every tooth.

Oba. nel.

This Channel of the Vessels is situate in the middle of the Jaw-bone, and is manifest; and therefore *Hippocrates* writ in his Book of the Nature of the Bones, that of all bones only the lower Jaw-bone has veins.

^a T. 15. f. 3. L. ■

Chap. 8. Of the Teeth.

Afterwards you shall with an Instrument made for that purpose, draw out by the roots one tooth of every sort, that you may contemplate the *Roots* and *Ligaments* of the Teeth, and the form of their boles and sockets.

When

When the Teeth are broke, you shall find them stuffed with a slimy substance and with threads, which are the vessels.

The Cavities are more evident in teeth which are withered and dried; it is the best way to compare the fresh teeth and dried ones together, and to observe the difference.

But that you may discern your self and demonstrate unto others the distribution of vessels, *viz.* of little veins, arteries and nerves in the Teeth: you shall take this course. You shall take an Oxes or a Rams nether Jaw (in which these vessels are more apparent) and cut it on the inside, and open it untill the marrow & Nerve appear. The marrow being taken away, and the Membrane of the nerve being torn, the nerve comes in sight, being composed of many little strings, from which certain fine threads and other things resembling veins and Arteries, being wove together, do enter beneath the cavities of the Teeth roots.

The way to show the vessel appertaining unto the Teeth.

To the ^a Dog-teeth and the ^b Cutters a nerve is carried which is more thick than ordinary. To the ^c Grinders according to the quality of their Roots, there is a triple or quadruple very small and exceeding fine nerve distributed.

Then drawing a Grinder or Cutter leisurely out of its hole, you shall see very small fibres inserted into the root of the Teeth, which you shall reckon to be nerves.

The teeth being pulled up clean by the roots, in the lowest part of the said roots, there appears a matter which is partly fibrous, bred of the vessels, and partly clammy, which fastens the tooth into its hole as it were with Glew, by way of *Syffarcosis*. An Ox or Sheeps-tooth being cut asunder in the middelt, the internal substance being clammy, is manifestly interwoven with vessels.

What must be observed in a Tooth that is drawn out?

All these things may be evidently demonstrated in the teeth of an Oxes, Calves, or Sheeps Jaw; they are not so clearly discernable in Man; nevertheless you may perceive the roots of the teeth to be bloody, and that a nerve creeps closely into the Roots. But in dried teeth the roots are hollow.

^a T. 15. f. 6. n n. ^b T. 15. f. 6. m. ^c T. 15. f. 6. o o.

Chap. 9. Of the Bone Hyoides, and of the Ligaments.

There is a Ligament placed under the beginning of the Musculus Digastricus or twibellie; which is produced from the Apophysis styloides as far as to the Angle of the nether Jaw.

The scitnation, colligation and structure of the ^a Os Hyoides ought diligently to be observed in a dead Body, because they cannot be seen in a Skeleton.

The Scitnation of the Os Hyoides.

It is placed in the Throat under the lower Jaw-bone, hanging upon the Apophysis of the Styloides by the help and assistance of Ligaments.

It is made up of five bones, the middlemost of which being the greatest and the broadest, is termed *Basis* ^b *linguae*, from which on either side there shoots forth a little ^c horn, which is for the most part gristly, seldom bony, being fastened to the upper sides of the Carrilago Thyroides, which two little horns are accounted for the sixth and seventh bones.

Its structure. Its fastening.

It is worth our consideration which *Galen* observes in his seventh book of the use of the Parts Chap. 19. How that this same bone is knit and fastened not only by Muscles; but it is fastened by Ligaments and Membranes unto the Apophyses of the Styloides, and to the upper Horns of the Thyroides; lest one Muscle being palsied, that same counterpoise and equability in the motion of the Muscles should be dissolved, whereby it should come to be drawn on the one side more than the other, or slip downwards, which would bring great detriment, and discommodity not only to the voice, but also to the swallow.

Why it has many Ligaments?

Nature providing against this Inconvenience, hath tied and fastened it by four Ligaments to the Stoyloidean Apophyses, and to the Cartilage or Gristle which is called Thyroides,

Howbeit

Howbeit, the Hyoidean Bone does in women appear smaller and thinner, and consists of fewer little Bones, whose use is supplied by the suspensory Ligaments, which in them are longer than in men.

You shall likewise observe that only the Epiglottis is received in the Cavity of Hyoides, the Tongue resting it self upon the upper side of the basis.

^a T. 15. f. 11, 12, 13. ^b T. 13. f. 11, & 12. A A. ^c F. 13. f. 11, & 12. B B.

Chap. 10. Of the Heads Motion, and Ligaments.

which Vertebra
the Head is
moved upon.

THE Head is moved by a straight, or oblique motion upon the ^a second Vertebra, which in its hinder part is a fingers breadth distant from the first ^b Vertebra. And the first Vertebra is so closely and firmly fastened to the hind-part of the Head, that it cannot be stirred, or agitated so much as with ones Hand.

Also the Tooth fashioned ^c Apophysis is so fastly united to the Body of the second Vertebra, that in the bending, and oblique motion of your Head, you may not hurt the Spinal Marrow.

Hence you may be assured of the verity of that Opinion of Vesalius, and other Anatomists, touching the motion of the Head, how it is moved upon the second Vertebra, both in its right and oblique motions.

For seeing the Head cannot be moved with a circular motion upon the first Vertebra, because such things as are moved with a circular motion, ought to rest upon one single Basis. Yet the Opinion of Galen might be confirmed, by that natural growing together of the two first Vertebra's of the Neck, which were joynd and fastened together in a certain Soldier, who having in the year 1611. killed a Man in a Tavern, was hanged, and his body brought into the Anatomical Theatre of the University: where while his bones were boyling to make a Skeleton, it was observed that the two first and uppermost Vertebra's of the Neck, did naturally grow together; yet did he in his life time freely move his head every way, as I have been informed by others. Celsus, before Vesalius and Columbus, described the motions of the Head, in these words:

The upmost Vertebra does altogether sustain the Head, receiving the small processes thereof through two ^a Cavities: whence it comes to pass that the Head is bunched above, beneath, on every side. The second is inserted into the first, for as much as concerns the circuit thereof. The upmost part is terminated with a smaller circle, and therefore the upmost incompassing the second, gives way to the Head to be moved side-long also.

The Ligaments
of the Head.

In the Articulation of the Head, three Ligaments are observed; the one is circular, which compasses the first and second Vertebra within, as far as to the hind-part of the Head.

The other two do appertain unto the Tooth-fashion'd Apophysis: the one fastens the said Apophysis unto the body of the first Vertebra; the other arising from the top of the Apophysis Odontoideis, is inserted into the hind-part of the Head.

Chap. 11. Of the Inside of the Ear.

Three Cavities
of the Ears.

LET us now approach unto the internal Cave of the Ear, which has been inaccessible to the ancient Physitians, and let us diligently survey the admirable Architecture thereof.

There are contained three Cavities within the same, disposed in the scituation and order following. The first is the ^a Concha, the second ^b Labyrinthus, and the third is the ^c Cochlea.

why the Drum
is placed ob-
liquely.

In the Porch of the Concha, is placed the ^d Tympanum, which is not green as PAVIUS imagines, neither is it directly opposed to the external hole of the Ear, but stretched

stretched out slantwaies before the same, lest any small matters should fall, or fly into the Ear, and finding the passage clear and open, should hurt the Drum: Whether any thing be fallen into the Ears, may in such as are living, and have wide Ears, be seen in the Sun, or by holding a Candle near the same.

Now the whole structure of the ^c *Concha* wherein three little Bones, the *Timpanum*; the string annexed to the *Timpanum*, and a *Muscle* are contained, are to be seen at one cast of the Eye in young Children and Infants: The Auricular Apophysis, which is then an *Epiphysis*, being pluckt away with the point of a Penknife; which must be done within the Skull.

The parts of the *Concha*.

But in grown men, which are come to maturity, all these cannot so well be seen and demonstrated, because whiles the *Ossis Lithoides*, is cut up towards the hind-part of the head, it is impossible but that somewhat appertaining to the internal structure of the Ear should be pulled in pieces.

The way to show the parts of the Ear

And thus you shall break the *Ossis Petrosam*, the Marrow of the Brain being taken away, and the Ear pluck'd up by the Roots, and the circumjacent flesh being removed.

The *Ossis Lithoides*, comprehending the *Ædifice* of the Ear, you shall cut a sundet with very well-steeled, & extreme sharp Knives, beginning at the external passage.

Then having pulled back the vaulted roof of the Ear, that is to say, having taken off the upper part of the *Ossis Lithoides*, you shall see the three little Ear-bones viz. The *Malleus*, or *Mallet*; the *Incus*, or *Anvil*; and the *Stapes*, or *Stirrup*.

The Mallet, Anvil, and Stirrup.

^a T. 20. f. 7. B. & c. ^b f. 9. B. B. ^c f. 9. A. A. ^d f. 4. 5. B. ^e T. 8. f. 6, 7, 8, & c. ^f T. 20. f. 7. A. ^g f. 7. B. ^h f. 7. C. ⁱ.

Then you shall see the ^a Drum with its string, and small Muscles fastened to the little bones, both within and without the Drum; which are indeed more plainly to be seen in other living Creatures, than in Men.

For in Men you can discern only one Muscle, which is seated on the left side of the internal Ear towards the hind-part of the head, being fastened to the little head or the Mallet or Hammer.

The Muscles.

But there are found two Tendons, or other Ligaments; one which staves the tail or handle of the Mallet; and a second which is fastened to the upper corner of the Stirrup.

The Ligaments.

A string, or little Nerve, is stretched out upon the Mallet, that it may hold and stay the Mallet upon the Drum.

The Drum string.

Moreover, in a Skull newly boyled or dried, you may discern the three little Ear-bones within the *Concha*. If you shall peep in toeright into the external passage, and hold your Eye close, with benefit of a clear day-light, or of a Candle, you may draw the said little bones every one of them out with a pin.

Chap. 12. Of the Clavicula.

The *Clavicula* in its ^d Articulation to the Sternum, has a soft *Cartilage*, or *Gristle* interposed, that it may more easily give way, in motions of the Arm and shoulder-blade.

The Gristle of the Clavicula.

You shall observe why it is formed after the manner of an Italian S. The *Claviculae* are tied and fastened together, by the Mediation of a strong Ligament.

Its Ligament.

Chap. 13. Of the Brest-bone.

The Sternum, or Brest-bone, is in persons come to years, of a bony ^c substance but different in Nature from the rest of the bones, because it is of a reddish colour.

^a T. 20. f. 4, & 5. B. ^b T. 21. f. 1. B. B. f. 2. A. ^c T. 10. f. 1. A. A. T. 8. f. 2. A. ^d.

Of how many
particular bones
the Breast-bone
is made up.

Galen will have it compounded of seven Bones, so as that the several bones of the Breast do by way of mutual articulation, answer to the several true Ribs, which *Hippocrates* seems to confirm. The Breast-bone^a growing together in it self, has oblique discriminations, there where the Ribs are fastened unto it. Howbeit in persons grown up, there are three, seldome four divisions remaining in the Breast bone.

Valverde saies that the Breast bone is compounded for the most part of six or seven bones, which in elderly persons, do so grow together, that it seems composed, only of two or three Bones.

Sometimes also, although very seldom, it consists of eleven bones, as I saw at *Rome* in the year 1554. in a Girl about seven years old, this bone divided into six bones, of which the five last were cut from the bottom to the top, through the length of the Bone.

Bartholomew Enstachius adds, how that it many times falls out, which none has yet observed, that the bones of the Breast bone, the first and last excepted, viz. all the middle ones, or at least some of them, are divided by a most evident line, sometimes streight and sometimes crooked, through the middle, long-ways: by which means it comes to pass, that the Breast bone is reckoned to consist frequently of ten, nine, seven, or eight bones.

The Hole of
the Breast-bone.

Sometimes the Breast bone is pierced through the middle with a large Hole, which was observed by *Sylvius* and *Enstachius*, being transmitted for the transmitting of Vessels. I have my self often observed the same, especially in women.

In one woman the hole was so large, on the inside of the Breast bone, as that a man might put his little finger into it, and her Chest did consist of thirteen Ribbs on each side.

^a T. 10. f. 2. A. A. T. 8. f. 2. A. ¶

Nicholas Massa brags that he was the first observer of that Hole in the Breast bone, that somewhat might thereby breath forth of the *Mediastinum* and the neighbouring parts of the Breast, or rather to give passage to the *Vena Mammaria* which is spread and branched forth into the Duggs.

In large-dug'd & corpulent women, their large dugs being removed, I have observed the Breast bone to be sharp and the Breast narrow, which was the cause of shortness of breath in such women, the which narrowness of Breast was caused by the weight of their Duggs.

The Natural
shape of the
Breast bone.

That representation of the Breast bone as branched or jagged, is not true nor natural: for the Breast bone according to *Galen* resembles a Dagger or Sword, whereupon the whole Bone is by some termed *Xyphoides* or sword-like bone.

The Gristly^a Branches being taken away from either side, which are parts of the Ribs, the Haft of the Dagger or sword Handle, will be in the upper part, and its point in the Cartilago^b *Xyphoides*.

Of the Carti-
lago Xyphoides.

The figure of which *Sword-like Gristle* or *Cartilago Xyphoides*, by such as are diligent observers, is found to be various: for sometimes it is single and triangular, sometimes it is double, & like the Herb *Hippoglossum*, Horse tongue or Tongue wort it has the larger part resting upon the smaller: sometimes it is tripartite and resembles a Trident; and other whiles it is bipartite resembling a Fork or Rake.

Nicholas Massa saies that the Barbarous writers call it *malum Granatum*, the Pomgranate, as resembling the flower of that Apple.

Its Use.

Galen conceives that it is placed there to defend the stomach and the Septum Transversum. But because the stomach is far distant therefrom, it seems to be framed only for the midrifs sake, or rather to hold up the Liver, fastened thereto by a ligament.

Its Hole.

Amatus Lucitanus, in the 95. Cure of his fifth Centure, observes that the Cartilago *Xyphoides* is bored through for perspirations sake, that the filthy vapors of the stomach might by that hole breath out; which is a simple conceit.

^a T. 8. f. 2. C. C. ¶ ^b T. 8. f. 2. B.

For unless the Cartilage is bipartite, it is perforated to give passage for the vena *mammaria interna*, and in wounds if there be no hole in the Breast-bone, it is found in the *Cartilago Xiphoides*.

This Cartilage being pressed down and crooked in, does so hurt the Liver being seated beneath it, that Infants are by that means killed with an Atrophy or Consumption, and in grown persons it causes perpetual vomiting, until it is reduced to a natural posture.

Its crooking.

Chap. 15. Of the Ribs.

Every Rib does consist of a twofold substance, the one of which is ^a bony, which makes up the greatest part of the Rib; the other is ^b gristly, of unequal length, which is joynd to the Breast-bone, by that sort of Articulation which is called *Arthrodia*, that in the rising and falling of the Chest, it may yield more easily. But they have another articulation with the vertebra's of the Back-bone which is twofold in every Rib.

Twofold substance of the Ribs.

Now there are seven, which are called true and perfect Ribs, because they are joynd to the Breast-bone by way of *Arthrodia*; unto which sometimes an eighth is added, which has been found more than once in the dissection of some bodies, being fastened to the Root of the *Cartilago mucronata*.

The true Ribs.

And this is the Cause why *Aristotle*, whom *Pliny* thought it no disparagement to imitate, has reckoned up sixteen true Ribs.

The five lower are called ^d *Bastard* and *Imperfect Ribs*, because they do not reach unto the Breast-bone, but are terminated in a long Cartilage which is reversed upwards, and so grow one to another.

The Bastard Ribs.

^a T. 8. f. 2. 1. 2. 3. &c. ^b T. 8. f. 2. C. C. ^c T. 8. f. 2. 1. 2. 3. 4. 5. 6. 7. ^d T. 8. f. 2. 8. 9. 10. 11. 12.

Chap. 16. Of the Back-Bone.

The Muscous flesh wherewith the Back-bone is covered being removed, its admirable figure is easily discerned, which is partly streight and partly oblique, sometimes bending inward and sometime outward, which *Hippocrates* first discovered, and *Duretius*, *Hippocrates his Ghost* has described in *Coackis*.

The shape of the Back-bone.

Every where between the vertebra's, a thick cartilage is placed in the middle like glue. *Galen* in his Book *de Ossibus*, writes that it is an hard and in some sort Glistly Ligament.

The Gristles of the Vertebra's.

All the vertebrae or turning Joynts of the Back, are covered on the outside with an hard membrane; and within they have a strong membranous ligament, drawn along from the highest vertebra as low as to the *Os sacrum*, which is there placed and wrapped about (besides two other membranes) to defend and preserve the spinal Marrow.

Their Membranes.

I have often found in bodies that were hanged and burnt, and have been informed by the Executioner, that it is a ridiculous fable, which the Cabalists relate of a certain Vertebra, viz. that in the Back is found a certain Vertebra which they have termed *Luz*; out of which as from a seed, the Bones shall be regenerated and spring up at the General Resurrection. This Bone *Luz* so called, *Cornelius Agrippa* and *Vesalius* will have it to be in the Foot.

A fable of the Cabalists touching a bone which they call Luz.

Howbeit *Hieronymus Maginus* in his fifth Book *de Executione Mundi*, relates that *Adrianus* learned experimentally of *Rabbi Joshua Ben Anime*, that the fore-said Bone is one of the Vertebra's of the Back.

For he found in the Back-bone, one bone that a millstone turning upon it would not break, the fire could not burn it, the water would not dissolve it, and at last being laid upon an Anvil and smitten with a sledge or smiths-hammer, it was so

far from being broken in the least, that the Anvil was crackt and the Sledge broken the Bone receiving in the mean while no detriment. Which is as false as false can be. For all the Vertebrae, may be broken in pieces, burnt and reduced to ashes.

Whence we may judge what credit is to be given to the Cabalists, who in things manifest, do impudently mock and abuse us.

The structure
of the Loins.

If Aristotle had observed the structure of the eleventh or twelfth vertebra's, he would not have written in his third Book *de part. Anima*, That the Back is fleshy, but the Loins without flesh, because the Bending-places of all parts are void of flesh.

But the Loins are more fleshy than the Back. But the Articulation of the twelfth vertebra is different from all the rest, being the Cause of all Motion which is performed thereupon, for both above and beneath, it receives, and is not received, as is observed, in other Articulations of the Vertebrae.

Crupper-bone.

From the Loins you shall descend to the *Coccyx* or *Crupper-Bone*, and you shall observe its structure consisting of three bones, its spongy reddish substance and triangular shape.

Which part we read does in some Nations sprout out like a tale. *Pliny* records in the 22. Chapter of his seventh Book, that in *India* there is a race of men that have hairy tails, and are incredible swift. And *Paulus venetus*, in the 28. Chap. of the fifth Book of his *Travels*, does avouch that in the Kingdom of *Laombri*, there are men that have Tails like Dogs a span long: who dwell not in Cities but in Mountains.

The *Nabienian Arabick Geography* mentions a tailed Nation, in that Island of the Eastern seas which is called *Namaneg*. Page 70. I suppose that it is but a fable which Historians relate touching the *Kentish-long-tales* in England, how that God to revenge the Injury done to *Tho. Becker* the Archbishop of *Canterbury*, caused Tails to sprout out of the *Kentish* Crupper-bones.

When the Crupper-bone suffers a Luxation inwards, a man cannot (according to *Avicen* draw his Ankles, towards his buttocks, neither can he bend his Hams, which is confirmed by the Experience of *Ambrosius Partus*. This Impediment is caused by compression of a very thick nerve seated on the hind-side of the Leg, which creeps along near the Crupper-bone. The said bone is easily reduced, by a mans finger put into the fundament.

The way to
disselt the ver-
tebra's of the
Back.

In the next place you shall fall to dissect the Vertebra's of the back, that you may contemplate the admirable fabrick of the spinal Marrow, viz. how in the extreme parts thereof the nerves are parted, ending in the shape of an Horse-tail; by reason of millions of little nerves woven together, which being agitated in water and dishevelled, do express the shape of an horses tail.

Now you shall dissect the Vertebrae in this manner; Having taken away all the ribs at their joyns, you shall fasten the Back-bone to the table with two iron hooks above and beneath your section, as joiners are wont to fasten their boards. Then with your incision knives you shall forcibly cut on every side about the conjunction of each Vertebra, in order cutting off every vertebra, with their oblique apophysis which help their articulation, till you come unto the *Os sacrum*. This is a painful work; but he that would eat the kernel, must of necessity crack the shell.

Before the fistula off: a be cut off to discover the spinal marrow: a few things are to be premised touching the natural constitution of the spinal marrow, and the Origination of the Nerves.

The natural
constitution of
the spinal mar-
row.

The *Spinal Marrow* springs from the Brain and pettie brain, and though it appear like the marrow of the Brain, yet is it in some things unlike, because softer and besides its two membranes propagated from the Menings, wherewith it is insolded, it is incompassled with a third membrane strong and nervous, which hinders the spinal marrow from bruising or breaking, when we stoop or any waies bend our Backs. I am not certain whether or no, that same membrane which is propagated from the *Crassa Meninx* have any pulsation: nor whether the spinal marrow be divided into two cavities according to the length of the back-bone as far as the loins.

Certain it is, that the spinal ^a marrow descending by the ^b fistula ossea, grows continually

continually harder, and smaller, till it come unto the Loins, where it spends it self into little ^c cords, and springs resembling an horse-tail; that in that part where it suffers violent motions, it might be out of danger of breaking.

The *Nerves of the spinal Marrow* are made up of divers little threads, fastened one to another, and contained in the tenuis *Meninx*; which little filaments of thready substance, do rise so much the higher, by how much more the spinal marrow descends.

And that nature might by all means possible provide for the security of the Nerves; when they come forth of the holes of the vertebra's, she has compassed them about with a thick substance, which does so closely and firmly knit and bind together the fibres of the nerve, that they cannot be drawn asunder one from another.

After which knot and egress, they are easily separated. But I beseech you observe the cunning Industry of Nature in the going forth of a nerve. Which that it might be less subject to rupture, seeing that it is as yet clothed only with the tenuis *Meninx*, she has not drawn it through that hole which is nearest its original, but through a lower, which when the nerve has passed, it does not go unto the next rib, but descends to a lower, which when it has reached, it is divided into two, and turns back the lesser branch towards the spina, and carries the greater to the fore parts.

Its Originals

Progress

^a T. 18. f. 5. A. ^b T. 2. f. 2. a. &c. ^c T. 18. f. 2. v. ^d T. 24. f. 9. &c. 10. &c.

It is a Question amongst Anatomists how the Animal faculty can with the spirit be carried through the Nerves into the whole Body; because in none of the Nerves except the optick, there is found any hole or pore or spongy substance; but we find them all solid, woven together of many small threads according as the Bulk and magnitude of every one requires.

How the animal spirit is carried through the Nerves?

Casalpini in his 5 Book of *Peripatetic Questions*, suppose that those little threads are a multitude of small Veins and Arteries, which make up one body as it were a sagot, being continuations of the Branches of the *Rete mirabile*, which may be imagined, but cannot be demonstrated; or at least that between the little membranes of every nerve, a very thin animal spirit is diffused which runs swiftly to the utmost parts of the limbs.

But I see not how *Casalpini* can demonstrate such a continuation of the *Rete mirabile* with the Nerves of the spinal marrow.

Out of the spinal marrow ^a 28 pair of nerves do take their Rise, seven out of the Neck; twelve out of the Back; five out of the loins; four from the *Os sacrum*, the branches whereof to search out, is a wearisome piece of work, and must be done in a dead body provided for that intent alone, and with diligent Inspection.

How many Nerves proceed from the spinal marrow?

^a T. 18. f. 1. D. I. K. &c.

The Medicinal Consideration:

The dignity of the spinal marrow with reference to the necessity of life, is equal to that of the Brain, and therefore *Hippocrates* termed it *Aion*, because he believed that the vitality of the animal was placed therein; as *Erosianus* proves in his *Onomasticon* and after him *Foesius* in his *Oeconomia Hippocratis*.

The Dignity of the spinal marrow.

Plato in his *Timæus* does acknowledge the spinal marrow to be the foundation of Life beneath the Head. And *Hippocrates* himself teaches that men have most grievous sicknesses and hard to cure arising from the marrow of their Back: for a fluxion thereinto causes a consumption, and its drying up and withering is a grievous disease, and a man dies if the marrow of his Back be wounded. In a word, *Hippocrates* in the 2d of his Predictions saies, That if the spinal marrow be diseased, either by reason of a fall, or upon any other occasion, or its own accord, the Patient becomes both lame in his Thighs, so that he feels not when he is touched, and also in his Belly and

and

and bladder impotent, so that at first he voids neither Urine nor Dung, save upon meer necessity: but when the disease grows older, both Dung and Urine come away of themselves, without any forcing of the Patient, and a short while after he dies the death.

From a flux into the Back-marrow an hidden and undiscernable Consumption arises: but when it flows back into the Vertebra's and the flesh, a Dropsie is ingendred; so saies Hippocrates in his *Book de Locis in Homine*. How the consumption of the Back proceeds from the Marrow, the same Hippocrates does accurately teach us in his 2. *Book De Morbis*.

The natural figure of the Back-bone.

Before we declare the Diseases of the *Ossa fistula*, I must shew you the natural figure of the *spina* or Back-bone, which is *Isthuscolios* streight bow'd through the whole length of it: but in the Neck and Loyns it is *Isthuslordos* streight bowed inward, in the back it is *Isthuscuphis* streight bowed outward, and therefore it is easie to declare the diseases which vitiate the Back-bone, such as are *Lordosis*, *Cuphosis*, *Scoliosis*, and, *Seisis*.

Diseases of the Back-bone.

Lordosis.

Lordosis, is a disease of the Back-bone, when the vertebra's thereof, are out of their place, and turned inward or forward.

Cuphosis.

Cuphosis, is a disease of the Back-bone, when its Vertebra's are disapointed and turned outwards or backwards.

Scoliosis.

Lordosis happens in the Back, as *Cuphosis* in the Neck and Loyns.

Seisis.

Scoliosis is a crooking or wreathing the Back-bone to one side.

The cause of *Scoliosis*.

Seisis is such a Commotion of the Vertebra's of the Back bone, as that they remain indeed in their places, but so as their frame and fashion is disordered.

Scoliosis is the Inclination of the Back bone to one side or another, when we go, depends upon some fault in the twelfth Vertebra of the Back, where the motion of the Back bone is performed.

This Vertebra is received by its Neighbours above and beneath, and does not receive, as all other Vertebra's do beside.

For it is joynted not by way of *Gynghimus* but by way of *Arthrodia*; and therefore if its Apophyses either upper or nether shall be depressed; it cannot sustain the Trunk of the body bolt upright in motion, but it must of necessity lean to one side or another; and this fault comes to People when they are Children, either being brought into the world with them, or caused by ill carrying, or by reason of the softness of those Vertebra's while the Child is forced to use its Legs sooner than is fitting.

I have shewed another cause of halting according to *Galen's* Doctrine in my *Chapter of the Thighs*. Those two causes of halting are irreparable and incurable. The Luxation of the second Vertebra of the Neck, causes a Squinzie, which in few hours does choke the Patient, because it cannot be restored into its place.

The diseases of *Os sacrum* are of great moment, whether they be tumors or ulcers, by reason of its natural constitution, the whole bone being in a manner spangy, fibrous, and perforated within and without: and therefore when this Bone is Diseased, the Patient is in danger of his life, as Hippocrates observes in his *Book de Glandulis*.

In his *third Book De Fracturis* he gives us to understand, that the *Os sacrum* being exulcerated, is not cured without very great difficulty, which *Galen* also confirms in his *Comments*. *Langius* in his *Epistles*, relates, that he saw two gallant Gentlemen worn away with incredible raging pain, their *Os sacrum* being putrified: so that in conclusion they consumed away and died.

Chap. 16. Of the Scapula.

Its Articulation with the Brachium.

Having diligently viewed the Trunk of the Body, you shall proceed unto the Limbs; and you must principally observe the Articulation of the ^a Scapula or Shoulder-blade with the ^b Arm, which is made by the way of *Arthrodia*, by the coming

coming between a most thick and nervous Ligament, which does round about embrace the whole Joynt.

Also four muscles, viz. the ^c *Supraspinatus*, ^d *infraspinatus*, the ^e *Rotunda minor*, *Its Muscles.*
and ^f *Subscapularis*, do with their broad tendons encompass the said joynt.

The Cavity of the ^g Head *Omniscapole*, being not sufficiently proportionated to receive the Shoulder: which was so contrived to make the motion more easie and free, but is augmented with a Gristle which crowns the Lips of its Cavity. *Its Cavity.*

Then you shall discover under the ^h *Deltoides*, a broad and remarkable Ligament, *Its Ligament.*
which reaches from the Shoulder-tip as far as to the *Coracoides Apophysis*, that it may hold in the Arm aloft, to prevent Luxation upwards.

Afterwards you shall observe the extremity of the ⁱ *Clavicula* articulated with *Its Articulation with the Clavicula.*
the Shoulder-tip or *Acromium*, which is therefore termed *Catapletis*, although *Galen* in the 12. Chapter of his *Book of the dissection of Muscles*, does call the first upper Rib by that name, because its placed beneath the *Clavis*. *Ruffus Ephesius* calls the *Acromium*, the coupling-band of the *Clavis* and *Scapula*: but *Eudemus* saies that it is a very little Bone, which in children is a most exact gristle, which though in process of time it degenerates into a bone, yet until they be 18. years old, it retains much of the substance of a gristle contrary to the nature of all the other bones. Some whiles it grows so highly together with the spine of the *Scapula*, that in a person of middle age wrestling or exercising, it may easily be separated, which happened to *Galen*, as himself tells us in his first *Book de Articulis*.

The like accident he observed in another, as he relates in *Comment. ad Part. 1. Sect. 1. de Officina*. *Hippocrates* himself takes notice of the Luxation of this Bone, in his *Articulis*: where he saies that the *Acromium* or shoulder-point is of a different nature in mankind, from that which it is in other creatures.

T. 21. f. 1. A. ^b T. 21. f. 1. C. ^c T. 22. f. 3. A. ^d T. 22. f. 3. B. ^e T. 22. f. 1. & 3. C. ^f T. 22. f. 1. D. ^g T. 21. f. 2. c. ^h T. 22. f. 1. A. ⁱ T. 21. f. 2. ^b

Upon the Neck of the scapula rests an ^a *Apophysis* which in children is an *Epi-* *The use of the Apophysis Coracoides.*
physis: from the likeness to a Crows Bill or an Anchor, it is termed *Coracoides* and *Ancuroides*. It prohibits the shoulder from slipping out on that side, according to *Galen* in *Cor.* in part. 1. *Sect. de Art.* and therefore it was framed for the security and strength of the Articulation.

For when the Actions of the Hand and Arme are forwards, the shoulder would easily be unjointed, unless it were retained by the *Coracoides*: and therefore the laxation of the shoulder is seldom towards the forepart; *Hippocrates* did observe it once, and *Galen* saw it five times at *rome*, as he himself relates in his *Comment: ad Part. 4. Lib. 7. de Articulis*.

Now the parts of the *Scapula* he thus distinguished: as much of the whole *Com-* *The parts of Scapula how named by Galen.*
missure or *Joynting*, as is subject to the sight he called *Omos*; and that part which is under the knitting of the shoulder, he called *Eponos*, which we term *Acromion*: and that broad part of the *Scapula* which is scituate behind, and is covered with muscles, is by *Galen* termed *Omsplata*.

From this place we may gather & fish out the Interpretation of an obscure passage in *Cornelius Celsus*, in his eighth *Book*. Again from the Neck two broad bones on either hand do go unto the *Scapula*, our Countrymen call them *Scapula aperta*, the *Greeks* term them *Omsplatas*, *Celsus* calls them *Scapula aperta*, because they flick out like boughs of Trees, and are scituate in the upper part of the Chest. For the tops of Mountains were by the ancient Latins termed *Scopula*, which *Tertullian* in his *Book de Pallio*, calls *Monsium Scopularum*. Also the small branches of trees were called *Scopi*, hence the phrase *Uvarum scopi* vine branches used by *Varro* in his first *Book de Re Rustica*. *Cato* speaks of *Scopula myrti* Myrtle branches.

It is worth observation which Women by long experience have learned, viz. that broad shouldered Men do for the most part beget great Children, because they are very hot hearted. And *Galen* saies in his *Ars parva*, that by how much the Heart is hotter *whether broad shoulder'd beget large children.*

ter, by so much the Chest is larger. And therefore *Foreſtus* his Wives Mother, would not marry her daughters to broad breſted and broad ſhouldered Men: for ſhe was afraid left they ſhould die in their travel by reaſon of the largeneſs of their Children, which *Foreſtus* ſaies he had often ſeen come to pais in the 70th Obſervation of his 28. Book.

Why French
maidens have
their right
ſhoulder higher
than the left?

The Cauſe of this is hard to aſſign as of another inconvenience, with which the young maids of *France*, eſpecially the Gentry are infeſted: Whoſe right ſhoulder is frequently higher and fuller than their left: ſo that among an hundred Virgins you ſhall hardly find ten that have well proportioned ſhoulders.

Whether it is cauſed by the more frequent and ſtronger motion of the right arm, whereby the ſhoulder blade is widened, and raiſed up, by means of the interjacent muſcles liſting themſelves up. And thereunto that in perſons that are grown up; the right ſhoulder is more heavy than their left, if we believe *Amatus Lacitanus* in the laſt Cure of his 4th Centure.

Why ſo few
that can uſe
both hands
alike?

Why is the right Hand ſtronger than the left? and why are theſe ſo few Ambodexters that can uſe both hands alike? Is it becauſe the Lungs and Liver do incline more to the right ſide than to the left? Or is it becauſe Nurſes when they teach children to go, do draw them on by the right hand.

Is it becauſe Mothers would make their daughters low ſhouldered while they ſtudy to make them ſmall and waſp-waſted? For as *Terence* long ſince ſaid, if a Girl have a good habit of Body and burniſh a little, they ſay ſhe is a champion or wraſtler, and therefore they pinch their bellies and withdraw their food, and though naturally of good conſtitutions, they never leave tampering till they make them like Bull-ruſhes; mere waſp-waſted Ruſh Candies. Which is done, not without manifeſt detriment to their Health; while by the overgreat pinching in of the lower part of their Cheſt, the upper parts thereof are enlarged, whence proceeds that ſame ſticking out of their ſhoulders, or from contorſion of the Back-bone, its natural ſhape is vitiated and depraved.

Chap. 17. Of the Humerus, Cubitus and Radius.

The ſhoulder-
hole.

IN all ſhoulders about the middle and inward part towards the Ribs, there is a manifeſt open hole tending downwards, and evidently piercing into the ſubſtance of the bone, through which a remarkable vein does inſinuate it ſelf into the cavity of the bone, that it may nourish the inner Marrow; whence it comes to paſs, that the whole marrow of this bone appears bloody when the bone is broke.

Its Ligaments.

The Articulation of the ^a *Brachium* with the ^b *Cubitus*, is faſtened and incompaſſed with a membranous and nervy *Ligament*.

Why the Ra-
dius is joined
to the Cubitus?

The ^c *Radius* is adjoined to the *Cubitus*, that it might direct the oblique motions of the Arm, which are performed downwards and upwards, which motions, having taken away the Muſcles, you may obſerve, by turning the *Radius* to and fro backwards and forwards.

Why they part
our from ano-
ther.

The ^d *Cubitus* and the ^e *Radius*, do in the middle way part one from another, that the *Radius* in a ſemicircular motion, might be more freely moved, and that a larger ſeat might be afforded for the muſcles, which in that part are many.

^a T. 21. f. 1. C. ^b T. 21. f. 1. D. ^c T. 21. f. 1. E. ^d T. 21. f. 2. c. ^e T. 21. f. 2. d.

Why a Liga-
ment is inter-
poſed?

Between this ſpace there is interpoſed a membranous ^a *Ligament*, by help of which the *Cubitus* and *Radius* are more neatly and ſtraightly combined, and the interior muſcles are ſeparated from the external. It helps alſo the equality of their motion, that both might be bent, or ſtretched outright at one and the ſame time.

The Articula-
tion with other
Bones.

Theſe two Bones are in their extremities faſtened together, by a very different joint; above, the *Cubitus* receives the *Radius*, but beneath, the *Cubitus* is receiv-

ved

ved by the *Radius*, the Bulk and thickness of the substance being changed. For the *Radius* is at the wrist thicker, that receiving the greater part of the wrist, it might more conveniently move the same by an oblique motion. But the *Cubitus* at the *Brachium* is broader, because that bone alone is articulated with the *Brachium*; the Articulation of the *Radius* with the knob of the *Brachium*, is thin.

Lastly you shall observe, whether or no the *Syloides*^b *Apophysis* of the Cubit do touch the wrist, being fastened thereunto by way of a joynt. *Hippocrates* observed the external part of the Cubit to be dislocated, in *Lib. de Artick.* Which kind of Luxation *Dalechampius* observed, as himself avers in his *Comments* upon the *Surgery* of *Paulus Aegineta*.

They who deny that the Cubit in a Man does touch the wrist, do allege that there comes between them a thick and moveable Gristle, which fills that space; and in very deed that same Cartilage or Gristle, seems to be adjoynd by way of a supplement.

Chap. 18. Of the Wrist:

The ^c wrist and ^d *Radius*, are joynd one to another by a nervous Ligament, which infolds the Articulation.

Moreover another ^e *Nervous Ligament*, is observed, being Chap'd like a Ring, which compasses the wrist round about, which contains within it the tendons which are carryed through the cavity of the wrist, and which lie upon the back of the wrist, saving some particular ones; howbeit on the outside it seems small.

^a T. 22. f. 2. cc. ^b T. 21. f. 1. ^c T. 21. f. 1. FF. ^d T. 21. f. 1. D. E. ^e

The Wrist ^a bones are eight, disposed into two orders or ranks.

The first order consists of three bones.

The second is made up of four bones. The fourth bone is over and above, out of rank and order; but we may with *Sylvius* refer it to the first order, seeing it rests upon the third bone of the first order. Howbeit *Vesalins* accounts it a *Sesamoidean* bone, because in this place it fills an empty space. But how can it have the use of *Sesamoidean*, seeing it is not interposed between Bone and Bone? It hangs over another, that it might form that cavity, which is in the inner part of the wrist, and to this bone the Muscle *Cubitus flexor carpi* does adhere.

The three wristbones of the first order, being joynd together, do make a cavity, which receives two Bones of the second order, which being joynd one with another, do make the joynts Head; whence you may know that the first order is obscurely moved with the second, and that ^c the articulation is by way of *Artrodia*, and in a dead body, having taken away the tendons, you may discover this motion.

The rest of the wrist bones, being articulated with the *Metacarpium*, do cause no motion at all, or a very obscure one. It is very rare to find nine bones in the wrist; howbeit some have found so many.

Number of the wrist bones.

Their Articulation.

Chap. 19. Of the Metacarpium, Fingers and Sesamoidean Bones.

After the wrist follows the ^b *Metacarpium* which is framed of five bones, if we believe *Celsus* and *Ruffus*, whom *Plinie* does favour, when he attributes only joynts unto the Thumb; *Lib. 11. Cap. 43.*

^a T. 21. f. 3. ^b T. 21. f. 1. HH. f. 2. G.

Galen does better, who separates the first bone of the ^a Thumb, from the *Metacarpium*, because it is joynd to the wrist by an *Artrodial Diathrosis*, with evident

Of how many bones the Metacarpium consists?

dent motion. But the bones of the *Metacarpium* are articulated to the wrist by way of *Synarthrosis*, without motion. Add hereunto, that this bone is shorter than the bones of *Metacarpium*, is not conterminous to them; has a contrary situation and a different motion.

The bones of
the Thumb.

For the *Thumb* is termed *pollex a pollendo*, because it alone is equivalent to the other four fingers. That it might be strong and substantial, it was requisite that it should have three bones; and that it might perform manifold and strong motions, it has peculiar muscles and they are affixed unto the first bone. When the *Athenians* would render the *Aginetæ*, their emulators, wholly unfit for warfare and Navigation, they cut their *Thumbs* off. And we call such as are cashiered for their cowardize: *Polletrunci*, thumb-les companions. They were by the antients in way of meriment termed *Murei*.

The *Metacarpium* therefore is compounded, only of four bones, two of which are immoveable, the other two which are under the ring finger, are manifestly moved.

In that same space where the *Thumb* is joyned to the *Brachialis*, there is a certain cavity, in which the *Arabian Caucery* was usually celebrated, which is largely and elegantly described by *Gesnerus* in his *Appendix to the Art of Chirurgery*.

And it is no wonder if some at this day undertake to cure the venereal Pox, by applying mercurial water to this part, which eats through the skin, and peices to deep as to flux the patient.

The Ligaments
of the Hand.
The Sesamoid-
an Bones.

In the hollow of the hand, a *transverse ligament* is observed, which connects the row of fingers to the bones of the *Metacarpium*.

^a T. 21. f. 1. GG. f. 2. H.

Within the palm of the Hand you shall find divers *Sinewy Ligaments*.

There are a few *Sesamoidan* bones found in the inside of the Hand. There are none in the outside. They are found hidden among the first joyntings of the fingers.

The *Thumb* in its second and third joynt has some *Sesamoidan* bones; in the first joynt it has none.

The way to find
those bones.

Now to find the *Sesamoidan* bones either in the hand or foot, you shall this do. You shall so cut out the tendons that stretch out the fingers, that you be careful not to take away the cartilages of the joynts which are under them, which may seem to be the *Sesamoidan* Bones.

Under these Tendons, most frequently in the hand, especially in hard bodies, you shall perceive a certain hardness sometimes gristly, sometimes bony. Then you shall cut cross-waies the Ligaments of all the joynts, until you make them appear, their inside in the hand, their outside in the foot; in which side, you shall find the *Sesamoidan* bones; having first cut asunder the ligaments wherewith they are infolded, or drawing them a little back, upwards towards the roots of the fingers.

Chap. 20. Of the Os ^a *Ilium* and ^b *Thigh-bone*.

This Ligaments

From the Arms you shall proceed unto the inferior Limbs.

Between the *Os sacrum* and the *Tuberos* banching out of the *Ischiun*, there intercedes a *great and strong Ligament*.

Beneath the seam or growing together of the share-bone there is another *Ligament* stretched out.

And a ^c *Circular Ligament* comprehends the Articulation of the *Thigh* with the socket of *Os Ischij*, which being cut away, another ^d *Ligament* somewhat long and bloody appears.

^a T. 2. f. 3. & 4. A. & c. T. 21. f. 2. A. ^b T. 21. f. 1. K. f. 2. C. ^c T. 21. f. 7. aa.

^d T. 21. f. 7. b.

The said bloodiness is caused by reason of certain little Veins which creep through

through the *Acetabulum* of the Huckle-bone.

That same Ligament which is brought out of the top of the thigh-bone, is fastened and strongly driven into a cleft which is in the foreside of the *Acetabulum*; which being relaxed, and drawn from its place, there falls out such an halting as is incurable; in which the Thigh, though perfectly put in Joynt, will still slip out again.

That same *tuberculum Coxarum*, *Pthipsis ischiadica*, mentioned by *Hippocrates* in his Book *De morbo Sacro*, and elsewhere, it is worth your observation; when by reason of an Impostume or a fluxion into the Hip-bones Cavity or *Acetabulum*, the Ligaments corrupt and putrifie, and the Hip grows lank and lean: It was an ingenious observation of *Hippocrates*; all Bones vitiated, cease to grow; if the part containing be corrupted, it infects the part contained; wherefore if the Huckle-bone be corrupted, the Thigh-bone cannot remain untainted; which disease I have often observed.

Consumption of the Hip.

The oval hole of the ^a Huckle-bone called *ibnroides*, from its resemblance of a door, is ascribed unto the share. It was contrived for lightness sake, and is exactly covered with an hard membrane, which does sever the *Musculos obturatores*, which rest on either side thereupon.

The oval hole of the Huckle-bone.

That is false which *Aristotle* has written in his fourth Book of the *Live-nights*, Chap. 10. that no four footed Beast has Huckle-Bones.

In the Thigh bone you shall observe the ^b shape thereof, bunching out on the foreside, and saddle-fashion'd behind, for the convenience of sitting and firm walking. Which figure *Hippocrates* observes in his Book of *fractures*, and advises when this bone is broken, that care be taken to preserve the same.

The natural shape of the thigh.

For such whose Thigh bone is straiter than it ought to be, are crook-leg'd, and are lame in their knee; and they cannot stand nor go without trembling.

^a T. 2. f. 3. & 4. B. ^b T. 21. f. 1. K. f. 3. G.

But they whose Thigh bones are very crooked, they stand more firmly either on one Leg or on both, than they who have strait Thigh bones.

The neck of the Thigh bone, is somewhat long fashioned and oblique, that it may pass along the Tendon of the *Rotator Infernus*. But *Galen* supposes it was made for that end, *viz.* to leave space for muscles, which were to be placed in the lower part, and for great Veins, Arteries, nerves and kernels, which are quartered near the divisions of the Vessels.

The neck of the Thigh-bone why long-fashioned.

They whose Thigh bone is shorter necked than ordinary, have their groyns narrow and compressed, and when they walk are constrained to halt on one side, and are termed *Vatij*. So saies *Galen* in his third Book de *Usu Partium*.

For the Thigh bone does contribute much to the rectitude and stability of the Body, by that same oblique Longitude of its neck; whence the cause may be given why men naturally halt to the one side or the other, or to both sides, their Feet and Legs being of equal length; which no man yet assigned, nor observed.

The lower end of the Thigh bone joynd to the Leg is termed the *Knee*, which is fastened by a twofold Ligament. One of them is ^b circular, and compasses both the Bones round about.

Ligaments of the Knee.

The other being ^c placed between the two bones, is somewhat Long-fashioned and bloodyish, through neighbourhood of such veins, as descend through the Ham into the Leg; it arises, from the middle space of the knobs of the Thigh bone, and is inserted into the middle Eminency of the Knobs of the Shank. Sick people often speak of this Ligament when they talk of a burning heat in their Knees.

Upon the Knobs of the Shank bone two semicircular *Gristles* are fastened, which hold the same Knobs more stable, that they may not swerve, in violent motions and contorsions of the Thigh. See *Galen* touching the _____ of the Shank bone, in its Articulation with the Thigh bone. *Liber. de fracturis*.

That Part which is opposite to the knee behind, is termed *Poples* the *Ham*, being empty and void. The Vessels which pass that way being removed, an empty space is observed, interposed between the two knobs, which *Pliny* seems to have under-

The void space in the Ham.

stood in the 45. Chap. of the 11 Book of his Natural History. In the knee it self, the conjunction of both, as well the right as the left, is on the fore side double (it should be on the hinder side) there is a certain emptiness like cheeks, which being pierced, the spirit flies out as from a Cut Throat.

Why wounds in
the Ham are
deadly?

Wherefore I have alwaies observed the wounds of the Ham to be deadly, not only for the dissipation of the spirit, but also by reason of cutting assunder such remarkable vessels, viz. Veins, Arteries and Nerves, which creep through that hinder part of the Thigh, which being cut, inevitable death follows.

Whence proceeds
that sympathy
which is be-
tween the knees
and the che. ks?

The society and sympathy between the knees and Cheeks is wonderful, which is described by the Author of that Book *De Ordine Membrorum*, which is falsely ascribed to *Galen*: How that the knees being affected and afflicted, the eyes condole and weep, by reason of that old acquaintance of the knees and eyes, or Eye-lids in the womb, where the child touches its eyes and sustaines them with its knees.

Chap. 21. Of the Patella.

Its consistence.

UPON the Articulation of the thigh and leg a small bone is placed, which they call a *Mota* or *Patella*, the whirle bone of the Knee.

T. 21. f. 1. LL.

It grows unto the knee, nor fastened by any Ligaments; but only being glued to the Tendons of the muscles of the shank, it is so held close upon the knee.

T. 21. f. 8. d.

Its use.

If you take a diligent view, you shall observe a *Ligament somewhat bloody*, which does firmly knit and bind the *Patella* to the hard fat which is placed beneath.

The office of this bone, is to defend the joynt to guard the bowing and bending of the Part, and to render the motion more facil; for it hinders the extension of the leg from passing out of a right line; and when we sit with our knees bent, it keeps the thigh from luxation forward. And because the whole body inclines forward, it hinders us from falling when we go down a steep Hill.

This *Galen* found by experience, in a certain young man that was a wrestler, in whom, as he was wrestling, the *Patella* was disjoynted, and did ascend towards the thigh bone, whereupon two inconveniences followed, viz. a dangerous bending in his knee, and a trouble in going down Hill; and therefore he could not go down hill without a staff. *Paracelsus* observes in the 22. Chapter of his 14. Book, that he never saw any that had the *Patella* broken, but they halted. I have seen such whose *Patella* was luxated and drawn upwards, who could not so easily go up hill and down-hill as formerly.

Whether his
opinion touching
the use of the
Patella.

Notwithstanding *Vesalins* in his *Surgery* denies that the *Patella* confers any thing to the firmness of the joynt, and that a man does halt, when it is broken or taken out, as he avers he had found by many examples, only he saies it is placed upon the knee for to defend and secure the joynt.

And he goes not much from the same opinion in his *Anatomy*, where he saies it performs the same office in the knee, which the *Sesamoidean* bones do in other joynts.

Hippocrates in his book *de locis in Homine*, assigns another use of this Bone, namely to prohibit moisture from descending out of the flesh into such a loose joynt as the knee is.

Seeing therefore the necessity of the *Patella* is so great, I conceive it is but a fable which is reported of the *Thebans*, who, that they might be able to run more swiftly, took certain bones out of their knees.

Whether
there have bin
found about
Nova Zembla
certain
Pigmies or
little Men,
who could bend
their knees
backward and
forward, and
were so swift
of foot that
none

Yet there have bin found about *Nova Zembla* certain *Pigmies* or little Men, who could bend their knees backward and forward, and were so swift of foot that

none

none could overtake them, if we give credit to the relations of sea faring Men.

Chap. 22. Of the Tibia and Fibula.

THe Tibia has two Bones, the one ^a larger and more inward, which beares the name of the whole; the other is smaller and more external, called ^b Fibula. The reason of these names. But *Perone* (which is rendred *Fibula*) does signifie two things in *Hippocrates*, the whole *Fibula*, an appendix of that bone, as *Galen* expounds it, in this Interpretation of the words of *Hippocrates*.

It is termed *Perone* from *peiro*, which signifies to boar or thrust through. This called *Fibula* in *Latin* from the *Greek* word *Phible*, which signifies small and lank; howbeit in *Latin* writers of Architecture, certain beams or joices of wood placed to give strength to other parts of the building, are termed *Fibule*. For this Bone *Fibula* does sustain the outer knob of the Shank bone unto which it is fixed; because the weight of the Thigh and of the whole Body, does most of all bear upon that part.

The lower ends of the *Tibia* and *Fibula* are termed ^c *Malleoli* Ankle-bones, wher the Malleoli are? both being fastened together by a strong circular *Ligament*, through which the Tendons of the Muscles are drawn, as was said of the wrists.

^a T. 21. f. 1. M. f. 4. D. ^b T. 21. f. 1. N. f. 4. E. ^c T. 21. f. 1. I. K. f. 4. g. h.

Chap. 23. Of the Foot.

THe Articulation of the ^a *Astragalus* with the ^b *Scaphoides* is very close, so that it seems altogether immovable, so that any man would think, that the foot is not moved laterally by that Articulation.

Two *Sesamoidean* Bones are fastened behind the great Toe, that they might give a secure passage to the tendon of that Muscle which bends the great Toe. The Sesamoidean bones belonging to the Foot.

In the sole of the foot, you shall find very many *Ligaments*, by which the Bones are straightly united, that the foot might become hollow. You shall therefore observe the *Transverse Ligament*, which binds up the bones of the *Metatarsus*, with the first rank of Toe-joints, like that which we find in the Hand. The Ligaments of the Foot.

Chap. 24. The Number of Bones for a Skeleton.

Two hundred thirty and two Bones are required to make a Skeleton, fifteen being taken from the number, two hundred forty seven. Because the breastbone is reckoned but for one, as also the *Os sacrum* and the *Coccyx* or Crupper bone, because in the boyling and cleansing of the Bones, they do not separate Neither will the ^d *Coccyx*, ^e *Larynx*, ^f *Hyoides*, nor ^g *Sternum* endure boyling.

I omit the six little Ear-bones, the *Os Hyoides* and the *Larynx*, because they are not joynd by way of Articulation with other bones.

^a T. 21. f. 5. A. ^b T. 21. f. 5. C. ^c T. 23. f. 3. N. & c. ^d T. 2. f. 5. & 6. b. ^e T. 13. f. 9. 10. & c. ^f T. 13. f. 11. ii. & c. ^g T. 10. f. 2. AA. ^h T. 20. f. 7. ABC.

Chap. 25. Of Breaking the Bones.

When you are sufficiently instructed in the number of the Bones, you shall break in pieces every particular bone, that you may enquire into the inner structure thereof.

The

The profit of this knowledge is evident in fractures. For hereby may be collected in how long time a broken Bone, may be sodered together again. Hippocrates writes in his Book de Alimentis: that the nourishment of a bone may be known by the breaking thereof. The Nose bone requires ten daies to grow together, the Jaw-bones and the clavícula and ribs twenty; the Cubit requires thirty, the Tibia and Brachium forty, and the thigh-bone fifty, little more or less as occasion serves.

Inasmuch there as the quantity of a Bones nourishment, and the space of time requisite thereunto, does alwaies hold proportion to the Bones thickness: to that if the Nose-bone, that is to say the bone of the upper Cheek which reaches to the Noie, do require ten degrees of nutriment; the nutriment of the other Jaw-bone of the Ribs and Jugular, which are twice as thick as the Nose-bone, must be double in proportion to the nutriment of the other, and will require twice as long time to grow together which is known by their breaking, or by the Cure of their respective fractures.

And therefore by how much thicker the Bones are, by so much the more nourishment, and the longer time they require to be sodered together; to that suppose the Nose-bone require ten parts of nutriment, and the Nose being broken shall need ten daies time to grow together: the Aliment of the ribs, Jawbone and Jugular, (which are twice as thick) must be double in quantity, and they shall require twice the time (being broken) ere they can grow together again.

And the Cubit-bone, because it is thrice as thick as the Nose-bone, therefore it will need thrice as much nutriment, and thrice as long time to grow together.

The Tibia and Brachium because they are four times as thick as the Nose-bone, will require four times as much nutriment and four times longer space to grow together.

Finally, the Thigh-bone being five times as thick, will require five times as much nutriment, and five times as much space to grow together, after they have bin broken.

Celsus writes in his seventh Book out of Hippocrates, that between the fourteenth and twentieth day the ^a jaw-bone, ^b Cheek-bones, the ^c Jugular, ^d Breast bone, the ^e Shoulder-blades, the ^f Ribs, the ^g Back-bone, the ^h Hip-bones, ⁱ the ankles bones, the ^k Heel-bones, the ^l Hand, and the ^m Foot-sole are healed. Between the twentieth and thirtieth daies the ⁿ Thighs and ^o Arms; between the seventh and twentieth and fortieth the ^p Arm-bones and ^q Thigh-bones are healed. The sense of which place cannot be understood, but by consideration of the threefold cavity and marrow of the Bones.

A Threefold
Cavity in bones.
A Threefold
Marrow.

For I find a threefold marrow contained in the Bones in three different Cavities. The marrow of the greater bones as of the Arm and Thigh, is reddish; the marrow of the middle sized bones which are hollow in some good measure, is white. The rest of the bones being of a spongy substance, or full of little Cavities, are replenished with marrowy Juicy, but not with red marrow.

^a T. 15. f. 3. L. ^b T. 15. f. 1. E. ^c T. 21. f. 1. BB. f. 2. A. ^d T. 10. f. 2. AA. & c. ^e T. 21. f. 2. B. ^f T. 10. f. 2. & 3. ^g T. 13. f. 19. T. 10. f. 2. & 3. I. 2. f. 1. ^h T. 2. f. 3. & 4. & c. ⁱ T. 21. f. 5. A. ^k T. 21. f. 5. B. ^l T. 21. f. 2. G. I. ^m T. 21. f. 4. GH. ⁿ T. 21. f. 1. MN. ^o T. 21. f. 2. DE. ^p T. 21. f. 1. CC. ^q T. 21. f. 1. KK.

Howbeit the inferior jaw-bone is hollowed in the base, and in the Chin it is of a stony hardness, it contains red marrow, which does not fluctuate from one end of the Jaw-bone to the other, because of the hardness and solidity of the jaw-bone in the Chin. Whence it is easie to be demonstrated that the Maxilla is a double bone.

The Clavícula, which Galeus writes is fistulous, we find to be every where of a spongy substance. The Ribs, the Vertebrae, the shoulder-blades, the Hip-bones, the Tarsian and Metatarsian bones, also the wrist and afterwrist-bones, are spongy and like Pumice-stones. The bones of the fingers are hollow and contain a whitish marrow. In the Feet, only the great Toe is fistulous or hollow-bon'd.

Chap. 26. The Collection and ordering of Bones for a Skeleton.

But if you are not minded to break the bones, but desire to preserve and prepare them for a *Skeleton*. You shall observe that there are two things required thereunto; first of the purifying and cleansing of the bones, secondly their apt uniting and fastning together, which may be termed *Scelero-pata*.

Two parts of this work.

As for what concerns the cleansing of Bones, *Scaliger* in his Exercitations observes, that the stone termed *Sarcophagus* does in a short space eat off and consume the flesh from the bones. And so the bones remain bare and naked.

The cleansing of the bones.

Pausanias in *Eliacis* relates that the Divel *Eurynomus* eats off the flesh of dead People, so as nothing but the bones remain.

The Jews imagine that there is an internal Divel named *Azazel*; who in *Leviticus* is named *Princeps desertorum*, and eats and devours the flesh of the dead; leaving only the bones behind.

But we are not wont to use the stone *Sarcophagus*, because we have it not; neither are we acquainted with its operations. Neither do we use the assistance of the Divel *Eurynomus*, because we despise and execrate those wicked spirits.

Wherefore having cut the bones one from another and taken their flesh off, you shall cast them into a large Kettle or Caldron, except the Breast-bone, the *Hyoides*, and *Coccyx*. Then fill the Caldron with scalding water, so as to cover all the Bones and set them on the fire and boile them four or five houres.

You shall be careful while they are boyling that no bone stick out; so as to be tainted by the smoak.

Also you shall ever and anon take off the scum and fat which swims a loft, that the Bones may be the more neat and clean.

Which that it may be more effectually performed, you shall peirce the larger bones that are full of Marrow, in the Head with an Awl that all the superfluous marrow may flow and soak out.

You may throw away the first water and boile them in a second, that all the marrow may be drawn forth.

Then take them out while the water is hot (for if it be cold they will be greasie) and scrape and cleanse them with a small knife.

Some, while they are boyling, throw in a pound of Lime or Chalk, to make them the whiter, but this eats off the *Epiphysis* and the *Gristles* which do crust the extremities of the Bones; which you must take heed you pull not away, when you scrape the Bones.

Then you shall put the Bones again into most pure water boyling hot, and boyl them for an hour, that all the marrow and fat may be separate and exhausted. After that cast them into cold water, and take them out and wipe and rub them well with course linnen cloaths.

When the Bones are thus prepared, many lay them two or three months in the open air to bleach and grow white. Others put them into a wooden case, bored full of holes and hang them in a running brook, or in the streams of a swift River, that the rubbing of the stream may whiten them.

I had rather lay them under the falling of a Mil-stream for the space of ten or twelve dayes.

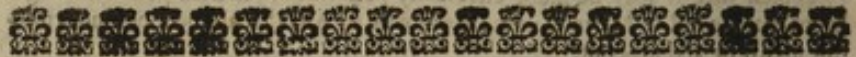
Bellonius in his Book *de Admirandis*, relates that he saw in the shoar of *Bononia* in *Picardy*, an innumerable company of exceeding white bones of Bodies which had been drowned and cast out upon the shoar having bin buried in the Sea sand. He saw the like by the Red-sea, so that the bones so prepared, and sticking and growing together by their Nerves and Ligaments, are exceeding neat and clean and whiter then Snow. Such as were those two *Skeletons* which *Galen* had to serve him in Anatomy. *Bellonius* observes in the same place, that dead bodies are preserved

served from corruption if they be anointed with the balme that drops out of Cedar trees; also that bones moistened with the same juyce remain uncorrupted.

The Bones accurately cleansed and dried, you shall preserve in a Chest, or you may fasten them together with brass-wire, and so keep them standing in a Case. It is needful that you have bones both waies, viz. single and united. And the truth is, as *Vesalins* has rightly observed, the Bones united serve more for ostentation than instruction.

The Manner of fastening the Bones to make a Skeleton.

Moreover by long boyling, first in water, and then in oyl, all the Bones of the Head and of the upper jawbone are easily separated, as I have often observed; and by this meanes you may have them severed one from another, that you may view and measure the size and dimentions of every one. The manner of fastening the bones together, depends either upon the Industry of the Artitt; or it is done by imitation of another Skeleton neatly composed. You may read more of this subject in *Vesalins* and *Columbus*. Also *Carolus Stepbannus*, has noted some things upon these Authors, worthy of Consideration.



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Wesand, or Windpipe, its use, gristles, Membrane, and diseases	208 209	Worms, in the Ears termed Eblai,	194
Whether the wounds thereof are curable	209	Wrist, The two Muscles thereof	227
Woman, Her Genital parts, which are either external, or internal, their diseases	81 82	The best way of dissolving its Muscles	247
Parts, internal which serve for generation, twofold, the way of shewing these parts	83	Wrist bones their number, and articulation	281
Woman childing, Why some sickly, others not	87	Y	
Woman big-bellied, whether she may be let bleed	88	Y ard of a Man, its parts, Skin, foreskin, Its bridle, membrane, vessels, muscles, Its hollow ligaments, their internal substance, its obliquation in the Perineum, the Nut thereof, impostumated hard to cure,	73 74
Whether in the disease Cholera she may bleed	ibid	Yard, the medicinal consideration, and diseases thereof	74
Women big-bellied, whether in them the womb grows thinner	ibid	Its muscles are four	233
Women never changed into a Man	75	Z	
Womb, Its substance, coats, temper, situation, greatness, shape, cavity, action, infirmities	84 85	Z ecchius, His vein brag	72
Worms, how they breed in the blood, Heart eaten by them	ibid	Zygomaticus, What Muscle so called.	220

F I N I S.

THE HISTORY OF THE
NORTH AMERICAN INDIANS

An Explanation of the A.B.C. of the Five Beas Place in this Book

The First Figure shows the History of a Living Man, in which, not only
the external parts of the anatomy, but also the Vessels under
the Skin which are contiguous are represented.

- | | |
|-------------------------|-------------------------|
| 1. The Osseous Shell | 1. The Osseous Shell |
| 2. The External Muscles | 2. The External Muscles |
| 3. The Internal Muscles | 3. The Internal Muscles |
| 4. The Arteries | 4. The Arteries |
| 5. The Veins | 5. The Veins |
| 6. The Nerves | 6. The Nerves |
| 7. The Glands | 7. The Glands |
| 8. The Spleen | 8. The Spleen |
| 9. The Liver | 9. The Liver |
| 10. The Gall Bladder | 10. The Gall Bladder |
| 11. The Pancreas | 11. The Pancreas |
| 12. The Stomach | 12. The Stomach |
| 13. The Duodenum | 13. The Duodenum |
| 14. The Jejunum | 14. The Jejunum |
| 15. The Ileum | 15. The Ileum |
| 16. The Cecum | 16. The Cecum |
| 17. The Colon | 17. The Colon |
| 18. The Sigmoid Flexure | 18. The Sigmoid Flexure |
| 19. The Rectum | 19. The Rectum |
| 20. The Anus | 20. The Anus |

The Second Figure exhibits the external appearance of the
Body of Man, and the Muscles under
them laid open.

- | | |
|-------------------------|-------------------------|
| 1. The External Muscles | 1. The External Muscles |
| 2. The Internal Muscles | 2. The Internal Muscles |
| 3. The Arteries | 3. The Arteries |
| 4. The Veins | 4. The Veins |
| 5. The Nerves | 5. The Nerves |
| 6. The Glands | 6. The Glands |
| 7. The Spleen | 7. The Spleen |
| 8. The Liver | 8. The Liver |
| 9. The Gall Bladder | 9. The Gall Bladder |
| 10. The Pancreas | 10. The Pancreas |
| 11. The Stomach | 11. The Stomach |
| 12. The Duodenum | 12. The Duodenum |
| 13. The Jejunum | 13. The Jejunum |
| 14. The Ileum | 14. The Ileum |
| 15. The Cecum | 15. The Cecum |
| 16. The Colon | 16. The Colon |
| 17. The Sigmoid Flexure | 17. The Sigmoid Flexure |
| 18. The Rectum | 18. The Rectum |
| 19. The Anus | 19. The Anus |



An Explanation of the TABLE of the First Brass Plate in this BOOK.

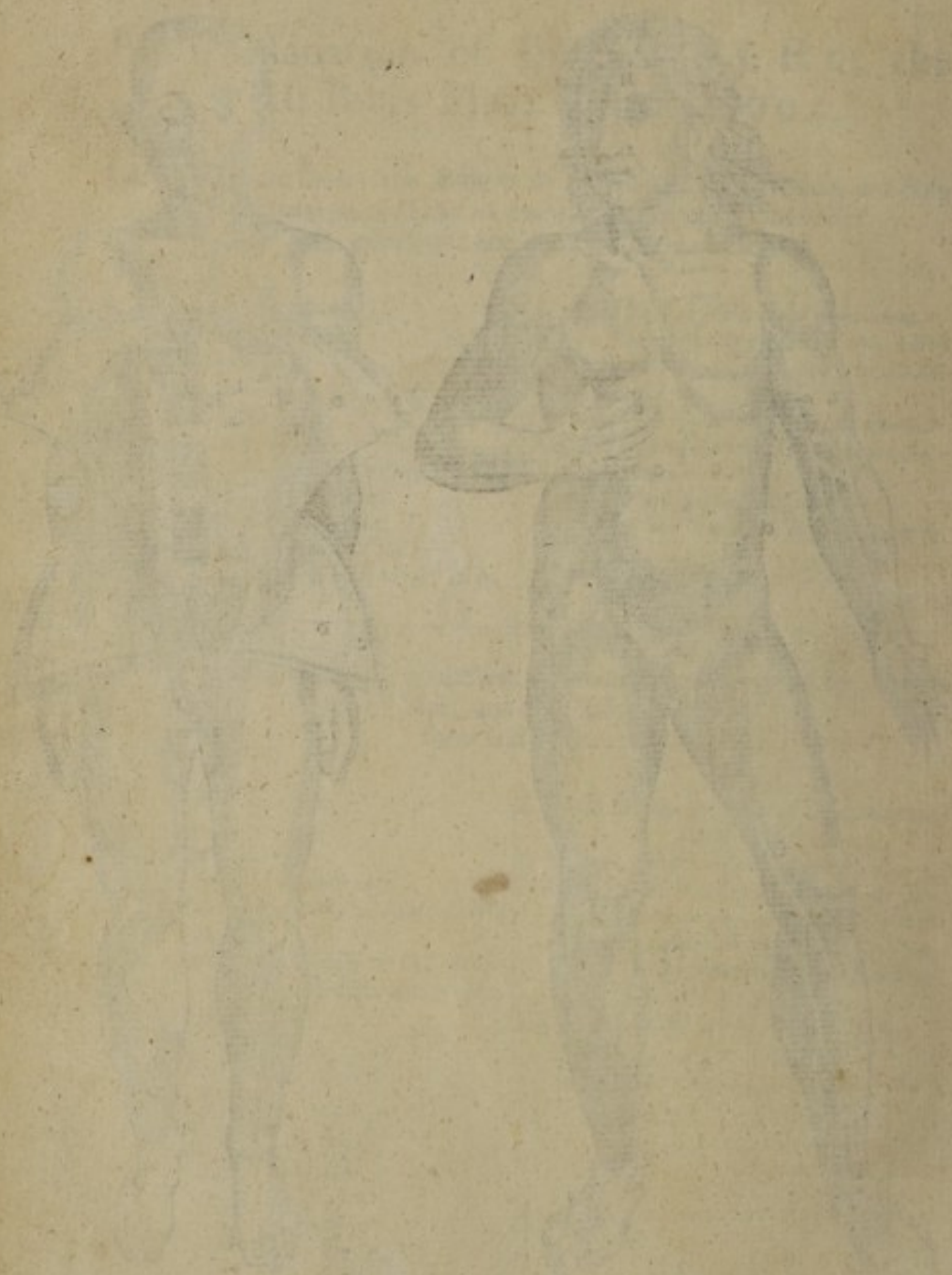
The First Figure shews the Effigies of a living Man, in which, not only the external parts of the *Abdomen*, but also the Veins under the Skin which are conspicuous are represented,

<p><i>A</i> The Right Hypochondria, <i>B</i> The left Hypochondria. <i>CC</i> The Epigastrium, <i>DD</i> The Bowels. <i>EE</i> The Hypogastrium. <i>FF</i> The Groyns. <i>G</i> The Region above the Privities. <i>H</i> The Vein of the Forehead. <i>I</i> The Vein of the Temples. <i>K</i> The external Jugular Vein. <i>L</i> The Cephalick vein of the right Arm.</p>	<p><i>M</i> The Basilick Vein of the right Arm. <i>N</i> The middle or common Vein, which is not in the same place in all Bodies. <i>O</i> The Cephalick Vein of the left hand. <i>P</i> The Vein of the left Hand, called <i>Satellata</i>. <i>QQ</i> The Vein <i>Saphena</i> descending. <i>RR</i> The Vein <i>Saphena</i> in the Foot it self. <i>SS</i> The Sciatick Vein.</p>
--	--

The Second Figure expresseth the common coverings of the Body of Man, and the Muscles under them laid open.

<p><i>AA</i> The Scarf-Skin, <i>BBBB</i> The Skin. <i>CCCC</i> The Fat. <i>DDDD</i> The fleshy Membrane. <i>EE</i> Part of the pectoral Muscles laid open. <i>FFF</i> Certain beginnings of the Muscles called <i>Serrati antici Majores</i>.</p>	<p><i>GG HH II</i> The Muscles of the Abdomen obliquely descending. <i>G HH</i> Their toothed beginnings. <i>IIII</i> The Tendon of the oblique descending Muscles, under which the right Muscles of the Abdomen with their <i>Nerves</i> inscriptions appear. <i>KK</i> The white line of the Abdomen.</p>
--	--





The TABLE of the Second Brass Plate
in this Book, Opened and Explained.

This Table laies open the Bones of the *Abdomen* in seven Figures; two others, to wit, the eighth and ninth shew the Muscles of the *Abdomen*: The tenth gives you a clear sight of the Parts, the *Peritonæum* being removed.

FIG. I.

Expresseth the five *Vertebrae* of the *Loyns*, as they are observed on the fore part.

a a a The *Transverse Procefs.*

FIG. II.

Laies open to your view, the *Vertebrae* of the *Loyns*, as are presented on the back Part.

a The hole for the *Marrow* of the *Back.*

b b The *transverse Procefs.*

c c c The *oblique Procefs.*

d The *acete Procefs.*

FIG. III.

Represents the internal face of the *Os Coxae*, as it is united in such as are grown up.

A *Os Ilium.*

B B *Os Coxendix.*

C *Os Pubis.*

FIG. IV.

Demonstrates the external face of the *Os Coxae.*

A *Os Ilium.*

a a The *Spine* of the *Os Ilium.*

B *Os Coxendix.*

C C *Os Pubis.*

FIG. V.

Gives the internal view of the *Os Sacrum* divided into six parts.

a a a The holes which give passage to the *Nerves.*

b The three parts of the *Coccyx.*

FIG. VI.

The same Bone externally to be seen,

a The hole for the *Marrow* of the *Back.*

b b b Lesser holes for *Nerves.*

c *Os Coccyx.*

FIG. VII.

The Figure which deciphereth the *Os Coxae*, as it is observed to be distinct in Children.

A *Os Ilium* a little taken from the rest.

B B *Os Coxendix.*

C C *Os Pubis.*

a a The cleft distinguishing the *Os Coxendix* and *Os Pubis.*

The connexure of all the Bones of the *Abdomen.* See in the Table to Chapter 17.

FIG. VIII.

A The *Muscle* of the *Abdomen* obliquely descending; in which,

a a Are the toothed beginnings.

b b The *Tendon* sticking to the white line.

B The *Muscle* of the *Abdomen* obliquely ascending; in which

c c c Its beginning.

d d A portion of its tendon which covers the right *Muscle.*

e e The *Right Muscle* of the *Abdomen.*

FIG. IX.

A The *transverse Muscle* loosed about the beginning; in which

a a a The beginning.

b b A portion of the *Tendon.*

B The *right Muscle* of the *Abdomen*, in which

c The Beginning.

d d d The *Nervous inscriptions.*

e The end.

C The back part of the other *right Muscle*, in which

d Shows the *Vein* and *mammary Artery* descending.

e The *Epigastrick vein* and *artery* ascending.

f The *Anastomosis* of the *Veins.*

g g The *Peritonæum* laid bare from the *Muscles.*

D D The *Pyramidal Muscles.*

E E The *Procefs* of the *Peritonæum* descending to the *Cad.*

FIG. X.

A Part of the *PeRoral Muscle* detached.

B The *Stecnum.*

C The *Stomach* being something hid by the *Liver.*

D The *Liver.*

E The *Omentum* in its Situation.

b A portion which sticketh to the *Liver.*

c c A portion which is knit to the bottom of the *Stomach.*

d d d The remainder of the *Omentum* as it lies upon the *Bowels.*

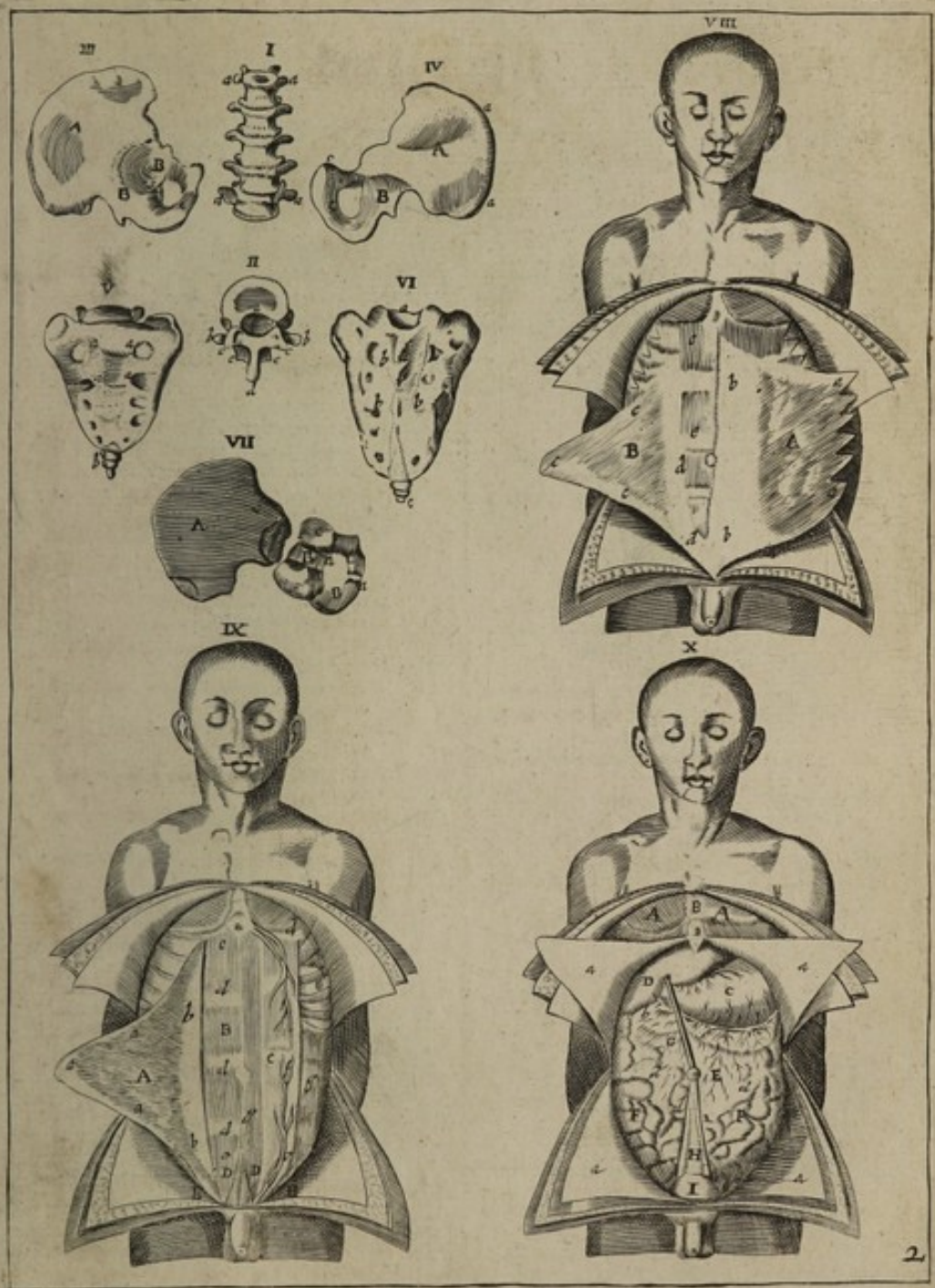
F F The *Bones* in their situation.

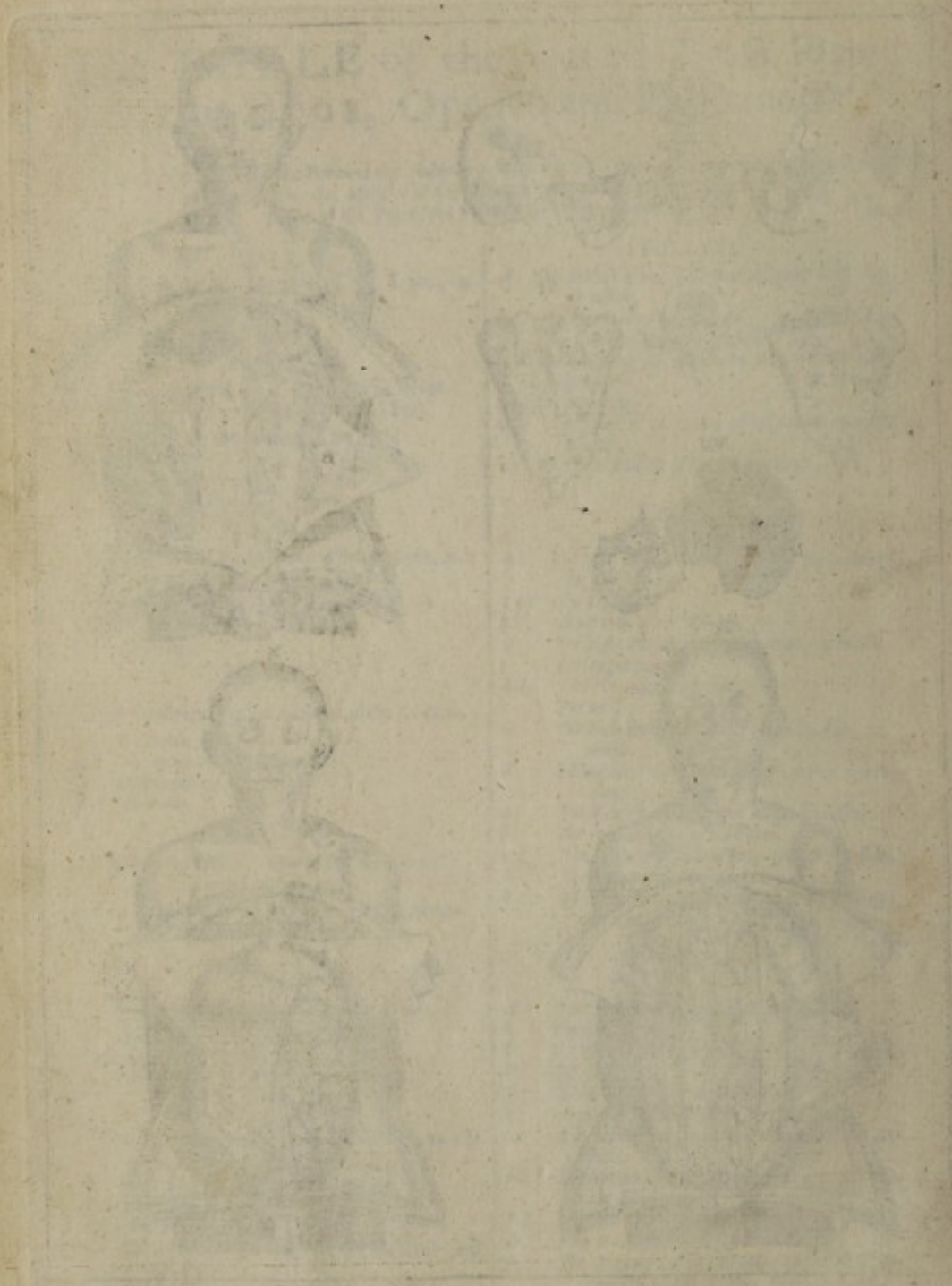
G The *Navil Vein.*

H The *Ligament* of the *Bladder* composed of the *Urethra*, and the two *Navil Arteries.*

I The bottom of the *Bladder.*

a a a a The *Peritonæum* divided.







The TABLE of the Third Brass Plate in this Book, Opened and Explained.

The *Omentum* and *Mesenterium*, figure I. The *Gula* with its Muscles, figure II. and III.
The *Stomach* and *Bowels* under it, figure IV. The *Tunicles* of the *Bowels*,
figure V. and VI. The *Muscles* of the right *Gut*, figure VII.
The *Nerve* of the sixth pair, figure VIII.

FIG. I.

- AAAA The *Mesenterium* with the *Guts* adjoyed.
aaaa The *Glandulæ* of the *Mesenterium*.
BBB The *Vessels* of the *Mesenterium* diffused to the *Guts*.
CC Part of the *Colon* stretched out.
DD Part of the *Omentum* drawn abroad upwards.

FIG. II.

- AA The first pair of the *Muscles* of the *Gula*, called *Cephalopharyngæus*.
BB The second pair of the *Muscles* of the *Gula*, or *Sphenopharyngæus*.
CC The third pair, *Stylopharyngæus*.
DD The *Sphincter* of the *Throat*.
EEE A backward view of the *Gula*.
F The left external *Nerve* of the sixth pair.
G The right external *Nerve* of the sixth pair.
H The superior *Orifice* of the *Stomach*.
III The bottom of the *Stomach*.
K The inferior *Orifice* of the *Stomach* with a portion of the *Duodenum* annexed to it.

FIG. III.

- AA The *Muscles* *Cephalopharyngæus* conspicuous on the fore part.
BB The *Muscles* *Sphenopharyngæus*.
CC The *Muscles* *Stylopharyngæus*.
DD The *Sphincter* of the *Throat* dilated.
E The internal face of the *Gula*.
F The descending part of the *Gula*.

FIG. IV.

- A The superior *Orifice* of the *Stomach* knit together within a thread.
B The inferior *Orifice*, or *Pylorus*.
CC The common *tunicle* of the *Stomach* separated.
D The middle *tunicle* of the *Stomach*.
E The inner *tunicle* of the *Stomach*.
F A portion of the *Duodenum*.
GG The gut called *Jejunum*.
HHH The gut *Ileum* as it lies in its foldings.
I The gut *Cæcum*.
KKK The gut *Colon*.
L The *flut*, being opened in the beginning of the *Colon*.
M The beginning of the right *Gut*, knit with a thread.

FIG. V.

- PP The common *tunicle* of the *Guts* separated.
Q The middle *tunicle* of the *Guts* which is the first proper one.

FIG. VI.

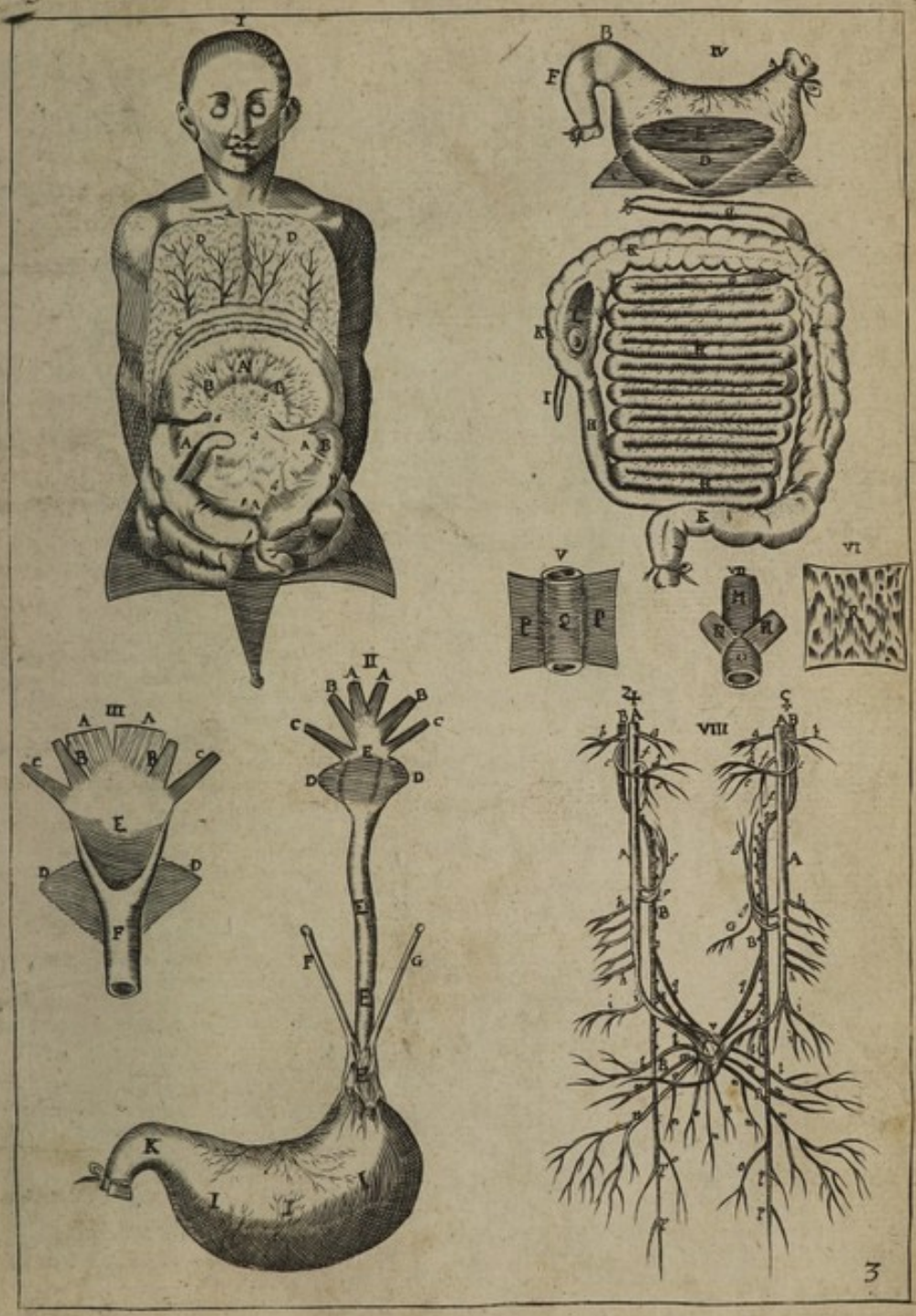
- R The rugged *tunicle* of the *Guts* which is the second proper.

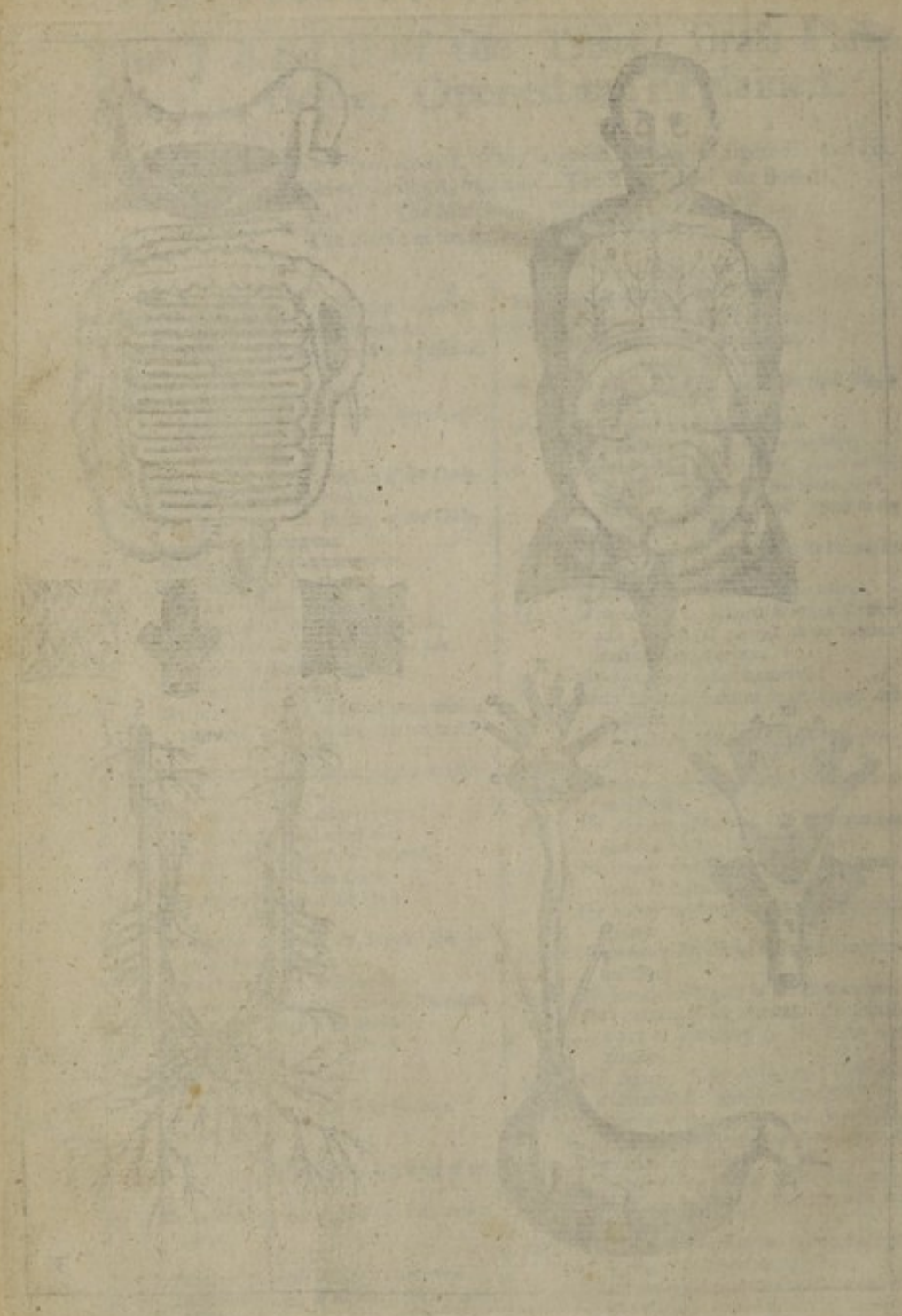
FIG. VII.

- M The right *Gut* cut off.
NN The two *Muscles* called *Levatores*.
O The *Sphincter* of the *Fundament*.

FIG. VIII.

- N The *Nerve* of the sixth pair on the right side, in which,
AA The external and greater branch.
a The branch which is carried to the *Neck*.
b A branch of the seventh pair, joyued to this sixth pair which is carried to the *Neck*.
c A *Nerve* of the seventh pair joyued to the sixth under the *Skull*.
d A branch of the seventh passing to the muscle of the *Os Hyois*.
e A branch from the seventh to the *tongue*.
ff A *Nerve* from the external branch of the sixth pair, which is carried to the internal muscles of the *Larynx*.
gg The right *Nerve* called *Recurrrens*.
hh Many *Nerves* distributed to the *Lungs* and windpipe.
iii The branches of the right *Stomachical*, stretched out.
BBB The internal, or costal branch, laid open with its bunches.
△ The *Nervous* plexure of the *Mesenterium* guarded with certain callous Bodies.
ll The branch which is carried to the *Omentum*, *Duodenum*, and *Liver*.
mm The branch which is carried to the right *Kidney*.
nnnn The branches distributed in the *Mesenterium* and *Guts*.
o The branch which goes to the *Os Sacrum*.
pp The extremity of the internal right branch, which is distributed to the *Womb* and *Bladder*.
qr The branches from the internal right side, which make the plexure on that side.
♀ The *Nerve* of the sixth pair on the left side, in which, the signification of the Letters is the same, save only.
♂ Is the *Nerve* from the left *Recurrrens*, which is distributed to the *Pericardium*, and *Heart* it self.
** The *Nerve* which from the external left *stomachical* is carried to the *Liver*.
ll The *Nerve* which is carried to the *Spleen* and *Gut Colon*.
mm The *Nerve* of the left *Kidney*. The remainder are the same with the former.





The TABLE of the Fourth Part of the
in this Book, Opened and Explained.

The Fourth Table is a Table of the Contents of the Fourth Part of the Book, and is divided into five Chapters, and is as follows.

1	The first Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Soul.
2	The second Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Mind.
3	The third Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Will.
4	The fourth Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Intellect.
5	The fifth Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Reason.
6	The sixth Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Understanding.
7	The seventh Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Judgment.
8	The eighth Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Memory.
9	The ninth Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Imagination.
10	The tenth Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Fancy.
11	The eleventh Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Phantasy.
12	The twelfth Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Intellective Faculty.
13	The thirteenth Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Reasoning Faculty.
14	The fourteenth Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Understanding Faculty.
15	The fifteenth Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Judgment Faculty.
16	The sixteenth Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Memory Faculty.
17	The seventeenth Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Imagination Faculty.
18	The eighteenth Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Fancy Faculty.
19	The nineteenth Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Phantasy Faculty.
20	The twentieth Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Intellective Faculty.
21	The twenty-first Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Reasoning Faculty.
22	The twenty-second Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Understanding Faculty.
23	The twenty-third Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Judgment Faculty.
24	The twenty-fourth Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Memory Faculty.
25	The twenty-fifth Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Imagination Faculty.
26	The twenty-sixth Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Fancy Faculty.
27	The twenty-seventh Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Phantasy Faculty.
28	The twenty-eighth Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Intellective Faculty.
29	The twenty-ninth Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Reasoning Faculty.
30	The thirtieth Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Understanding Faculty.
31	The thirty-first Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Judgment Faculty.
32	The thirty-second Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Memory Faculty.
33	The thirty-third Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Imagination Faculty.
34	The thirty-fourth Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Fancy Faculty.
35	The thirty-fifth Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Phantasy Faculty.
36	The thirty-sixth Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Intellective Faculty.
37	The thirty-seventh Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Reasoning Faculty.
38	The thirty-eighth Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Understanding Faculty.
39	The thirty-ninth Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Judgment Faculty.
40	The fortieth Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Memory Faculty.
41	The forty-first Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Imagination Faculty.
42	The forty-second Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Fancy Faculty.
43	The forty-third Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Phantasy Faculty.
44	The forty-fourth Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Intellective Faculty.
45	The forty-fifth Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Reasoning Faculty.
46	The forty-sixth Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Understanding Faculty.
47	The forty-seventh Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Judgment Faculty.
48	The forty-eighth Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Memory Faculty.
49	The forty-ninth Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Imagination Faculty.
50	The fiftieth Chapter of the Fourth Part of the Book, which is the Chapter of the Nature and Properties of the Fancy Faculty.

The TABLE of the Fourth Brass Plate
in this Book, Opened and Explained.

The Fourth Table laies down the Scituation of the Sweet-bread, Liver, and Spleen,
and the Delineation of the *Vena Porta*.

FIG. I.

- A* The hollow part of the Liver.
B The round convex, or bowing part of the Liver.
a The umbilical Vein drawn upwards.
C The Gall in its Scituation.
D The Spleen in its natural place.
EE The Sweet-bread in its proper place.
FF The Vena Porta descending by the Sweet-bread under the Liver.
O The superior Mesenterical Artery.
aaaa The branches of the Vena Porta, extended by the Mesenterium.
bbbb The branches of the artery distributed by the Mesenterium.
HH The Mesenterium it self dismantled of its superior Membrane.
II The Splenical Vessels laid open, the Pancreas being cut.

FIG. II.

- AA* The Body of the Sweet-bread deciphored in its Natural form.

FIG. III.

- The back part of the Sweet-bread, together with the Spleen turned downwards.
AA The substance of the Sweet-bread, its Membrane being taken off.
BBB The Channel of the Sweet-bread newly found out.
C The biliar pore joyed to the channel.
DDD A portion of the Guts Duodenum and Jejunum, cut off.
E The common Orifice, by which the biliar pore and channel of the Sweet-bread, open themselves into the Duodenum.
FFF The internal face of the Spleen.
GGG The veins and arteries distributed in the Spleen.

FIG. IV.

- AA* The convex or bowing part of the Liver.
B The skin of the Liver separated from it.
CC The Ligament of the Liver called Septale.
DD The large branches of the Vena Cava within the Liver.

FIG. V.

- AA* The hollow part of the Liver turned upwards.
B The Lobe of the Liver by which it joyes it self to the Omentum.

- C* The cleft of the Liver, out of which the umbilical vein descends.
E The umbilical vein turned upwards.
F The Gall placed under the Liver.
G The channel of the Gall.
HH The biliar pore, with the channel stretched outwards, together with a part of the Duodenum, noted by *M*.
I The trunk of the Vena Porta, descending from the Liver.
K The right Calicual artery.
L A Nerve arising from the plexure of the coxals.

FIG. VI.

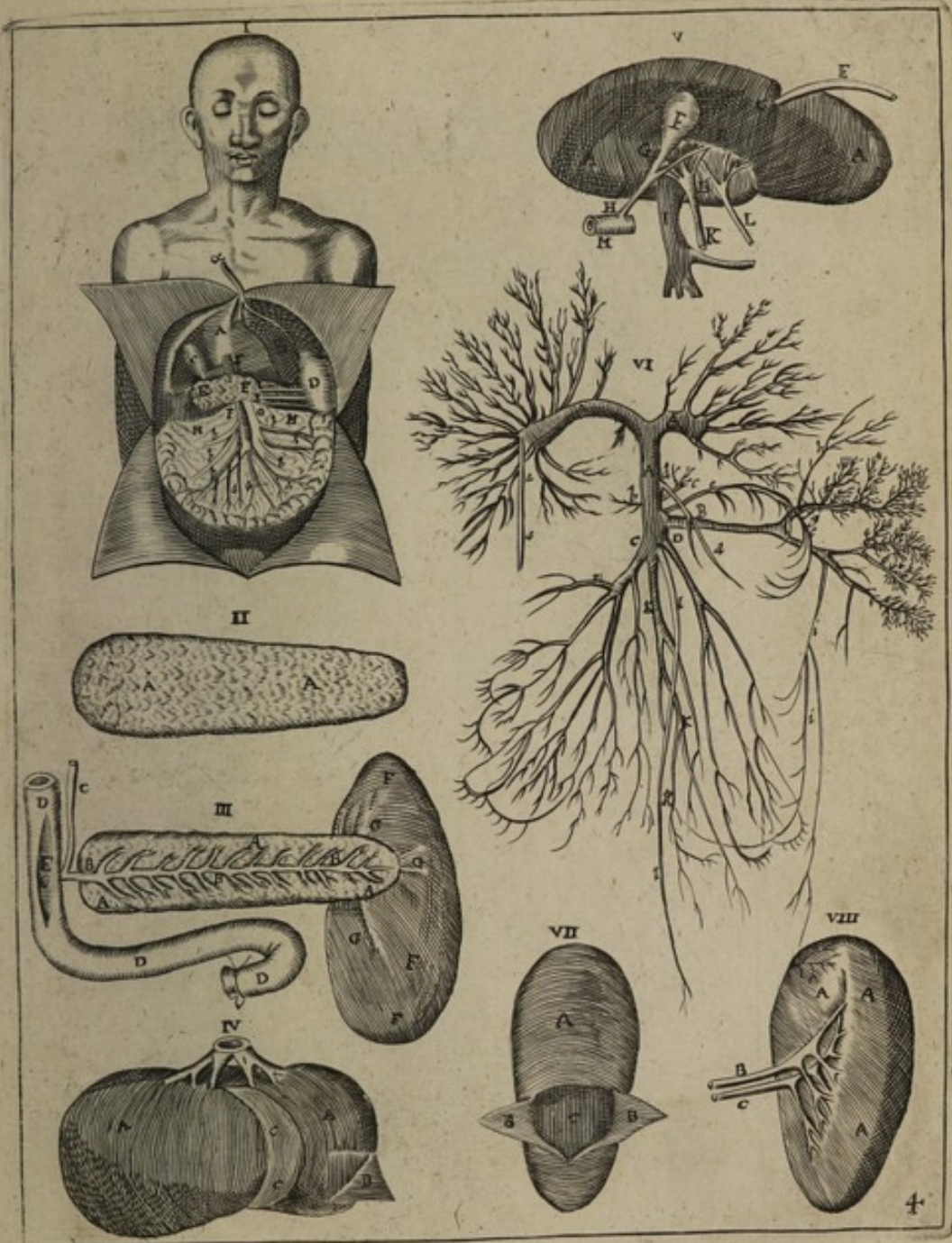
- The Vena Porta whole, distinguished into branches, as it is publicly shewed.
AAA The trunk of the Vena Porta; *A* the inferior portion, descending from the Liver. *AA* the deduction of it to the right and left with an infinite number of small branches.
B The Splenical branch, divided first into great, afterwards into very many small branches, and distributed like strings about the Spleen.
C The right Mesenterical branch.
D The left Mesenterical branch.
ax The umbilical vein.
b The vein of the Gall.
c The vein of the Sweet-bread.
dd The vein called Gastrica dextra.
tee The greater Gastrica sinistra.
fg The lesser veins called Gastricæ sinistra.
h The vein called Vas breve.
ii The vein called Gastroepiploica sinistra.
KK The vein called Gastroepiploica dextra.
ll The Hemorrhoidal veins produced here from the right Mesenterical branch of the Vena Porta.
m The vein of the Duodenum.

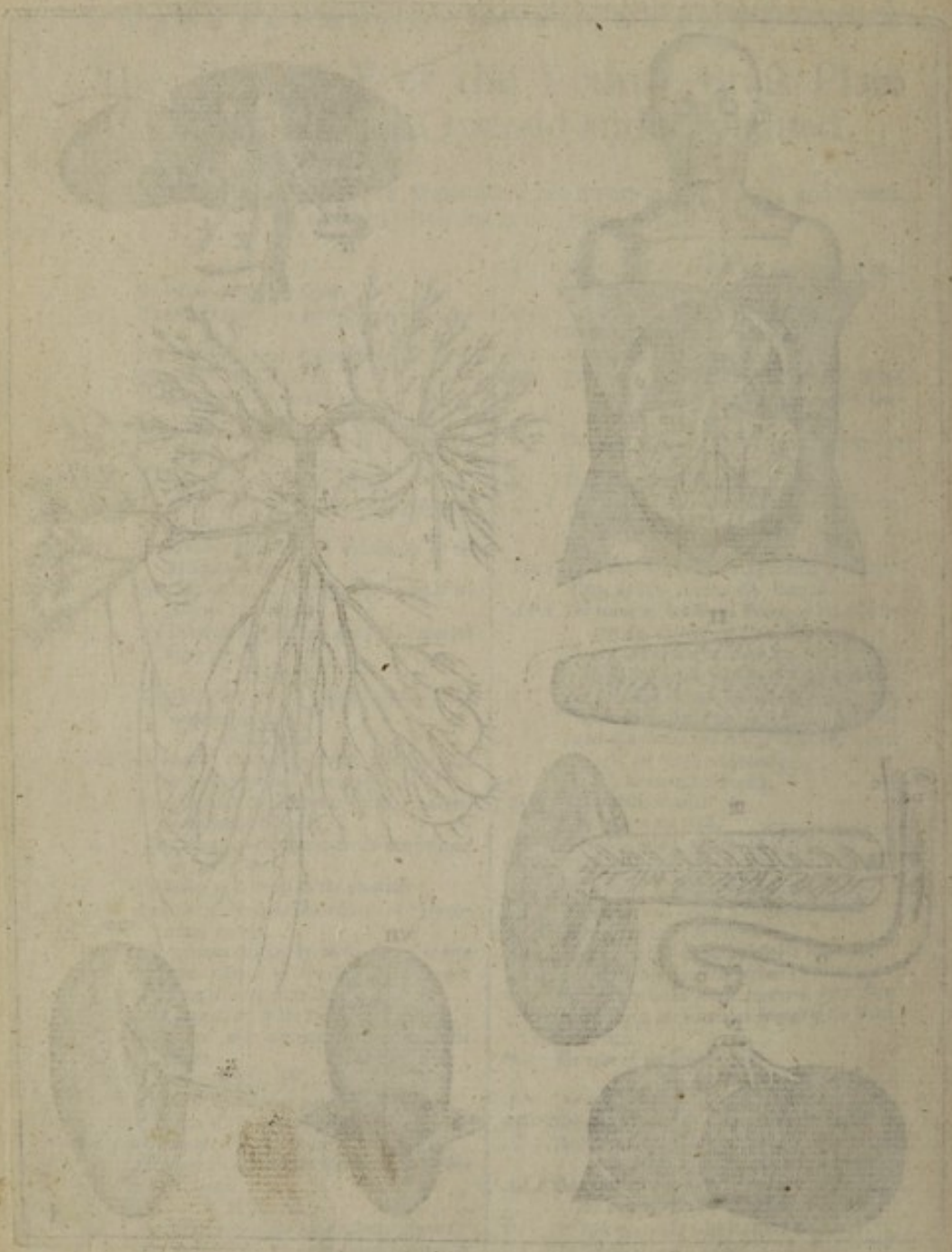
FIG. VII.

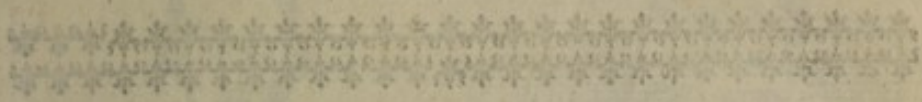
- A* The convex part of the Spleen laid open.
BB The Membrane of the Spleen separated.
CC The black substance of the Spleen.

FIG. VIII.

- AAA* The hollow part of the Spleen which receives the Vessels.
B The Splenical vein with its three branches.
C The Splenical vein opened in like manner beneath.



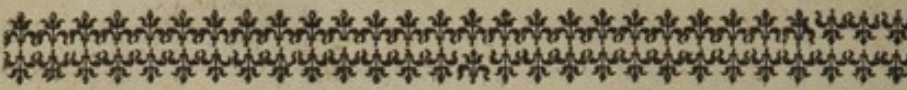




The TABLE of the Fifth Part Explained in this Book.

The present Table is open the Tables with their Quotients, the Principal Values, Heads and Answers. Also the use and progress of the Spoken Verbs.

111	The Fifth part of the Book	111	The Chapter of the Fifth part of the Book
112	The Second part of the Fifth part	112	The Chapter of the Fifth part of the Book
113	The Third part of the Fifth part	113	The Chapter of the Fifth part of the Book
114	The Fourth part of the Fifth part	114	The Chapter of the Fifth part of the Book
115	The Fifth part of the Fifth part	115	The Chapter of the Fifth part of the Book
116	The Sixth part of the Fifth part	116	The Chapter of the Fifth part of the Book
117	The Seventh part of the Fifth part	117	The Chapter of the Fifth part of the Book
118	The Eighth part of the Fifth part	118	The Chapter of the Fifth part of the Book
119	The Ninth part of the Fifth part	119	The Chapter of the Fifth part of the Book
120	The Tenth part of the Fifth part	120	The Chapter of the Fifth part of the Book
121	The Eleventh part of the Fifth part	121	The Chapter of the Fifth part of the Book
122	The Twelfth part of the Fifth part	122	The Chapter of the Fifth part of the Book
123	The Thirteenth part of the Fifth part	123	The Chapter of the Fifth part of the Book
124	The Fourteenth part of the Fifth part	124	The Chapter of the Fifth part of the Book
125	The Fifteenth part of the Fifth part	125	The Chapter of the Fifth part of the Book
126	The Sixteenth part of the Fifth part	126	The Chapter of the Fifth part of the Book
127	The Seventeenth part of the Fifth part	127	The Chapter of the Fifth part of the Book
128	The Eighteenth part of the Fifth part	128	The Chapter of the Fifth part of the Book
129	The Nineteenth part of the Fifth part	129	The Chapter of the Fifth part of the Book
130	The Twentieth part of the Fifth part	130	The Chapter of the Fifth part of the Book



The TABLE of the Fifth Brass Plate
in this Book, Opened and Explained.

The present Table laies open the Reins with their *Glandula*, the Emulgent Vessels,
 Bladder and *Ureters*. Also the rise and progress of the
 Spermatick Vessels,

FIG. I.

- AA The *Glandulae* of the Reins, or the *Capsula* of Melancholly.
- B The right *Kidney* uncovered of the Membrane.
- C The left *Kidney*.
- D The descending trunk of the *Vena Cava*,
- E The descending trunk of the great artery.
- FF The right *Ureter*.
- GG The left *Ureter*.
- HH The right Vessels preparing the Seed.
- II The left Vessels preparing the Seed.
- K Part of the Bladder, besides which, the Vessels carrying the Seed are turned in the Abdomen.
- L Part of the right Gut cut off.

FIG. II.

- AA The common Membrane of the Reins which is spread with fat.
- BB The *Glandulae* of the *Kidneys*.
- C The right *Kidney*.
- D The left *Kidney*.
- E The proper skin of the *Kidneys* partly separated.
- F The trunk of the *Vena Cava* descending.
- G The trunk of the great artery descending.
- H The left Emulgent Vein.
- II The right Emulgent Vein.
- aa The right Emulgent arteries.
- bb The left Emulgent arteries.
- c The left Spermatick artery.
- d The left Spermatick vein.
- e The right Spermatick vein.
- f The right Spermatick artery.
- g The Fatty Vein arising from the Emulgent.
- h The fatty artery.
- KKKK The *ureters* on both sides.

- LLL The Vessels preparing the Seed.
- MM The *Scrotum* with the testicles in it.
- NN The vessels carrying the Seed.
- O The Bladder stripped of his external tunicle.

FIG. III.

- A The *Capsula*, or right *Glandula Renalis*.
- BB A Vein from the trunk of the *Vena Cava* coming into it.

FIG. IV.

- A The *Capsula* dissected.
- BB The hollows of the *Capsula* somewhat laid open.

FIG. V.

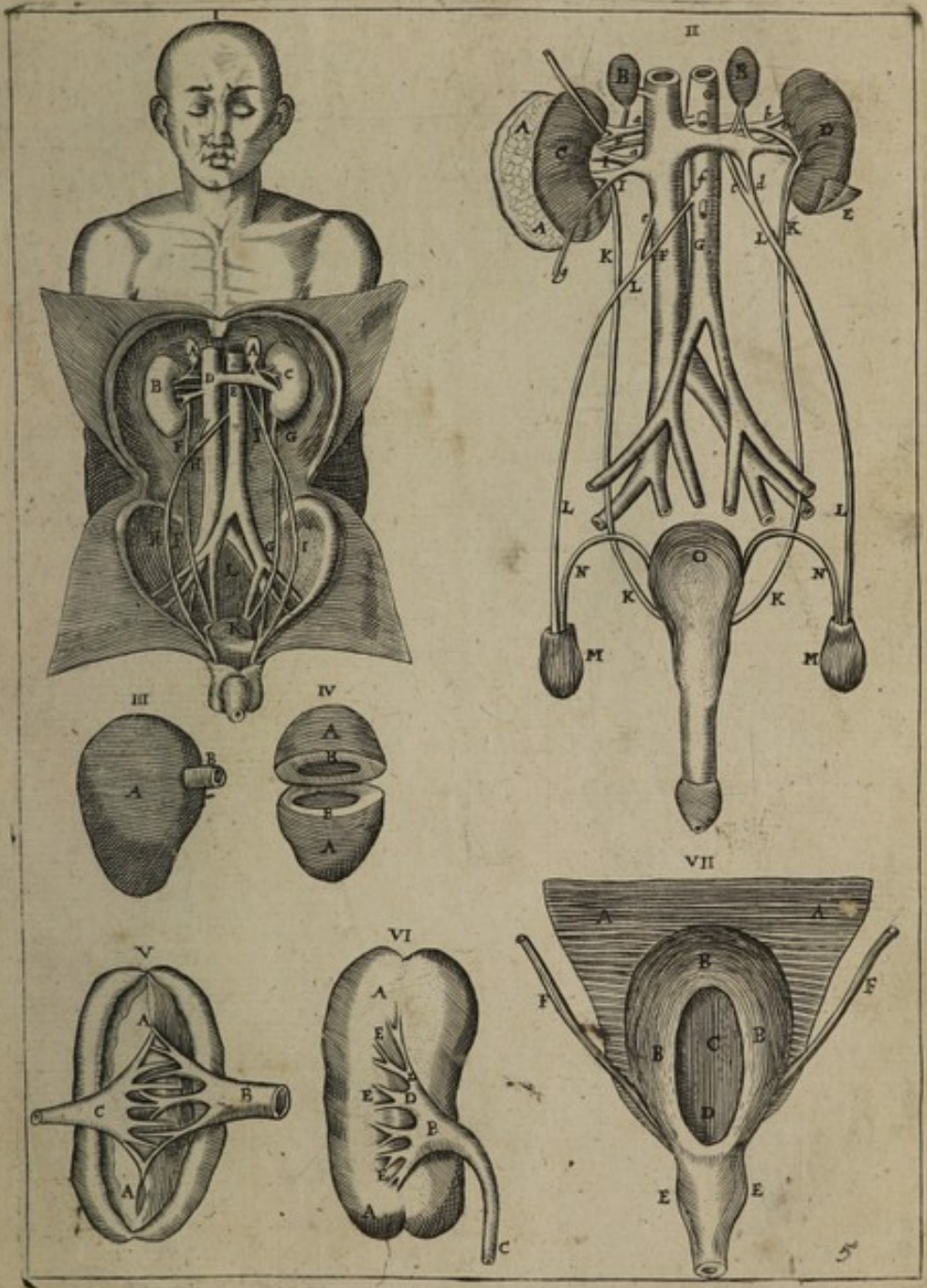
- AA The internal face of the dissected *Kidney*.
- BB The Emulgent Vein with his branches distributed in the *Kidney*.
- C The Emulgent artery in like manner distributed.

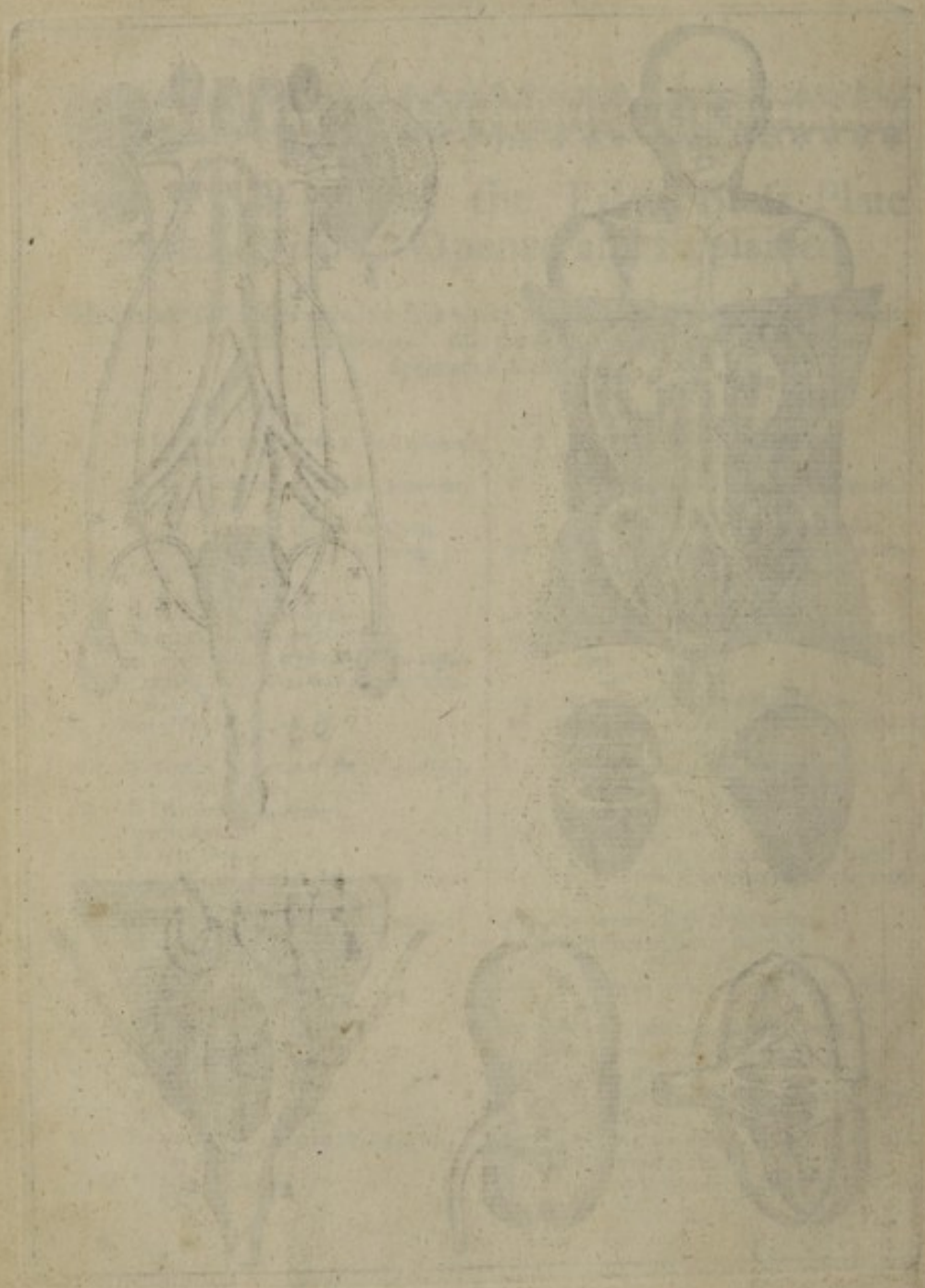
FIG. VI.

- AA The *Kidney* dissected.
- B The Sinus of the *Ureter* about the *Kidney*.
- C The round form of the *ureters* descending from the *Kidneys*.
- DD The narrow passages of the *ureters*.
- EEE The fleshy Knobs called *Papillares*.

FIG. VII.

- AA The common tunicle of the Bladder drawn back.
- BB The middle tunicle and bottom of the Bladder.
- C The inner tunicle which appears when the Bladder is cut.
- D The Orifice of the bladder by which the urine pisseth out.
- EE The Neck of the Bladder which seems swelled by reason of the *Prostata* joynd to it.
- FF Part of the *Ureters* that come to the Bladder.

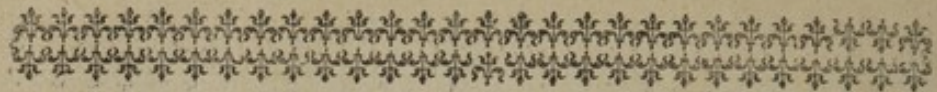




The TABLE of the Sixth Year 1845
in the Book of Opened and Explained

TABLE of the Sixth Year 1845
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The TABLE of the Sixth Brass Plate
in this Book, Opened and Explained.

This Table shews the Spermatick Vessels, the Testicles, the Membranes of the *Scrotum*, the *Yard*, the *Reins* and *Bladder*,

FIG. I.

- A* The right *Glandula renalis*.
B The left *Glandula renalis*.
CC The *Reins* on each side.
D The left *Emulgent Vein*.
E The right *Emulgent Vein*.
FF The right and left *Emulgent arteries*.
G The right *Spermatick Vein*.
HH The trunk of the *Vena Cava* descending.
I The left *Iliack branch* of the *Vena Cava*.
K The right *Iliack branch*.
L The right *Spermatick artery*.
MM The trunk of the great artery descending.
N The right *Iliack branch* of the great artery.
O The left *Iliack branch* of the same.
P The left *Spermatick artery*.
Q The left *Spermatick vein*.
RR The left *Ureter*.
SS The right *Ureter*.
TT The *Vessels* preparing the *Seed*.
tt The same *Vessels*, in what place the *Pampiniformia* begin.
uu The *Vasa deferentia* passing behind the *Bladder*.
XX The *Scrotum* with the *Testicles* in it.
Y The *Bladder*.
Z The neck of the *Bladder*.
aa The two *Muscles* erecting the *Yard*.
bb The two *Muscles* dilating the *Urethra*.
c The *Body* of the *Yard*.
d The *Præputium*.

FIG. II.

- AA* The skin of the *Scrotum* separated.
BBB The *Membrane* called *Dartus*.
CC The external part of the membrane *Elytroides*.
DD The *Cremaster* arising under the transverse *Muscles* of the *Abdomen*.
EE The internal or membranous part of the *Elytroides*.
FF The proper white tunicle of the testicle separated.
f The same joynd to the testicle.
G The *Glandulous substance* of the testicle.
H The *Vessel* called *Pampiniforme* or *Pyramidal*.

I I Epididymis.

K The *Parastate*.

FIG. III.

- a* A portion for the preparing *Vessels*.
AA The *Pyramidal Vessels*.
BB Epididymis.
CCC *Parastates*.
D The testicle covered with its proper *Membrane*.
E A portion of the *Vasa deferentia*.

FIG. IV.

- AA* The contexture of the veins and arteries in the *Pyramidal Vessel*.
BB Epididymis.
CC *Parastate*.
DD A portion of the *Vasa deferentia*.

FIG. V.

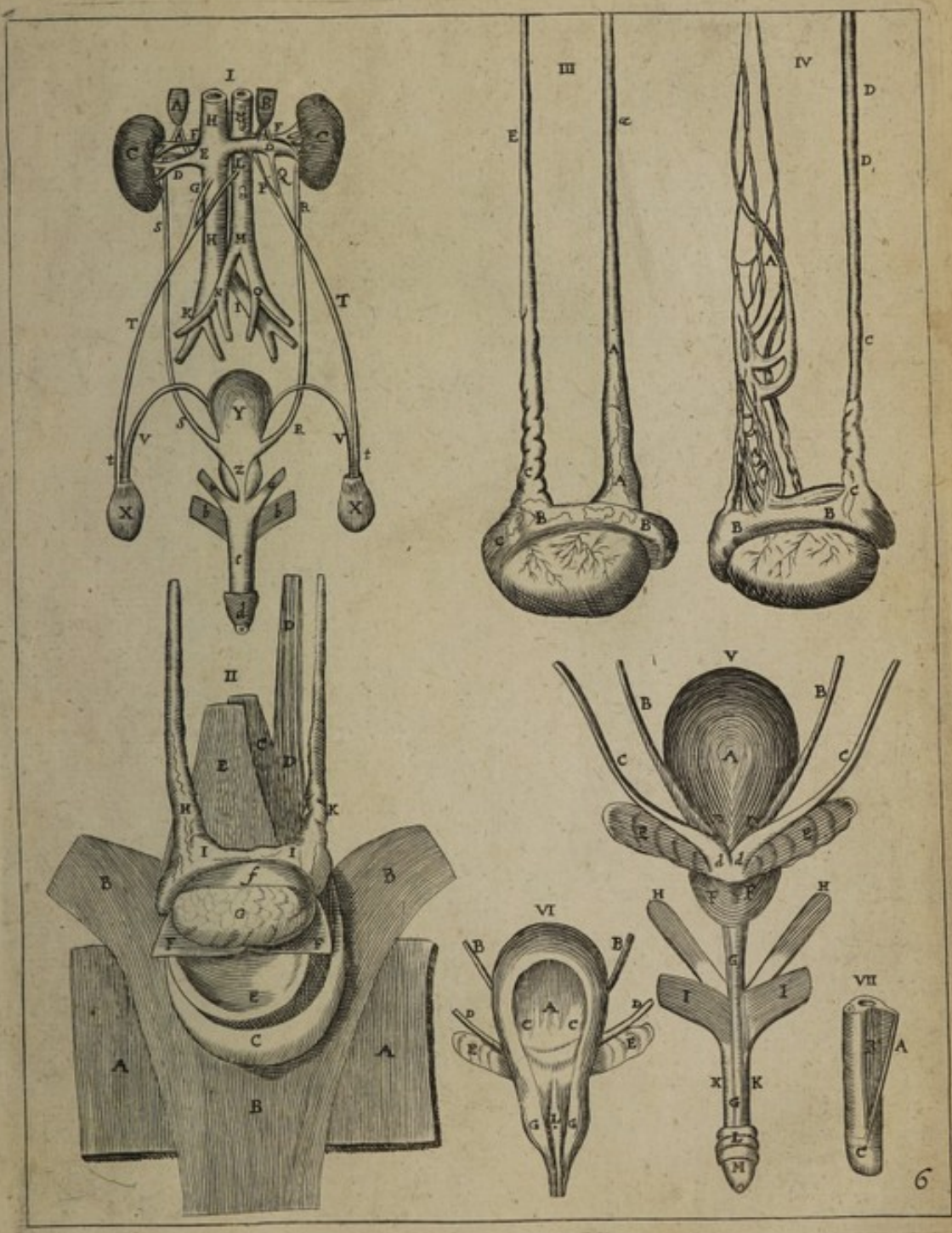
- A* The *Bladder* laid bare from its outward tunicle.
BB A portion of the *streters*.
CC A portion of the *Vasa deferentia*.
DD The *Capulæ*.
dd The end of the *Capulæ*.
EE The *Seminal Bladders*.
FF The *Glandulæ Prostatæ*.
GG The *Urethra*.
HH The *Muscles* which erect the *Yard*.
II The *Muscles* which dilate the *Urethra*.
KK The two *Nervous bodies* of the *Yard*.
L The *Præputium* drawn back.
M The *Glans* with its *Biddle*.

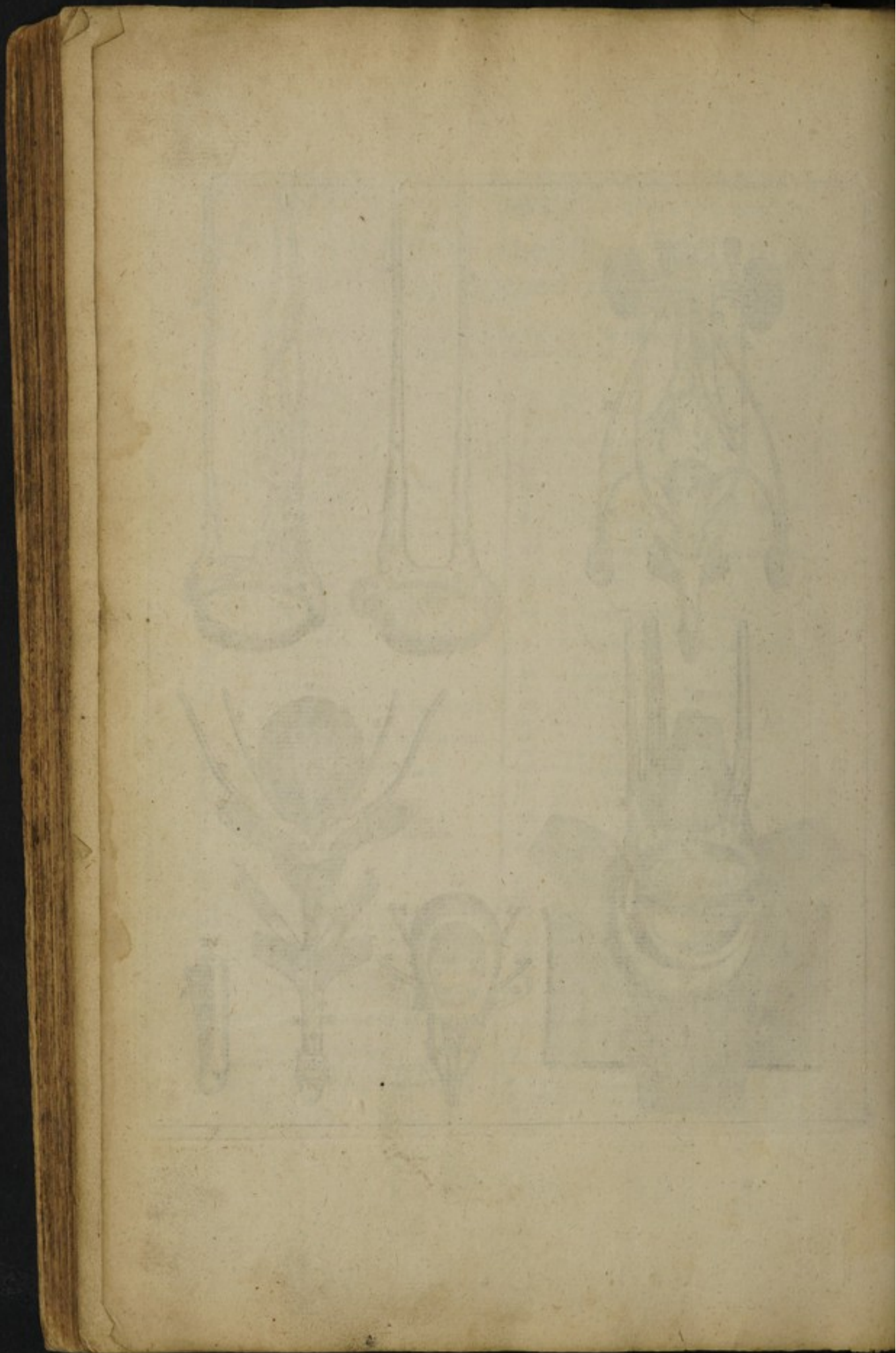
FIG. VI.

- A* The internal tunicle of the *Bladder* being open.
BB Part of the *streters*.
CC The *Orifice* of the *streters*, as they are disacted into the *Bladder*.
DD The beginning of the *Capulæ*.
EE The *Seminal Bladders*.
GG The *Glandulæ Prostatæ* divided.
L The hole in the *Capulæ* passing into the beginning of the *Urethra*, which is covered with a *stutter*.

FIG. VII.

- A* The *Membrane* of the nervous body of the *Yard* separated.
B The blackish marrow of the same body.
C The *Glans* laid naked.





The TABLE of the Seventy-two Plates in this Book, Opened and Explained.

The Table is divided into two Columns: The first Column contains the
Number of the Plate, and the second Column contains the Title of the Plate.

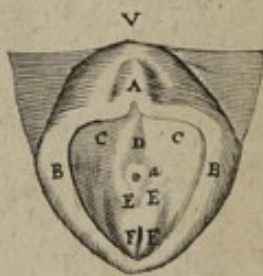
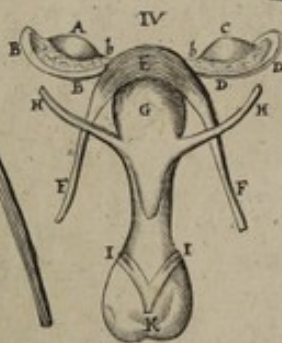
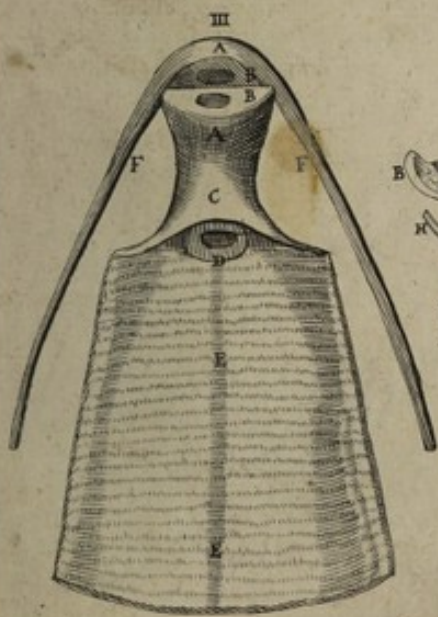
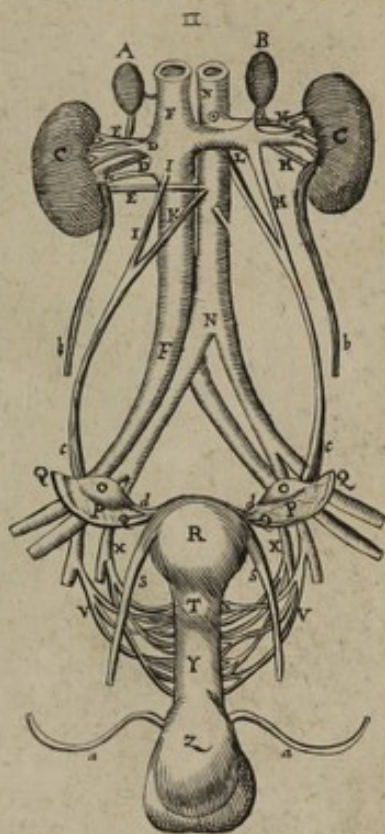
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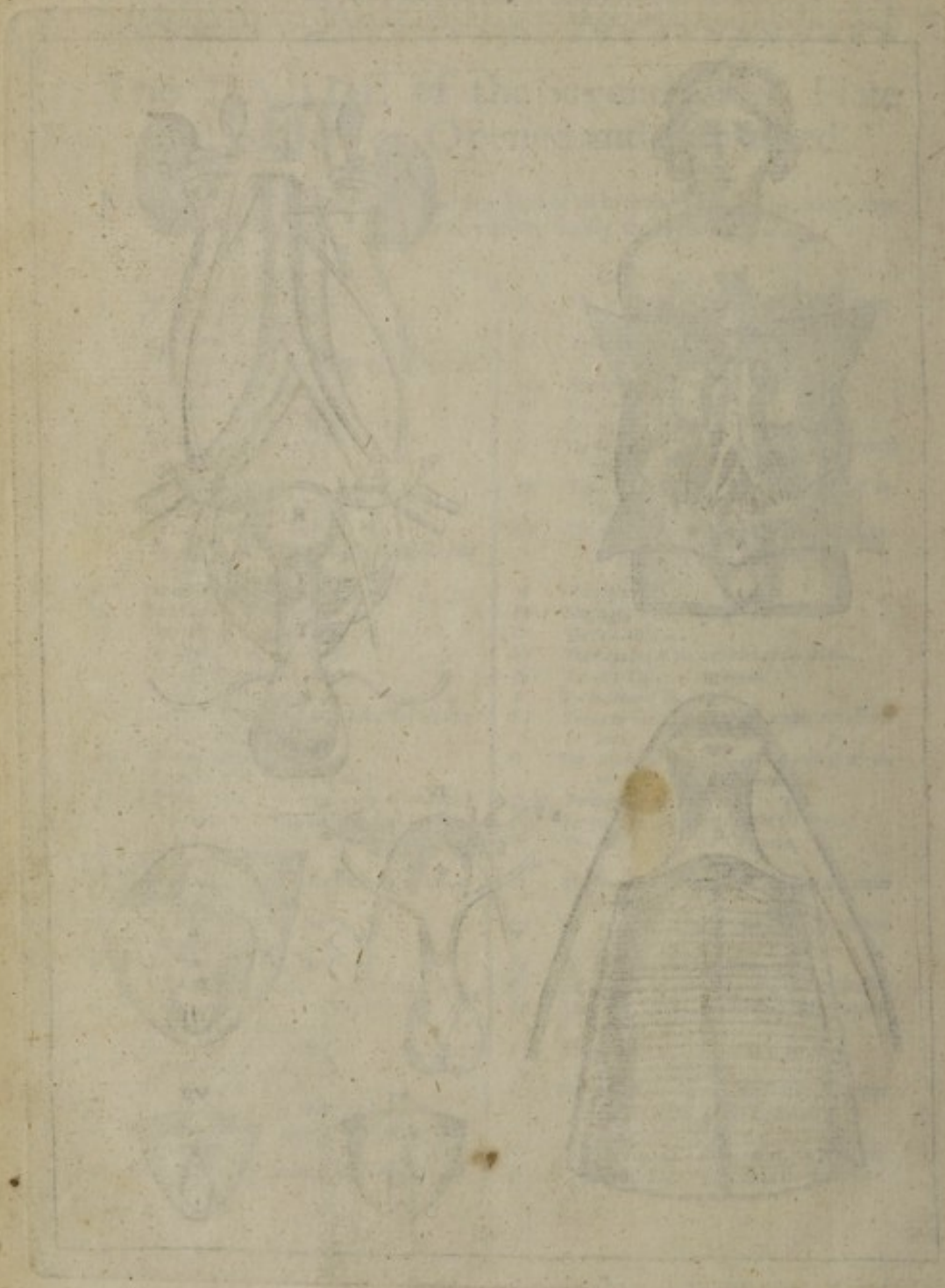
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The TABLE of the Seventh Brass Plate in this BOOK, Opened and Explained.

This Table shews the Genitals of Women : First of all in their Natural Scituation; then
their severall Parts out of their Scituation; Lastly, the *Hymen* and *Zona*.

FIG. I.		
a	The right preparing Vessels.	
b	The left preparing Vessels.	
c	A portion of the right Gut.	
d	The bottom of the Womb sticking up above the Bladder.	
e	The bladder.	
FIG. II.		
A	The right Glandula renalis.	
B	The left Glandula renalis.	
CC	The Kidneys on both sides.	
DD	The right Emulgent Veins.	
EEE	The right Emulgent arteries.	
FF	The trunk of the Vena Cava, divided into the right and left Iliack branches.	
G	The left emulgent vein.	
H	The left emulgent arteries.	
II	The right Spermatical Vein.	
K	The right Spermatical artery.	
L	The left Spermatical artery.	
M	The left Spermatical vein.	
NN	The trunk of the great artery divided into the right and left Iliack.	
OO	Womans Testicles.	
PP	A portion of the broad Ligament.	
Q Q Q	The Tubes of the Womb, depressed on both sides with the Ligament, that so the Testicles may appear.	
R	The bottom of the Womb.	
SS	The round Ligaments of the Womb cut off below.	
T	The neck of the womb.	
U	In the right side, the Hypogastrick vein.	} distributed in the womb.
U	In the left side, the Hypogastrick artery.	
X	In the right side, the Hypogastrick artery.	
X	In the left side, the Hypogastrick vein.	
Y	The passage of the womb.	
Z	The Bladder depressed above the Privities.	
aa	A portion of the ureters cut off about the Bladder.	
bb	A portion of the ureters descending cut off	
		about the reins.
cc	The preparing Vessels dilated about the testicles.	
dd	The Vasa deferentia.	
FIG. III.		
AA	The bottom of the womb dissected cross.	
BB	The cavity of the bottom.	
C	The neck of the womb.	
D	The hole in the neck of the womb of a woman which hath brought forth.	
EE	The wrinkled face of the passage of the womb.	
FF	The round Ligaments of the womb cut off underneath.	
FIG. IV.		
A	The right testicle.	
BB	The right Tube depressed.	
C	The left testicle.	
bb	The passages of the testicles of the womb.	
DD	The left Tube of the womb.	
E	The bottom of the womb.	
FF	The round Ligaments of the womb cut off below.	
O	The Bladder inserted to the passage of the womb and stretched upwards.	
HH	Portions of the ureters.	
II	The two muscular parts of the Clytoris.	
K	The body it self of the Clytoris.	
FIG. V.		
A	The head of the Clytoris sticking out under the skin.	
BB	The external Lips of the Privities drawn aside.	
CC	The Alx or Nymphæ drawn aside.	
D	The Caruncle of the passage of urine besides (a)	
EE	The two fleshy productions like Myrtle Leaves.	
FF	The Membranous containing of the chink.	
FIG. VI.		
A	The Membrane drawn cross the Privities vulgarly taken for the Hymen.	
FIG. VII.		
A	The Privities of a young Girl, in which the significatio is the same as in the fifth figure.	





The TABLE of the Eighth Brass Plate
in this Book, Opened and Explained.

The following is a list of the names of the
Persons mentioned in the eighth Brass Plate,
as they are given in the original Hebrew,
and as they are translated into English
in the present Edition of the Bible.

Page	Original Hebrew	English Translation
100	אֶלְיָשָׁפָא	Elishapha
101	בְּרַחְמִי	Brachmy
102	גְּדַלְיָהוּ	Gedaliah
103	הַחֲזִקִּי	Hachizki
104	יִשְׁמָעֵאל	Yismael
105	יִשְׂרָאֵל	Israel
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148	יִשְׂרָאֵל	Israel
149	יִשְׂרָאֵל	Israel
150	יִשְׂרָאֵל	Israel

The TABLE of the Eighth Brass Plate
in this Book, Opened and Explained.

The Fruit in the Womb being often helped by Physical Remedies, requires no less diligent observation than the Body it self of Man; therefore we have given you the representation of it in two Tables according to the Method of Dissections. The first of which laies open to your view the Umbilical Vessels, and the *Skeleton*: The other the Deliniment of the Bowels,

FIG. I.

Shews the Child ready to be born, as it lies in a fit posture for extramission.

AAAA The parts of the Abdomen dissected and distracted.

BBBB The body of the womb divided into four parts

CCCC The Chorion and Amnios joyned together, and dissected into four parts.

D The Child turning its head downwards, which is the natural way of birth.

FIG. II.

Shews the Child taken out of the Womb, the Umbilical Vessels, and Membranes separated about the beginning.

A The umbilical vein distended from the liver.

BB The two umbilical Arteries rising to the Navil.

C The Urachus knit to the Navil.

DDD The Navil produced even to the Placeneum.

EE The Amnios separated from the Chorion, under which a portion of the Navil appears.

FF The Chorion divided into four parts.

GGG The Umbilical veins and arterie, distributed in the Placenta which are extended above the Chorion, but very lucidly appear under it.

FIG. III.

Explains the Secundines, in what part they cleave to the Womb.

AA The convex part of the Placenta.

BBBB The Chasion under the Placenta.

FIG. IV.

Shews the Bones pertaining to the Head.

AA The bone of the Fore-head distinct from the Suture.

BB The two bones of the fore part of the head.

C The Crown as yet Membranous by reason of the distance of the Bones.

D The inferior cheek divided into two parts.

FIG. V.

Shews the ring-like bone of the Infant, to which the Membrane of the Ear called Tympanum is knit.

FIG. VI.

The bones of the Ears, removed a little from their Natural Situation.

A The Malleus.

B The Incus.

C The Stapes.

D The little bone annexed to the Ligament of the Stapes, first found out by Dr. Sylvius.

FIG. VII.

Exactly represents the Labyrinth and Cochlea of the Ears perfect in all parts.

A The Oval hole in the Tympanum, which lookt toward the Labyrinth.

B The round hole in the Tympanum between the Labyrinth and the Cochlea.

CCC The three bony Cavities of the Labyrinth.

DD The Cochlea.

FIG. VIII.

Shews the Internal face of the Cochlea with the Labyrinth.

A The oval hole.

B The round hole.

CCC The three circles of the Labyrinth something opened.

DD The Cochlea broken, shewing the little inward porous circle.

FIG. IX.

The Vertebrae of the Infant in three distinct parts.

A The first back part.

B The second back part.

C The third fore part.

FIG. X.

Shews the Vertebrae of the Neck, the bones of the Breast as they are seen on the fore part.

A Denotes only the upper part of the Sternum, the rest are under it.

FIG. XI.

Shews the back, and its Vertebrae, wanting their Processes.

FIG. XII.

Shews the Vertebrae of the Loyns with the bones that make the Pelvis.

A The five Vertebrae of the Loyns, whose Processes are yet cartilaginous.

B The Os Sacrum composed of six parts.

CC The bones called Ilium.

DD The bones of the Pubis.

EE The bone of the Coxendix.

FIG. XIII.

Expresseth the bones of the whole hand.

a b d The Appendices of the bones, yet cartilaginous.

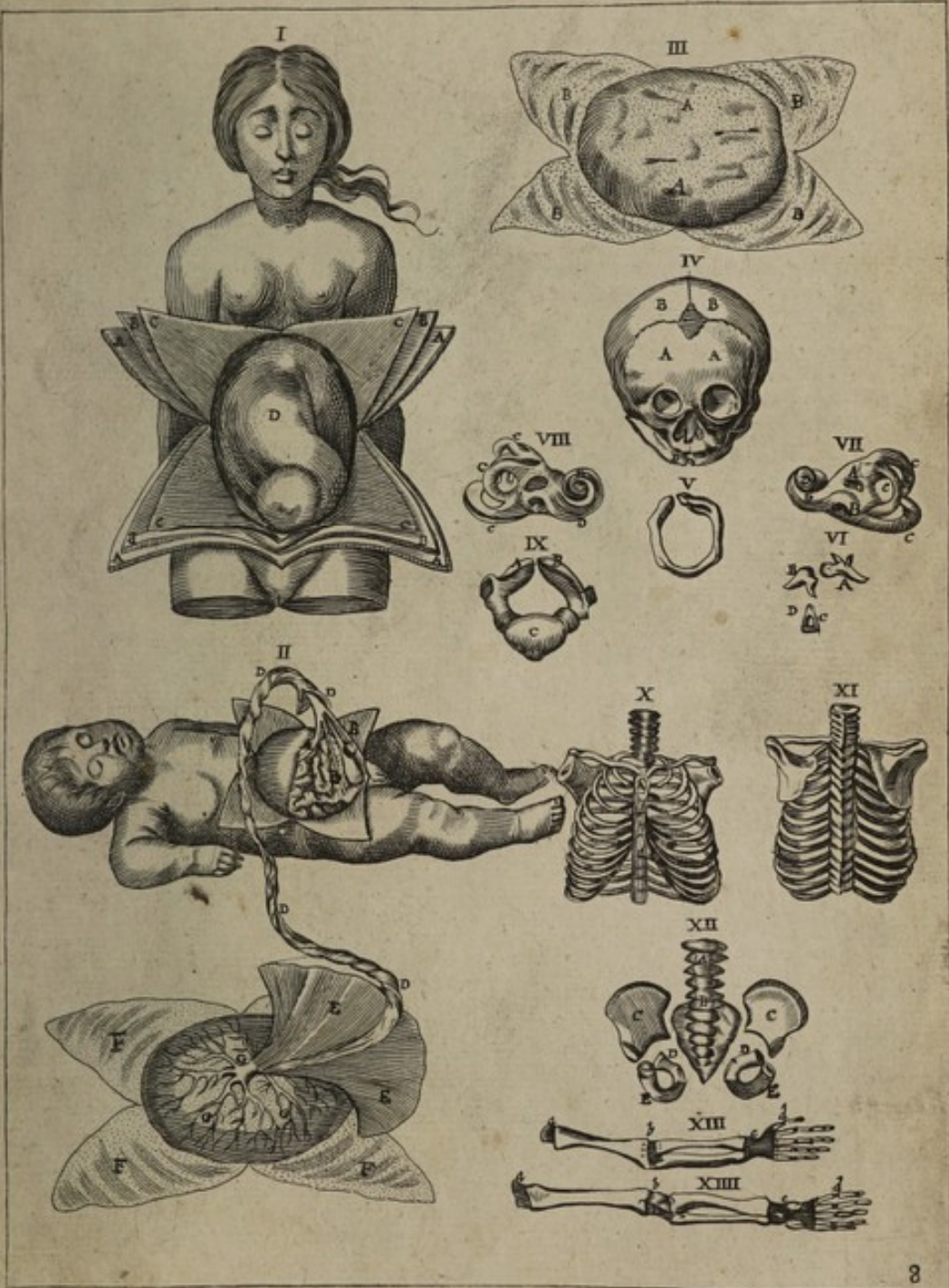
c The bones of the wrist all cartilaginous.

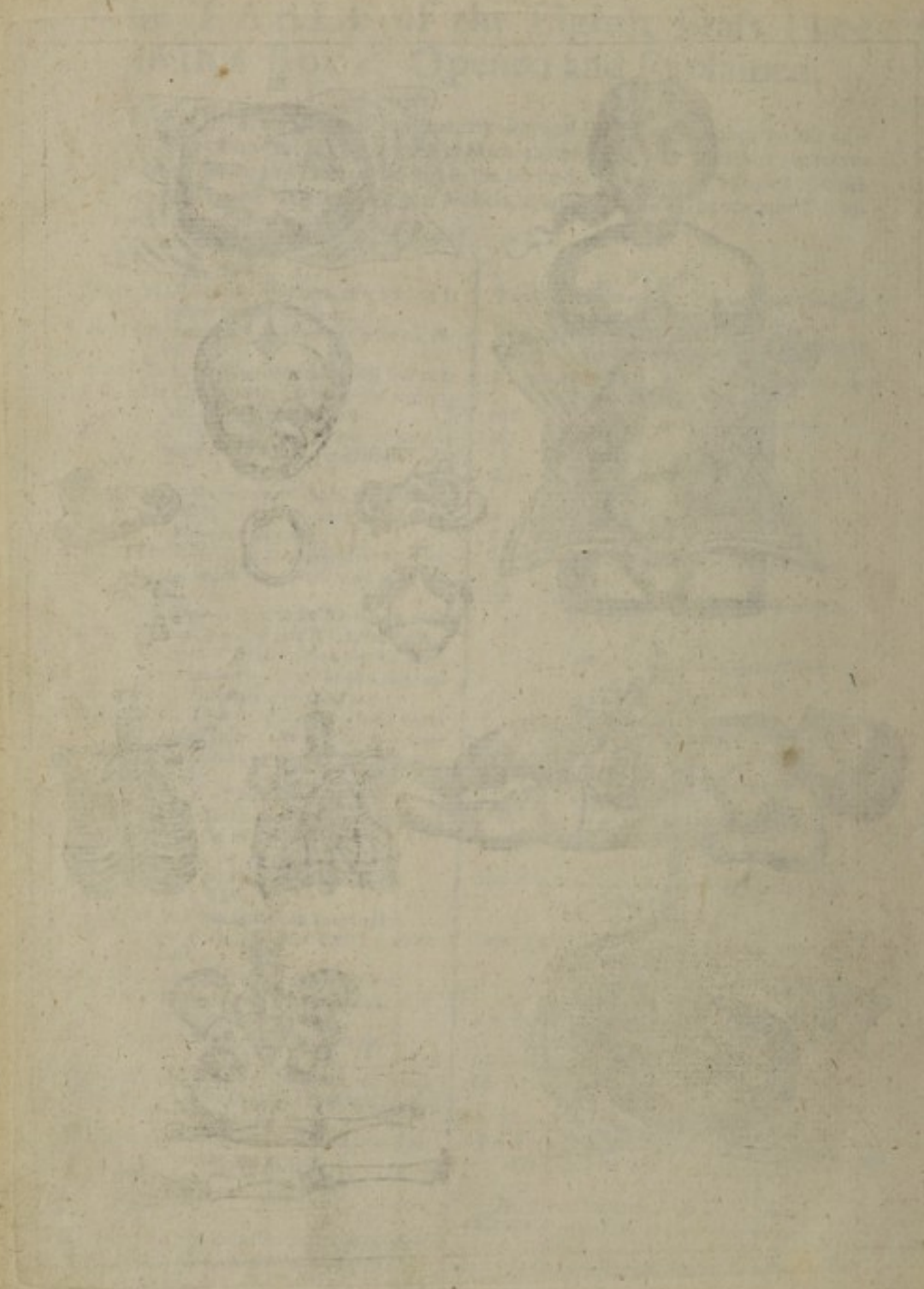
FIG. XIV.

Represents the bones of the whole Foot.

a b d The Appendices of the bones which are cartilaginous.

c Certain Cartilaginous bents of the Instep.





THE TABLE OF THE NINTH BOOK

The TABLE of the Ninth Book

in this Book, Opened and Explained

This Table contains all the Chapters which are in the Ninth Book of the Bible

1	Chapter I
2	Chapter II
3	Chapter III
4	Chapter IV
5	Chapter V
6	Chapter VI
7	Chapter VII
8	Chapter VIII
9	Chapter IX
10	Chapter X
11	Chapter XI
12	Chapter XII
13	Chapter XIII
14	Chapter XIV
15	Chapter XV
16	Chapter XVI
17	Chapter XVII
18	Chapter XVIII
19	Chapter XIX
20	Chapter XX
21	Chapter XXI
22	Chapter XXII
23	Chapter XXIII
24	Chapter XXIV
25	Chapter XXV
26	Chapter XXVI
27	Chapter XXVII
28	Chapter XXVIII
29	Chapter XXIX
30	Chapter XXX

* * * * *

The TABLE of the Ninth Brass Plate in this Book, Opened and Explained.

This Table comprehends all the Bowels which are found in the *Abdomen* and
Breast of the Infant.

FIG. I.

Singularly expresseth the *Lacteal Veins*, as they
are represented at a single view.

- AAA The hollow part of the *Liver*.
B The *Gall*.
CC The *umbilical vein* bowed upward.
DD The *Stomach* turned upwards.
E Its lower *Orifice* tyed with a string.
F A portion of the *Jejunum* cut off near the *Pylorus*.
GGG The *Pancreas* of a famous bigness.
H The *Spleen*.
II The right *Kidney* covered with the common
Membrane.
K The left *Kidney* in like manner covered.
LLL The *Mesenterium* stretched abroad.
MM &c. The *Guts* knit to the *Mesenterium*.
aaaa Certain *Lacteal veins* stretched from the
Sweet-bread to the *Liver*, whereof few and
those the least of them are here expressed.
bbb &c. *Lacteal veins* distributed from the *Sweet-*
bread to the *Guts*, and those bigger.
ccc &c. The *Meseraick* branches of the *Vena Porta*.
ddd &c. Branches of the *Meseraick* arteries.

FIG. II.

- A The right *Renal Glandula*.
B The right *Kidney*.
C The left *Glandula* of the *Reins*.
D The left *Kidney*.
E The *Vena Cava* descending.
FF Its internal *Iliack* branches.
GG The external *Iliack* branches of the *Vena Ca-*
va.
HHH The great artery with its external *Iliack* bran-
ches.
II The internal branches of the great artery.
KK &c. Both *umbilical* arteries bent downwards.
L The bottom of the *womb* compressed.
M The neck of the *womb*.
N The *bladder* turned downwards.
O The *Urachus*.
P The node of the *Navel* cut off.

- a The vein of the right *Renal Glandula*.
b The artery of the right *Renal Glandula*.
c The right *emulgent* artery.
d The right *emulgent vein*.
e The right *spermatical vein*.
f The right *spermatical artery*.
g The left artery of the *Renal Glandula*.
h The left vein of the *Renal Glandula*.
i The left *emulgent vein*.
k The left *emulgent artery*.
l The left *spermatical vein*.
m The left *spermatical artery*.
nn The *Vessels* preparing the *Seed*.
oo The *testicles* of a great magnitude.
pp The broad *Ligaments* of the *womb*.
qq &c. The *Tubz* of the *womb* bowed down.
rr The young *Ligaments* of the *womb* cut off be-
low.
ff Portions of the *uterus* cut off.

FIG. III.

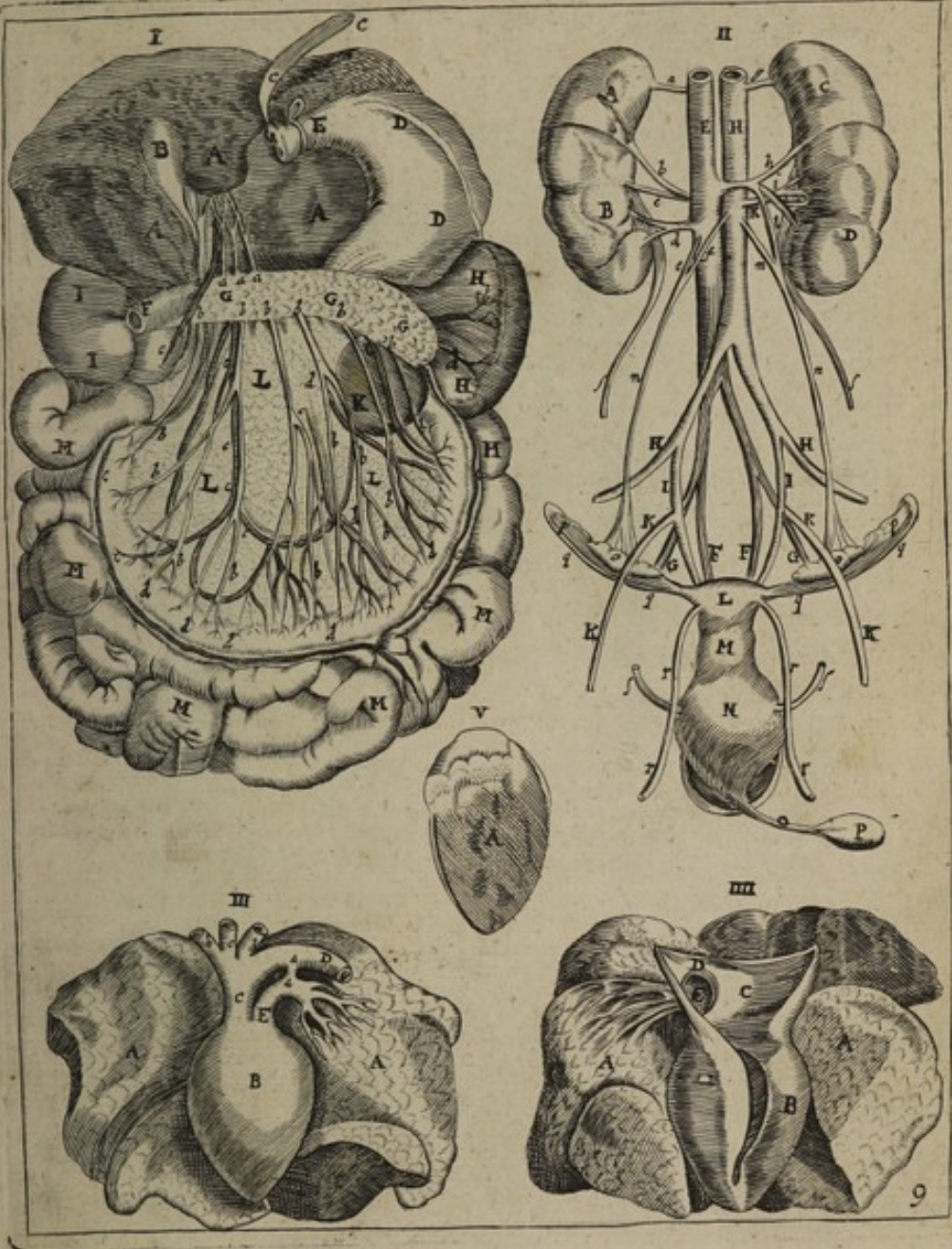
- AA The *Lungs* diducted on both sides.
B The *Heart* whole.
C The trunk of the great artery coming from the
Heart.
D A portion of the same artery passing down-
wards.
E The *Vena Arteriosa* stretched from the *Heart*.
aa The channel between the *Vena Arteriosa* and
the great artery.
b The beginning of the right *subclavian* artery.
c The beginning of the right *Carotides*.
d The beginning of the left artery *Carotides*.

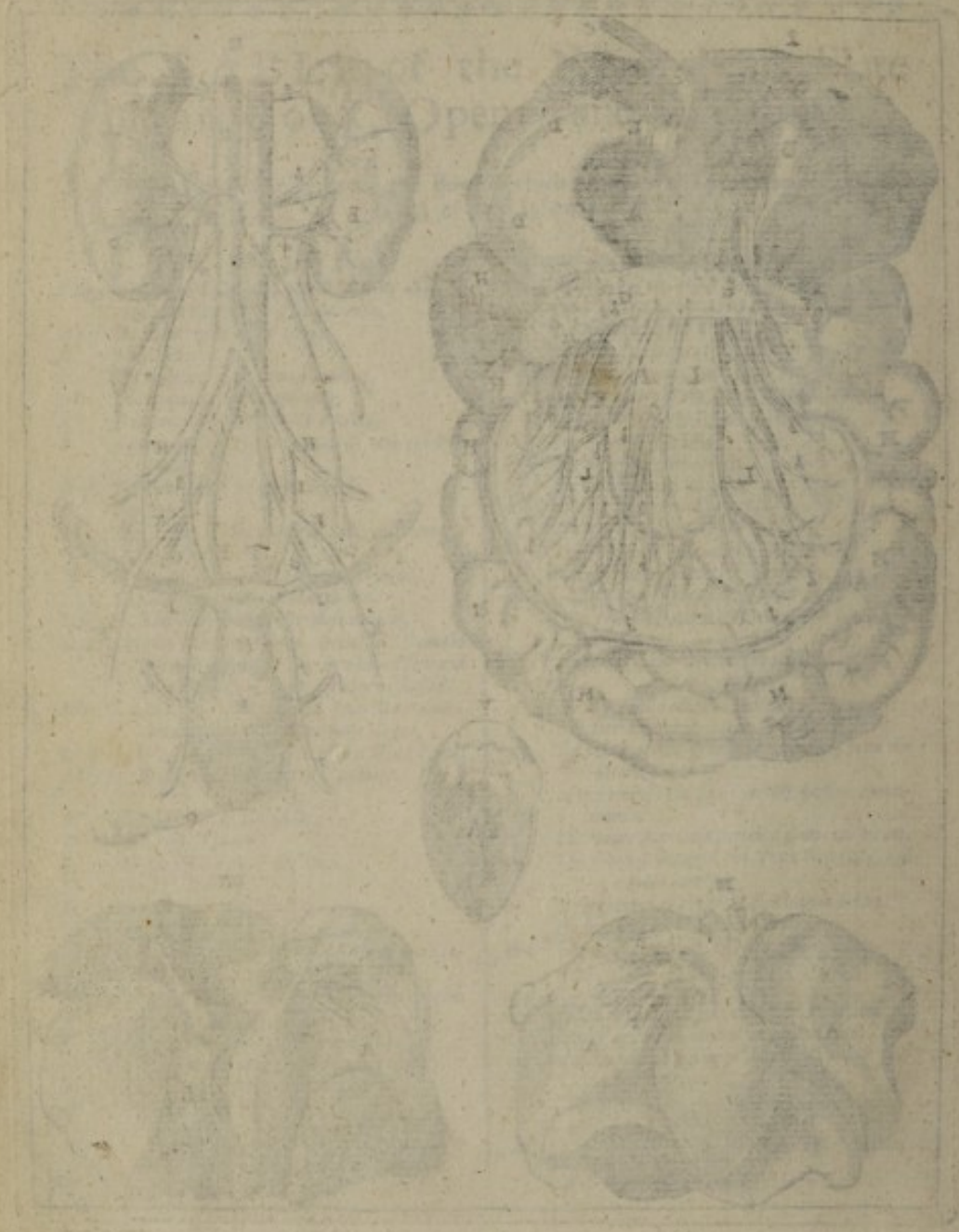
FIG. IV.

- AA The *Lungs* diducted.
B The *Heart* cut towards the right *Ventricle*.
C The *Vena Cava* opened near the *Heart*.
D *Anastomosis* between the *Vena Cava* and
Arteria Venosa.
E The *shutter* in the *Anastomosis*.

FIG. V.

- A The *Corpus Thymium* separated from the
Vessels of the *Heart*.





The TABLE of the Table of Contents
 in this Book, Opened and Explained.

The Table presents the subjects and books of the Bible
 its Members and Chapters.

Table of Contents
 The Bible is divided into
 Old Testament
 New Testament
 The Old Testament is divided into
 Law
 Prophets
 The New Testament is divided into
 Gospels
 Acts
 Epistles
 Revelation

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The TABLE of the Tenth Brass Plate
in this BOOK, Opened and Explained.

This Table Represents the Muscles and bones of the Breast,
its Membranes and *Diaphragma*.

FIG. I.

- A The Pectoral Muscle in his situation.
 B The same Muscle out of his situation.
 C Serratus major anticus in its situation.
 D The same a little removed out of it.
 E Serratus anticus minor totally in its situation.
 F The subclavian Muscle in its situation.
 f The Clavicula bowed back under the pectoral Muscle.
 gg Platysma myodes in the neck with their right strings.
 GG &c. The external intercostal muscles without their situation.
 HH &c. The internal intercostal Muscles in their situation.
 II A portion of the Diaphragma in its situation.
 K Part of the great artery descending.
 L The hole for the Gula passing the Diaphragma.
 M The hole for the Vena Cava descending.
 NN The square muscles of the Loyns in their situation, of which Chap. 12.
 OO The Muscles called Psoas in their situation, of which Chap. 19.

FIG. II.

Shews the bones of the Breast as they are to be seen forwards.

- AA The Sternum.
 B The Mucronata, or sword-like Cartilage.
 CC &c. The cartilaginous part of the Ribs.
 1, 2, 3, 4, 5, 6, 7. The true Ribs.
 8, 9, 10, 11, 12. The bastard Ribs.

FIG. III.

Shews the Ribs, *Vertebrae* and processes on the back part.

FIG. IV.

The Breast opened, in which

- AA The Mediastinum drawn into the side.
 BB The tunicle of the Mediastinum disadsted under the Sternum.
 C The right lobe of the Lungs.

FIG. V.

- AA Part of the Pleura drawn at one side from the Ribs.
 BB The Ribs laid bare from the Pleura.
 CC The Ribs clothed with the Pleura.

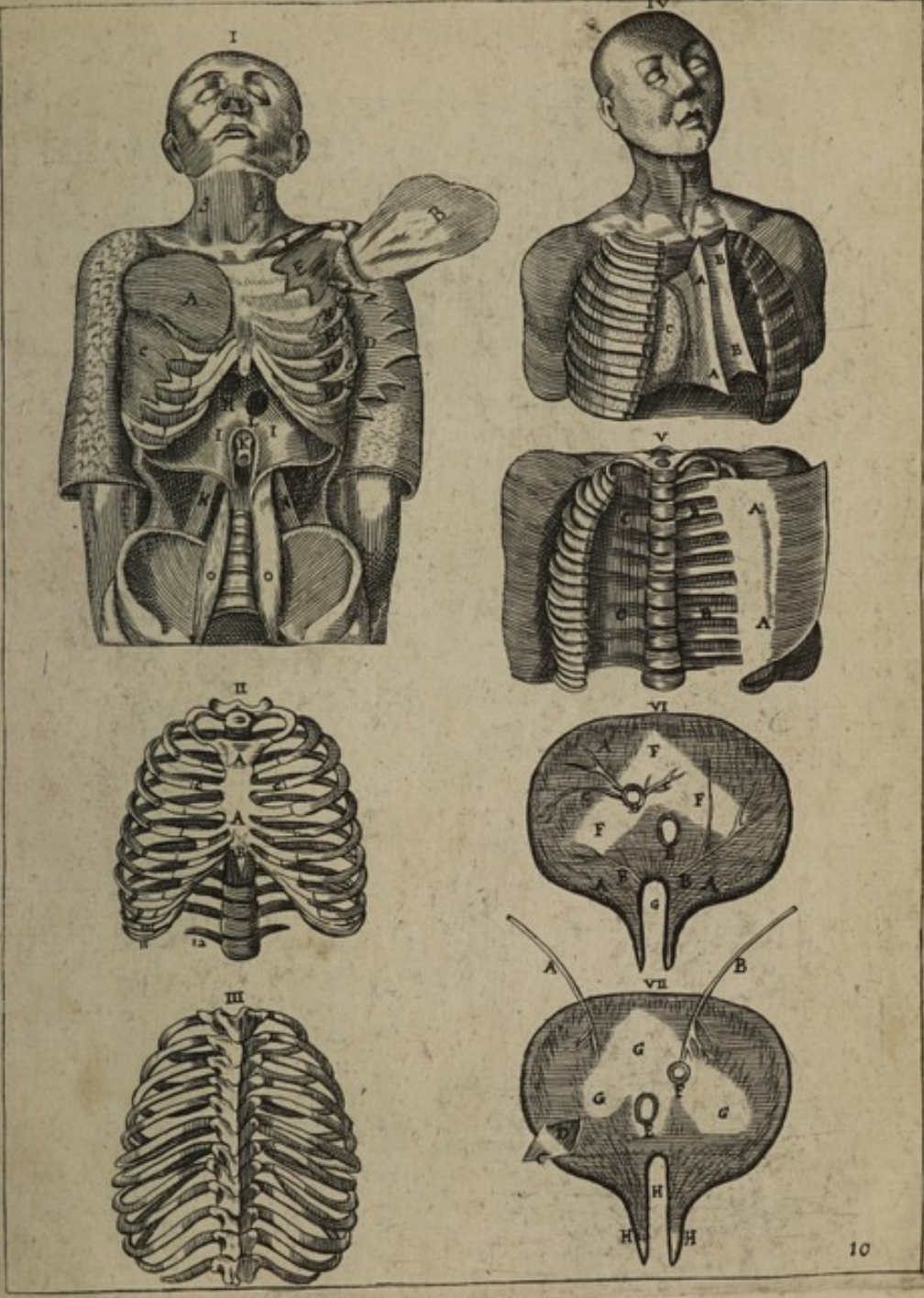
FIG. VI.

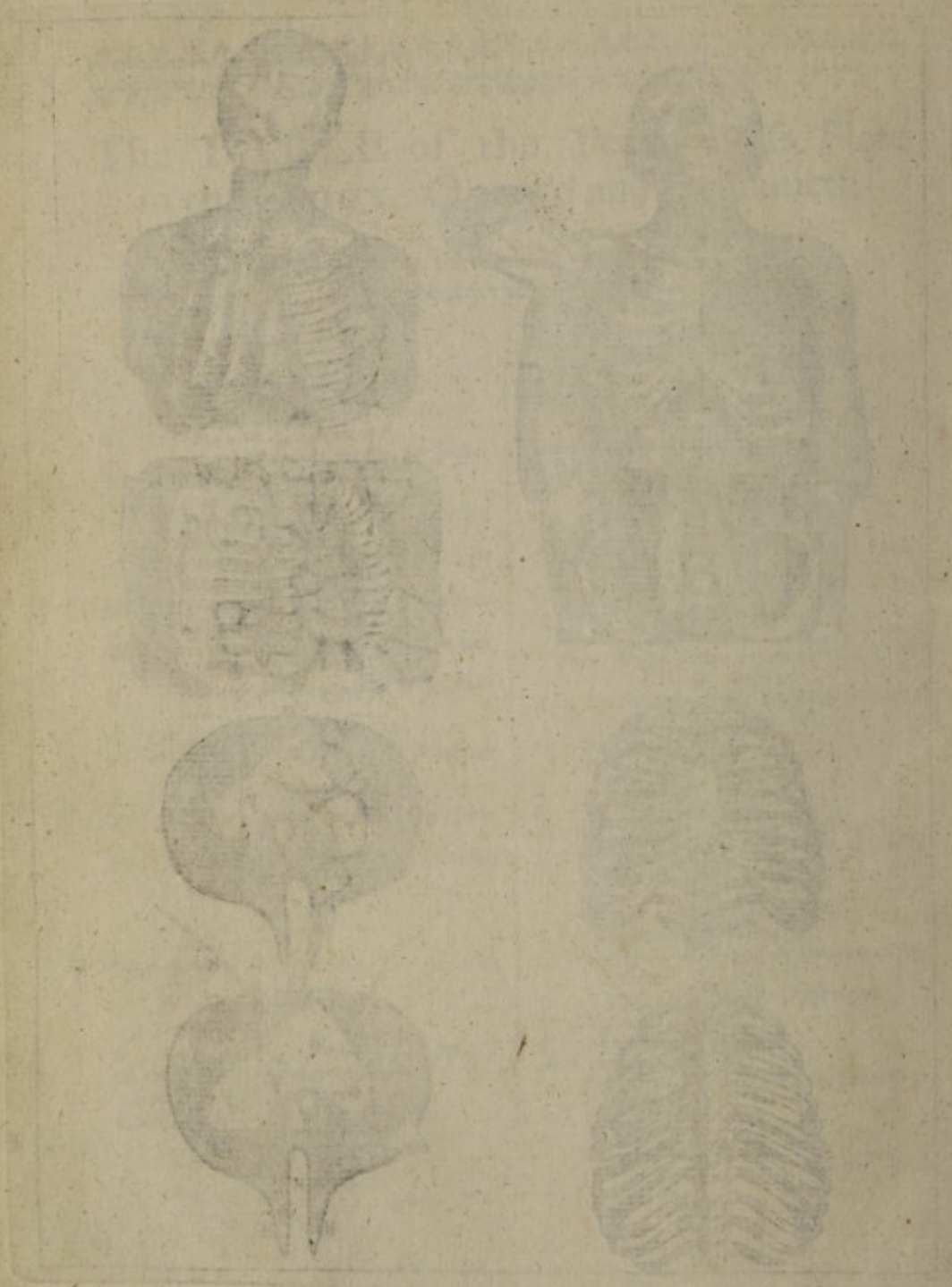
Shews the Diaphragma separated from the Ribs and *Vertebrae*.


- AAA The fleshy part of the Diaphragma covered with its Membrane.
 BB The Phrenical arteries.
 CC The Phrenical veins.
 D The passage of the Vena Cava.
 E The passage of the Gula.
 FFF The membranous part of the Diaphragma.
 G The hole between the fleshy portions of the descending of the great artery.

FIG. VII.

- A The left nerve of the Diaphragma.
 B The right nerve of the same.
 C The superior Membrane of the Diaphragma separated.
 D The fleshy substance of the Diaphragma.
 E The hole for the Gula.
 F The hole for the Vena Cava.
 GGG The Membranous part.
 HHH The fleshy parts between which the great artery descends.







The TABLE of the Eleventh Brass Plate
in this Book, Opened and Explained.

This Table chiefly represents the Heart, its Membranes, Vessels, Ventricles and Shuttters, then the Lungs and the *Aspera Arteria* separated from them.

FIG. I.

- A The Pericardium compassing the heart.
- BB The Lungs embracing the Heart in their Natural situation.
- C The Vena Cava ascending above the Heart.
- D The beginning of the vein without a fellow.
- E The right subclavian vein.
- F The right Jugular vein.
- G The left Jugular vein.
- H The left subclavian vein.
- II The right and left Carotis artery.
- KK The right and left subclavian artery.
- LL The Nerves of the sixth pair descending to the Lungs.
- M The beginning of the great Artery descending.

FIG. II.

Shews particularly the Vessels passing from the Heart to the Lungs; which are shewed you separated in the third and sixth Figure of the following Chapter.

- A The Pericardium taken from the Heart.
- B The Heart with the Coronal veins and arteries.
- C The trunk of the great Artery passing out of the Heart.
- D Its descending part turned upwards.
- EE The left branch of the Arterial vein distributed to the Lungs.
- F A channel between the arterial vein, and the great artery.
- G The right branch of the arterial vein.
- HH The right and left branch of the venal artery.
- I The Ear of the Heart.
- KK The Lungs about the Heart.
- L The proper tunicle of the Lungs separated.

FIG. III.

The Heart of an Infant whole.

- A The proper Membrane of the heart separated.
- B The substance of the Heart bare.
- CC The right and left Ears of the Heart.
- D The great artery sticking out of the Heart.
- E A portion of the Vena Cava.

FIG. IV.

- A Part of the Heart transversely cut.
- B The left ventricle.
- EC The right ventricle conspicuous.
- DD The Septum of the Heart.

FIG. V.

Shews the Vena Cava dissected with the right Ventricle.

- A The Orifice of the coronal Vein.
- B The Anastomosis betw. en the Vena Cava and the venal artery.
- CCC The shutters called Tricuspides.
- DDD The right Ventricle of the Heart opened.
- aa The passages between the Membranes ending in the Septum.

FIG. IV.

- A The arterial vein dissected in the right ventricle.
- BBB The shutters called Sigmoides in the arterial vein.
- CCC The right Ventricle of the Heart opened.

FIG. V.

- A The great artery dissected near the Heart.
- BBB The semilunar shutters of the great artery.
- CC The left ventricle of the Heart.
- D Part of the left ventricle turned back.

FIG. VI.

- A The Venal artery dissected.
- B The beginning of the Anastomosis between the venal artery and the Vena Cava.
- bb The passages between the Membranes ending in the Septum.
- CC The two central shutters.
- DD The left ventricle of the Heart opened.

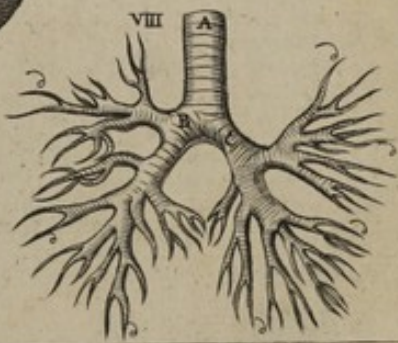
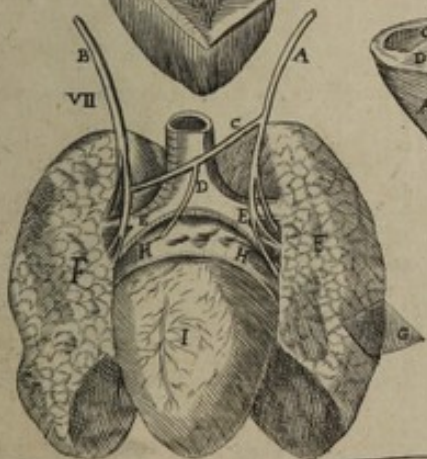
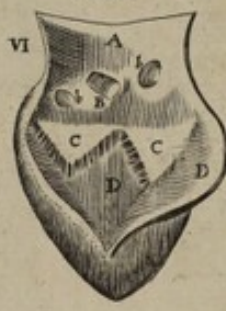
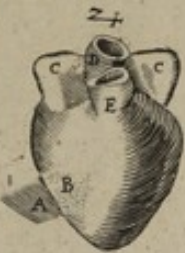
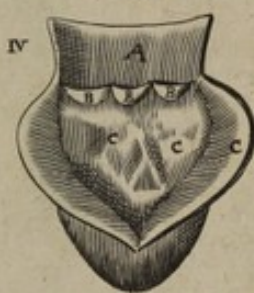
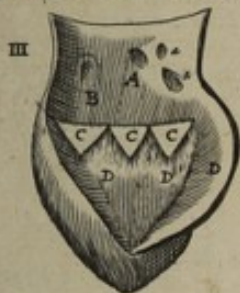
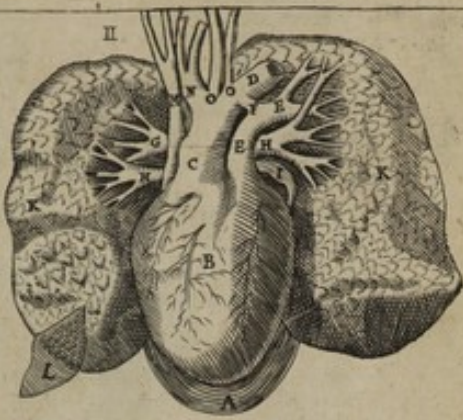
FIG. VII.

Shews the backward part of the Lungs and windpipe, as they are joynd to the Heart.

- A The right Nerve of the sixth pair which comes to the Lungs.
- B The left Nerve of the same.
- C The middle branch between each Nerve.
- D The branch which is carryd to the Pericardium.
- EE The two greater branches of the windpipe which are Membranous behind.
- FF The hinder part of the Lungs.
- G The proper Membrane of the Lungs.
- HH A portion of the Pericardium left.
- I The heart left in his situation.

FIG. VIII.

- A The wind-pipe cut off under the Larynx.
- B The right branch thereof divided first into two parts.
- C The left branch thereof divided into greater and lesser branches.
- add &c. The extremity of the branches ending in membranous channels.





The TABLE of the Twelve Books in this Book, Opened and Explained.

<p>1. The first book, which is the first of the twelve books, and is the first of the first part of the book.</p> <p>2. The second book, which is the second of the twelve books, and is the second of the first part of the book.</p> <p>3. The third book, which is the third of the twelve books, and is the third of the first part of the book.</p> <p>4. The fourth book, which is the fourth of the twelve books, and is the fourth of the first part of the book.</p> <p>5. The fifth book, which is the fifth of the twelve books, and is the fifth of the first part of the book.</p> <p>6. The sixth book, which is the sixth of the twelve books, and is the sixth of the first part of the book.</p> <p>7. The seventh book, which is the seventh of the twelve books, and is the seventh of the first part of the book.</p> <p>8. The eighth book, which is the eighth of the twelve books, and is the eighth of the first part of the book.</p> <p>9. The ninth book, which is the ninth of the twelve books, and is the ninth of the first part of the book.</p> <p>10. The tenth book, which is the tenth of the twelve books, and is the tenth of the first part of the book.</p> <p>11. The eleventh book, which is the eleventh of the twelve books, and is the eleventh of the first part of the book.</p> <p>12. The twelfth book, which is the twelfth of the twelve books, and is the twelfth of the first part of the book.</p>	<p style="text-align: center;">FIG. I.</p> <p style="text-align: center;">Shows the first part of the book.</p> <p>1. The first part of the book, which is the first of the twelve books, and is the first of the first part of the book.</p> <p>2. The second part of the book, which is the second of the twelve books, and is the second of the first part of the book.</p> <p>3. The third part of the book, which is the third of the twelve books, and is the third of the first part of the book.</p> <p>4. The fourth part of the book, which is the fourth of the twelve books, and is the fourth of the first part of the book.</p> <p>5. The fifth part of the book, which is the fifth of the twelve books, and is the fifth of the first part of the book.</p> <p>6. The sixth part of the book, which is the sixth of the twelve books, and is the sixth of the first part of the book.</p> <p>7. The seventh part of the book, which is the seventh of the twelve books, and is the seventh of the first part of the book.</p> <p>8. The eighth part of the book, which is the eighth of the twelve books, and is the eighth of the first part of the book.</p> <p>9. The ninth part of the book, which is the ninth of the twelve books, and is the ninth of the first part of the book.</p> <p>10. The tenth part of the book, which is the tenth of the twelve books, and is the tenth of the first part of the book.</p> <p>11. The eleventh part of the book, which is the eleventh of the twelve books, and is the eleventh of the first part of the book.</p> <p>12. The twelfth part of the book, which is the twelfth of the twelve books, and is the twelfth of the first part of the book.</p>
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The TABLE of the Twelfth Brass Plate in this Book, Opened and Explained.

FIG. I.

Shows the Vena Cava.

- A* The beginning of the Vena Cava, with his large orifice about the Heart.
BB The rise of the subclavian branches.
C The beginning of the descending trunk.
DD The right and left Iliack branches.
aaa &c. The branches of the Axygus distributed to the Ribs.
bb The superior intercostal.
cc The internal mammary.
*** The Mediastini.
dd The Vertebral Vein.
ee The internal Jugular cut off under the Skul.
ff The external Jugular, from which the inferior branch riseth to the Organ of speech, and the Subcutaneous by the face and Temples, and backwards by another branch to the Ears.
gg The Cervical Vein.
hh The progress of the subclavian branches.
ii The internal scapular vein.
KK The external scapulars.
3.3. The vein carryed to the Musclev Deltoid.
ll The superior Breast-vein.
mm The Cephalick vein cut off.
nn The basillick vein cut off.
oo The inferior Breast vein.
p The left plevnical vein.
q The right plevnical vein.
rr A famous branch distributed in the Liver.
ss tt &c. The sprigs thereof distributed in the right and left side thereof.
uu The Vena cavae, or superior Lumbals.
yy The Veins of the Renal Glandula.
xx The right and left emulgent.
zz The right and left spermatical.
aa The beginning of the Lumbals.
bb The Vena cavae of the inferior Lumbal.
cc The Vena sacra.
dd The external Iliack branch.
EE The Epigastrick vein.
ff The internal Iliack branch.
es Vena Glutea.
zz The Hypogastrick veins.
uuu The veins of the Privities.
oo The inguinal veins.
KK &c. The branch of the crural vein.
iii The Saphens.
ll The vein Ilchias.

FIG. II.

Particularly describes the coronal vein of the heart

FIG. III.

Shows the Arterial vein of the Heart.

- A* The beginning by which it passeth out of the right ventricle.
BB Its branches which pass to the right part of the Lungs.
CC Its branches which pass to the left.

FIG. IV.

Shows the great Artery.

- A* Its beginning rising out of the heart.

- BB* The beginning and progress of the subclavian branches.
C The trunk descending.
DD The right and left Iliack branches.
aa The artery Carotis.
bb Its external branch distributed to the Jaws, Face, and backwards to the Ears.
cc The internal Carotis cut off under the Skul.
dd The vertebral artery in like manner cut off.
ff The cervical musclev.
ee The internal Mammary.
ff The branches of the superior intercostal artery.
gg The internal scapular artery.
hh The external scapular artery.
ii The superior breast-artery.
kk The inferior breast-artery.
lm The arteries distributed to the musclev of the Shoulder.
nn The inferior intercostals.
oo The plevnical arteries.
p The famous artery called Coeliac.
q Its right branch divided into three parts; of which, the superior and inferior is distributed to the Liver, and the middle to the Gall.
r The left branch of the Coeliac.
s The right Gastrical artery.
t The splenical artery divided in small branches to the spleen.
u The artery called Epiplioca.
ur The Gastroepiplioca.
x The artery carryed to the Renal Glandula.
yy &c. The superior Mesenterical artery distributed into branches.
zz The emulgent arteries.
aa The rise of the Lumbal arteries.
bb The spermatical arteries.
cc The inferior Mesenterical artery derived into many branches.
d The Arteria sacra.
dd The external Iliack artery.
ff The internal Iliack.
g Arteria Glutea.
zz The Hypogastrick artery distributed to the right Gut and Privities.
qq The Hypogastrick artery distributed to the womb distinguished from the former.
oo The umbilical artery.
EE The Epigastrick artery.
oo The Arteria Pudenda.
ii The Ilchias.
kk The inferior Arteria Muscleva.
ll The Artery which goes to the internal Iliack musclev.

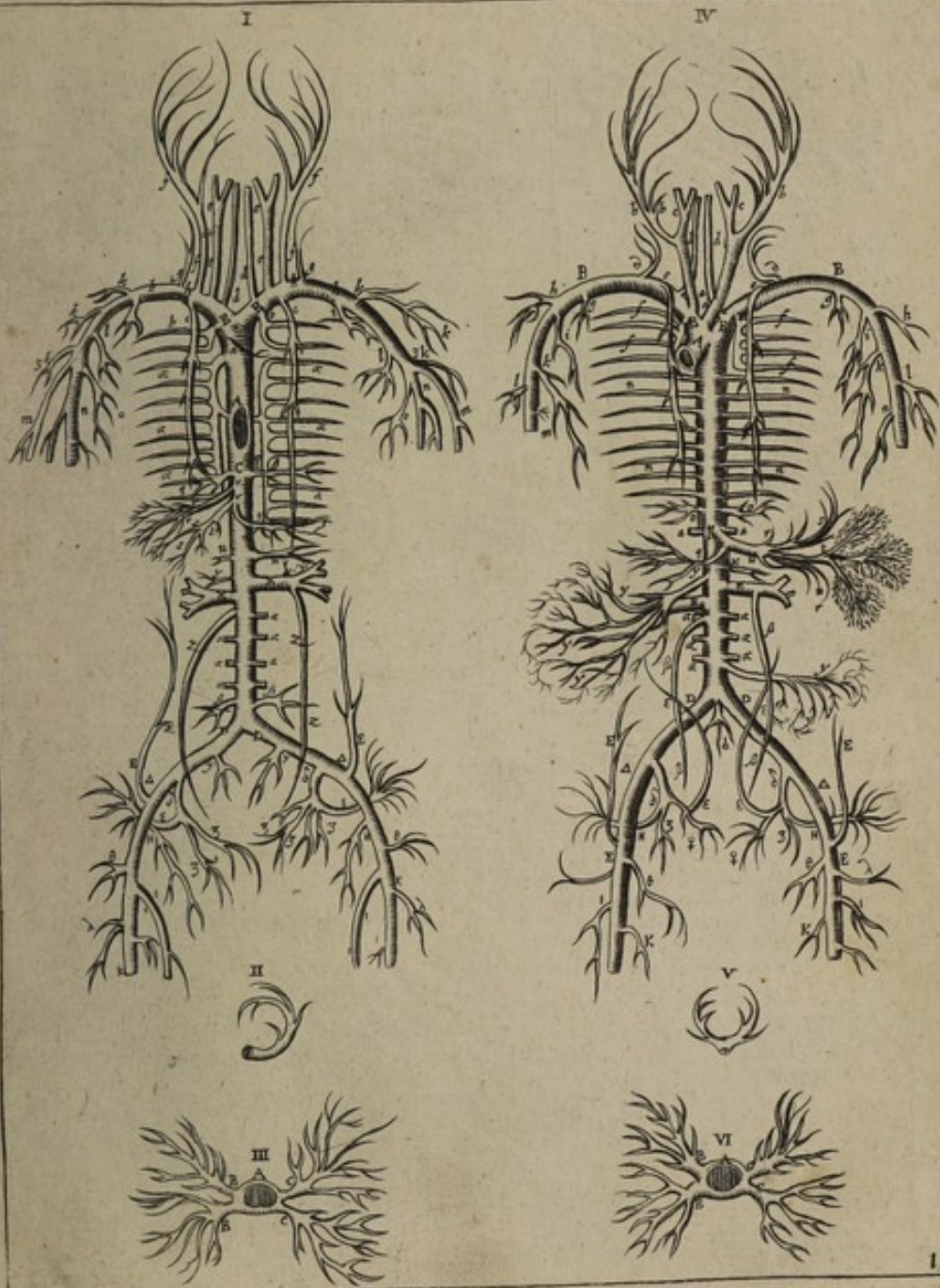
FIG. V.

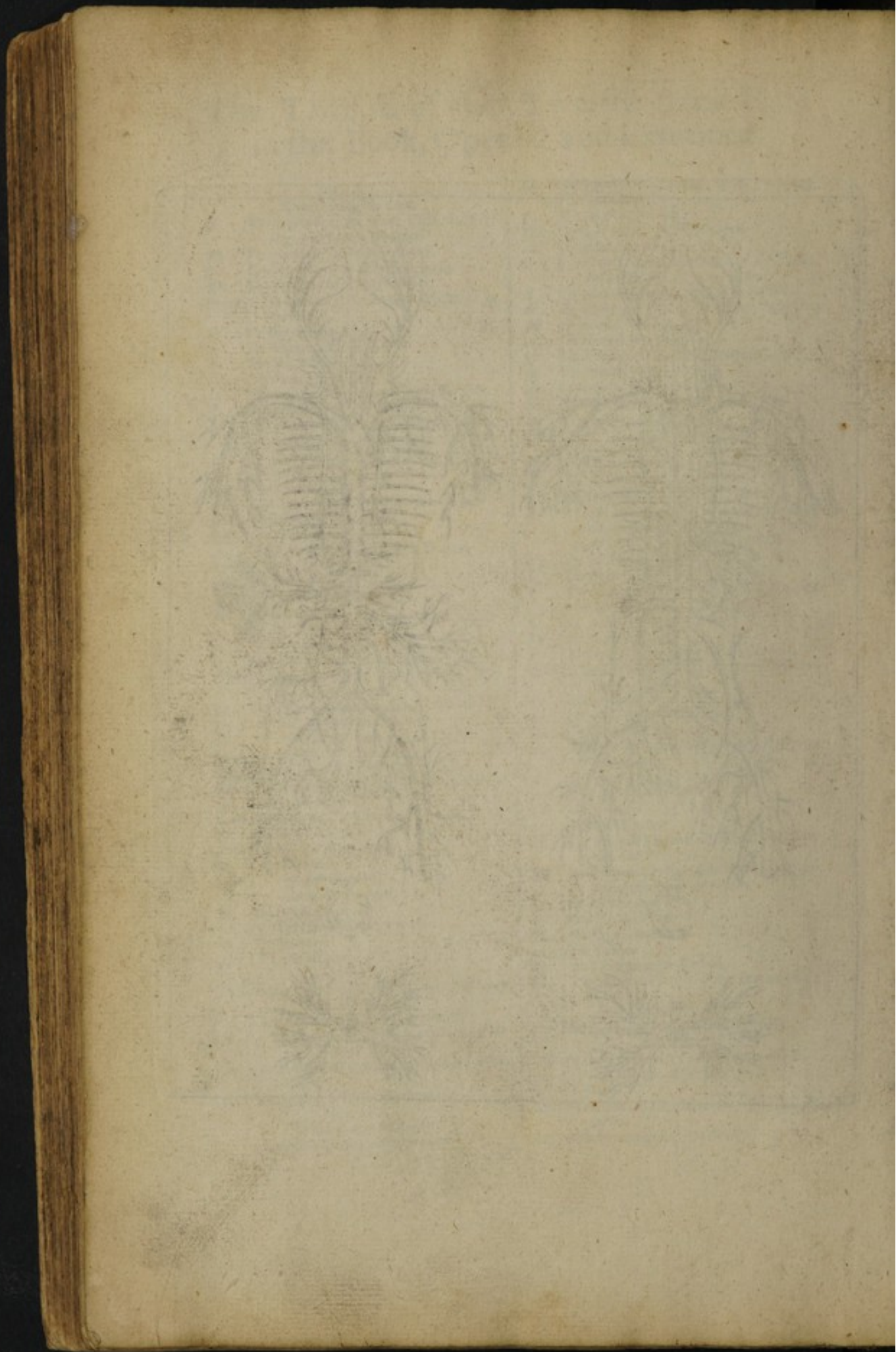
Shows the Coronal Artery of the Heart.

FIG. VI.

Shows the Venal Artery arising from the left Ventricle of the Heart.

- A* Its Orifice.
BB Its branches distributed to the right side of the Lungs.
CC Its branches distributed to the left.

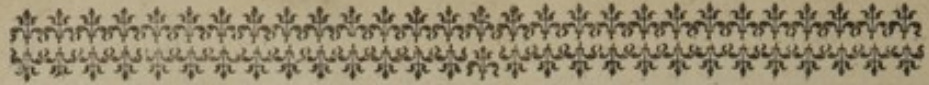




The TABLE of the Thirteenth Part
in this Book, Opened and Explained

In the Table is given the Order of the Chapters of the Book, with the
beginning of each Chapter, and the Verse, in which it begins, and
the Verse, in which it ends, and the Verse, in which it is
continued to the next Chapter.

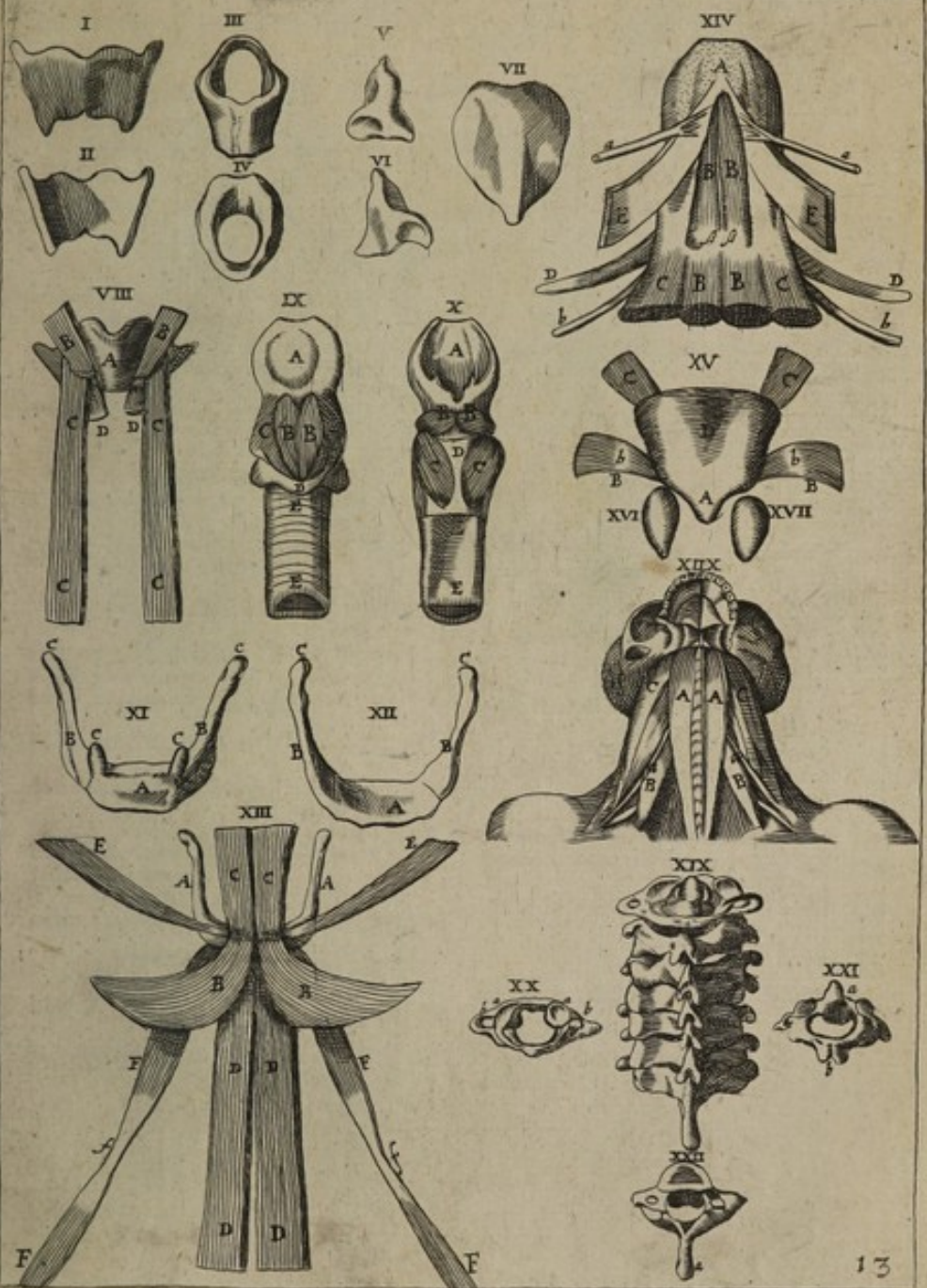
1	The first Chapter of the first Part	1
2	The second Chapter of the first Part	1
3	The third Chapter of the first Part	1
4	The fourth Chapter of the first Part	1
5	The fifth Chapter of the first Part	1
6	The sixth Chapter of the first Part	1
7	The seventh Chapter of the first Part	1
8	The eighth Chapter of the first Part	1
9	The ninth Chapter of the first Part	1
10	The tenth Chapter of the first Part	1
11	The eleventh Chapter of the first Part	1
12	The twelfth Chapter of the first Part	1
13	The thirteenth Chapter of the first Part	1
14	The fourteenth Chapter of the first Part	1
15	The fifteenth Chapter of the first Part	1
16	The sixteenth Chapter of the first Part	1
17	The seventeenth Chapter of the first Part	1
18	The eighteenth Chapter of the first Part	1
19	The nineteenth Chapter of the first Part	1
20	The twentieth Chapter of the first Part	1
21	The twenty-first Chapter of the first Part	1
22	The twenty-second Chapter of the first Part	1
23	The twenty-third Chapter of the first Part	1
24	The twenty-fourth Chapter of the first Part	1
25	The twenty-fifth Chapter of the first Part	1
26	The twenty-sixth Chapter of the first Part	1
27	The twenty-seventh Chapter of the first Part	1
28	The twenty-eighth Chapter of the first Part	1
29	The twenty-ninth Chapter of the first Part	1
30	The thirtieth Chapter of the first Part	1
31	The thirty-first Chapter of the first Part	1
32	The thirty-second Chapter of the first Part	1
33	The thirty-third Chapter of the first Part	1
34	The thirty-fourth Chapter of the first Part	1
35	The thirty-fifth Chapter of the first Part	1
36	The thirty-sixth Chapter of the first Part	1
37	The thirty-seventh Chapter of the first Part	1
38	The thirty-eighth Chapter of the first Part	1
39	The thirty-ninth Chapter of the first Part	1
40	The fortieth Chapter of the first Part	1
41	The forty-first Chapter of the first Part	1
42	The forty-second Chapter of the first Part	1
43	The forty-third Chapter of the first Part	1
44	The forty-fourth Chapter of the first Part	1
45	The forty-fifth Chapter of the first Part	1
46	The forty-sixth Chapter of the first Part	1
47	The forty-seventh Chapter of the first Part	1
48	The forty-eighth Chapter of the first Part	1
49	The forty-ninth Chapter of the first Part	1
50	The fiftieth Chapter of the first Part	1
51	The fifty-first Chapter of the first Part	1
52	The fifty-second Chapter of the first Part	1
53	The fifty-third Chapter of the first Part	1
54	The fifty-fourth Chapter of the first Part	1
55	The fifty-fifth Chapter of the first Part	1
56	The fifty-sixth Chapter of the first Part	1
57	The fifty-seventh Chapter of the first Part	1
58	The fifty-eighth Chapter of the first Part	1
59	The fifty-ninth Chapter of the first Part	1
60	The sixtieth Chapter of the first Part	1
61	The sixty-first Chapter of the first Part	1
62	The sixty-second Chapter of the first Part	1
63	The sixty-third Chapter of the first Part	1
64	The sixty-fourth Chapter of the first Part	1
65	The sixty-fifth Chapter of the first Part	1
66	The sixty-sixth Chapter of the first Part	1
67	The sixty-seventh Chapter of the first Part	1
68	The sixty-eighth Chapter of the first Part	1
69	The sixty-ninth Chapter of the first Part	1
70	The seventieth Chapter of the first Part	1
71	The seventy-first Chapter of the first Part	1
72	The seventy-second Chapter of the first Part	1
73	The seventy-third Chapter of the first Part	1
74	The seventy-fourth Chapter of the first Part	1
75	The seventy-fifth Chapter of the first Part	1
76	The seventy-sixth Chapter of the first Part	1
77	The seventy-seventh Chapter of the first Part	1
78	The seventy-eighth Chapter of the first Part	1
79	The seventy-ninth Chapter of the first Part	1
80	The eightieth Chapter of the first Part	1
81	The eighty-first Chapter of the first Part	1
82	The eighty-second Chapter of the first Part	1
83	The eighty-third Chapter of the first Part	1
84	The eighty-fourth Chapter of the first Part	1
85	The eighty-fifth Chapter of the first Part	1
86	The eighty-sixth Chapter of the first Part	1
87	The eighty-seventh Chapter of the first Part	1
88	The eighty-eighth Chapter of the first Part	1
89	The eighty-ninth Chapter of the first Part	1
90	The ninetieth Chapter of the first Part	1
91	The ninety-first Chapter of the first Part	1
92	The ninety-second Chapter of the first Part	1
93	The ninety-third Chapter of the first Part	1
94	The ninety-fourth Chapter of the first Part	1
95	The ninety-fifth Chapter of the first Part	1
96	The ninety-sixth Chapter of the first Part	1
97	The ninety-seventh Chapter of the first Part	1
98	The ninety-eighth Chapter of the first Part	1
99	The ninety-ninth Chapter of the first Part	1
100	The hundredth Chapter of the first Part	1

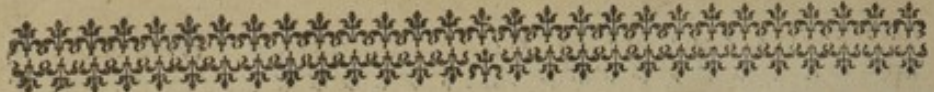

**The TABLE of the Thirteenth Brass Plate
 in this Book, Opened and Explained.**

In this Table is laid open to view, the Cartilages of the *Larynx*, with their Muscles; the *Os Hyois* with its Muscles; the *Tongue*, its Nerves and Muscles; the *Uvula* with its Muscles; the *Tonsils*, the *Vertebrae* of the Neck and its bowing Muscles.

- FIG. I.
The external face of the Buckler-like Cartilage.
- FIG. II.
The internal face of the Buckler-like Cartilage.
- FIG. III.
The hinder view of the Ring-like Cartilage.
- FIG. IV.
A view of the foremost part of the same Cartilage.
- FIG. V. VI.
The Cartilages called *Arytænoides*.
- FIG. VII.
The *Epiglottis*.
- FIG. VIII.
A The Buckler-like Cartilage.
BB The pair of Muscles *Hyothyroides*.
CCCC The pair of Muscles *Sternothyroides*.
DD The small Muscles called *Cricothyroides*.
- FIG. IX.
A The external part of the *Epiglottis* joynted to the *Larynx*.
BB The Muscles *Thyroarytænoides*.
CC The lateral Muscles *Cricoarytænoides*.
D The Ring-like Cartilage.
EE The fore part of the wind-pipe.
- FIG. X.
A The internal face of the *Epiglottis*.
aa The sticking out of the cartilages *Arytænoides*.
BB The Muscles *Arytænoides* every where loose.
CC The Muscles *Cricoarytænoides postici*.
D The broad part of the Ring-like cartilage.
EE The hinder and membranous part of the wind-pipe.
- FIG. XI.
A The Basis of the *Os Hyois*.
BB The horns of the *Os Hyois*.
CC The two cartilaginous Appendices.
- FIG. XII.
A The internal face of the Basis of the *Os Hyois*.
BB The internal face of the Horns.
CC The two cartilaginous Appendices.
- FIG. XIII.
A The sides of the *Os Hyois*.
BB The muscles *Geniohyoides* turned downwards.
CC The internal *Geniohyoides* commonly called *Genioglossi*.

- DDDD* The muscles *Sternohyoides*.
EE The muscles *Styloceratothyoides*.
FFF The muscles *Corascohyoides*.
ff The middle tendinous part.
- FIG. XIV.
A The inferior part of the top of the *Tongue*.
BEBB The muscles *Basoglossi*.
ff The nervous substance between the Muscles.
CC The muscles *Ceratoglossi*.
DD The muscles *Styloglossi*.
EE The muscles *Myloglossi*.
aa The Nerves of the *Tongue* from the fourth conjugation.
bb The Nerves of the *Tongue* from the seventh conjugation.
- FIG. XV.
A The *Gargareon* or *Uvula*.
BB The external pair of Muscles.
bb Its tendons which passeth the cheek.
CC The internal pair of muscles something compressed.
- D* Part of the *Pallat* from which the *Uvula* hangs
- FIG. XVI, and XVII.
Shews the *Glandula* called *Tonsilla*.
- FIG. XVIII.
AA The long muscles bowing the neck.
BB The muscles bowing the neck called *Scaleni*.
aa Part of the Nerves tending to the arms.
CC The muscles bowing the Head with the *Mastoides*.
- FIG. XIX.
Shews the seven joynts of the Neck.
- FIG. XX.
The first joynt of the Neck, in which
aa The two holes holding the hinder part of the Head.
bb The holes on the sides which gives passage to the arteries to ascend.
- FIG. XXI.
The second *Vertebra* of the Neck.
a The tooth-like process.
b The *Spina Bifida*.
- FIG. XXII.
a The Spine; the rest is like the other joynts.




**The TABLE of the Fourteenth Brass Plate
 in this Book, Opened and Explained.**

It contains the Muscles which are conspicuous about the shoulders, Back,
 Loyns, and Neck, the Carcass being turned over upon the Belly.

FIG. I.

- AA The muscles Trapezij in their situation.
- BB The Rhomboides laid a little to view.
- CCDD The broadest muscle of the back, in which
- CC Shews its fleshy part.
- DD Its membranous beginning.

FIG. II.

- AA Trapezius pulled out of its situation.
- BB The Rhomboides laid open in its situation.
- C The same drawn out of his situation, as yet
- joyned to the basis of the Scapula.
- DD Both the Levators of the Scapula.
- E Serratus posticus minor in his situation.
- F Serratus posticus major in his situation.
- G The same muscle out of his situation.
- HH The greatest part of the Musculi Splenij con-
- spicuous in their situation.
- II A portion of the Musculi complexi.
- KK The Mastoides somewhat separated above.
- LL The Sacrolumbi not removed out of their
- place.
- MM The longest muscles of the back not separated.
- NN The beginnings of the Sacrolumbi and longest
- muscles united.
- OO The muscles Quadrati somewhat laid open.

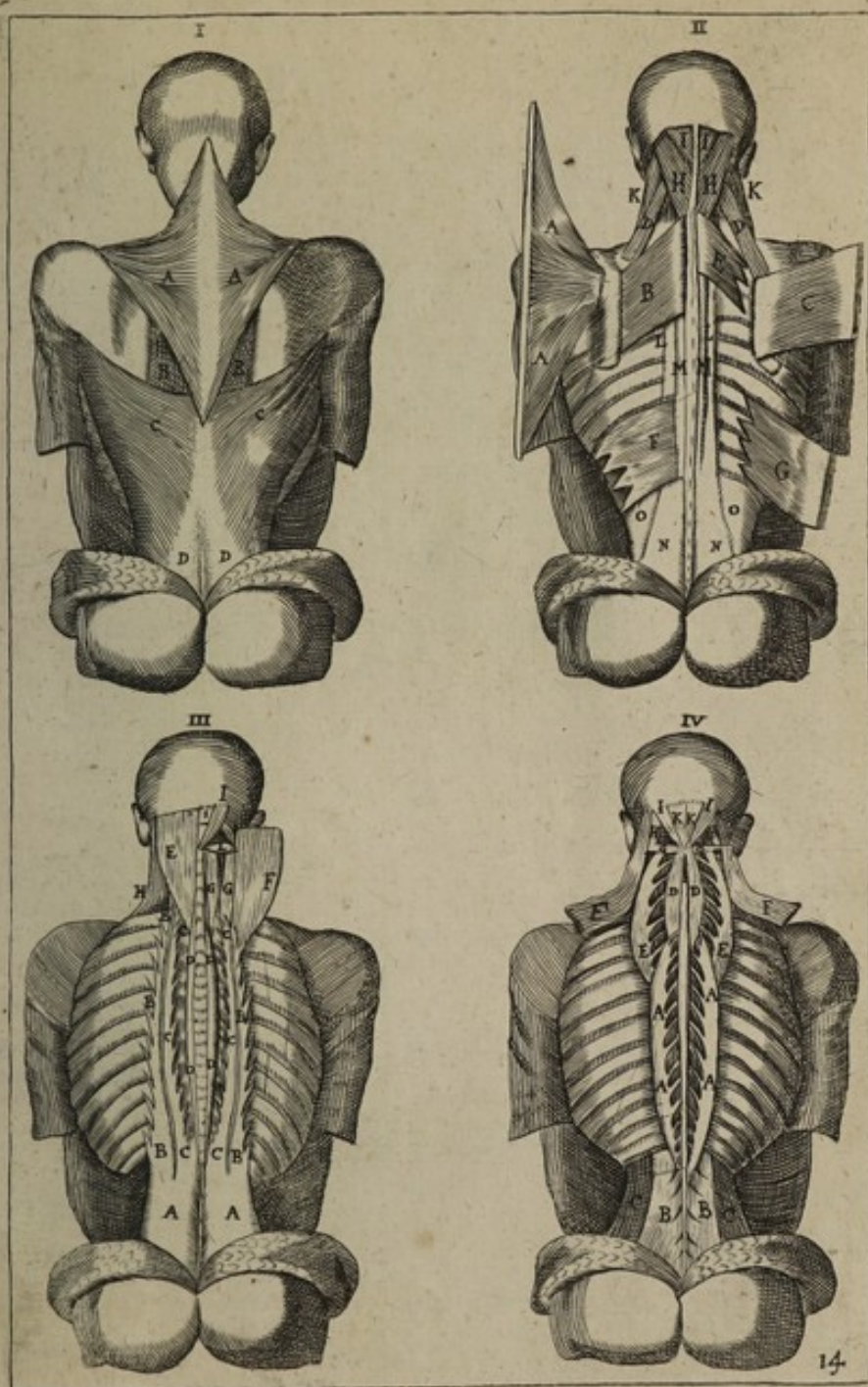
FIG. III.

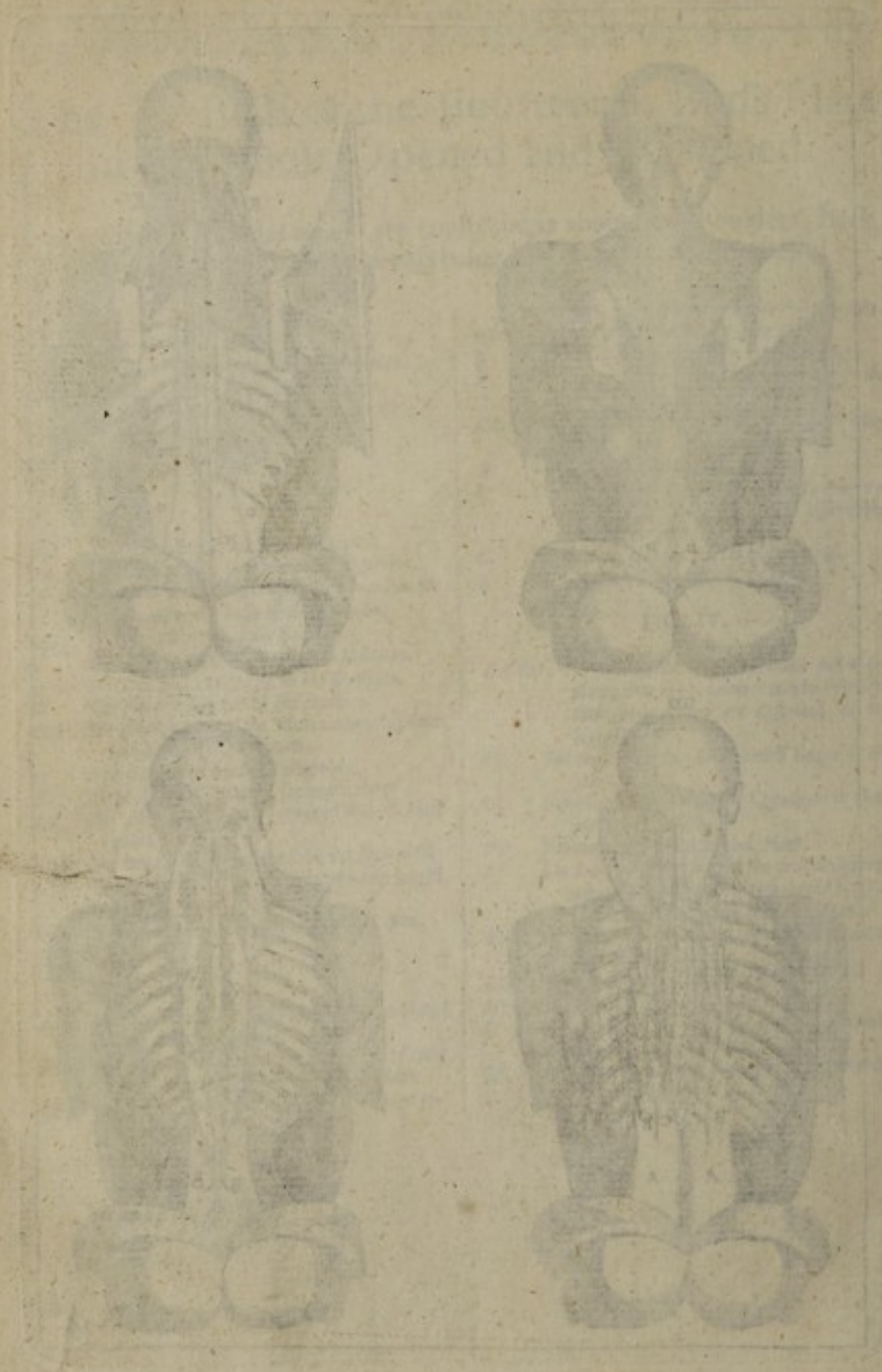
- AA The beginnings of the muscles Sacrolumbi and
- the longest united.
- BBBB The Sacrolumbi something moved out of their
- place and distinguished in their Tendons.
- CCCC The longest muscles of the back somewhat re-

- moved, and distinguished into their tendons.
- DD The Musculi Spinati not separated.
- E The Muscle Complexus in its situation.
- F The same separated from the Head, that so the
- rest may come to view.
- GG The Muscles extending the neck in their situ-
- ation.
- H The fore part of the Mastoides loosd.
- I The greater right muscle of the Head, drawn a
- little out of his place, that so the lesser right
- muscle may appear.
- K The superior oblique muscle of the Head.
- L The inferior oblique muscle.

FIG. IV.

- AA &c. The Musculus Spinatus pulled out of his
- place, that so the tendons may be beheld in
- their order; they are described at the
- biggest.
- BB The Muscles of the Loins call'd Sacri in his
- place.
- CC A portion of the Muscles Quadrati in their
- place.
- DD The muscles Spinati in their place.
- EE The transverse muscles of the neck deciphered
- greater and longer than they should be, that
- so the tendons may be the better seen.
- FF The Mastoides separated from the Sternum,
- and turned back.
- GG The inferior oblique muscles of the Head.
- HH The superior oblique muscles of the head.
- II The greater right muscles of the head some-
- thing drawn aside.
- KK The lesser right Muscles of the head in their
- place.





The TABLE of the Fifteenth Brass Plate
in this Book, Opened and Explained.

This Table contains the Muscles of the Face and inferior Jaw; also the
Bones of the Skull, and of both Jaws.

FIG. I.

- AA The skin of the Head detrailed.
 BB The fleshy Panicle separated.
 CC The Pericranium detrailed.
 DD The Skull bare.
 E The muscle of the Forehead.
 FF The muscle that shuts the Eye-lids.
 G The first muscle of the Nose.
 H The second muscle of the Nose.
 I The muscle dilating the wings.
 K The muscle of the first pair lifting up the Lips.
 L The muscle drawing the Lips upwards.
 M The muscle drawing the Lip downwards.
 NN The muscle shutting the Lips.
 O The Buccinator.
 PP The temporal muscle in his place.
 Q The muscle lifting up the Ear.
 R The muscle drawing the Ear obliquely.
 S The muscle Masseter in his place.
 TT The muscle Digastricus moved from his beginning.

FIG. II.

- AAA The temporal muscle out of his place, the Jaw
being disselled.
 aa Its acute insertion into the process of the Jaw.
 BB The Masseter separated.
 CC The Digastricus loosed at the end, and drawn
aside.
 DD The internal Pterygoides.
 EEEE The external Pterygoides.
 F The Musculus Quadratus, or muscularous Ex-
pansion separated.

FIG. III.

- A The bone of the forehead.
 aaa The Coronal Suture.
 a The hole of the bone of the forehead for the
Nerve of the third pair.
 B The right bone of the fore part of the Head.
 bb The Sagittal Suture.
 C The left bone of the fore part of the Head.
 D The bone of the Temples.
 cc The false Suture.
 d The Duglike process.
 e The process of the Os Jugalis.
 E The first bone of the upper Jaw.
 F The Jugal process.
 G The second bone of the Jaw bid. with the sha-
dow of the former.
 H The third bone.
 I The fourth bone of the Jaw.
 i The hole in it for the Nerve of the third pair.
 K The fifth bone.
 L The lower Jaw.

- l The hole in it for the Nerve of the fourth pair to
pass out.
 M The sharp process of the inferior Jaw.
 N The blunt process of the inferior Jaw.

FIG. IV.

- A The left bone of the fore part of the Head.
 aa The sagittal Suture.
 B The right bone of the fore part of the Head.
 bb The Suture Lambdois.
 C The bone of the hinder part of the Head.
 D The triangular bone.
 e A portion of the base of the Temples with the
Duglike process.

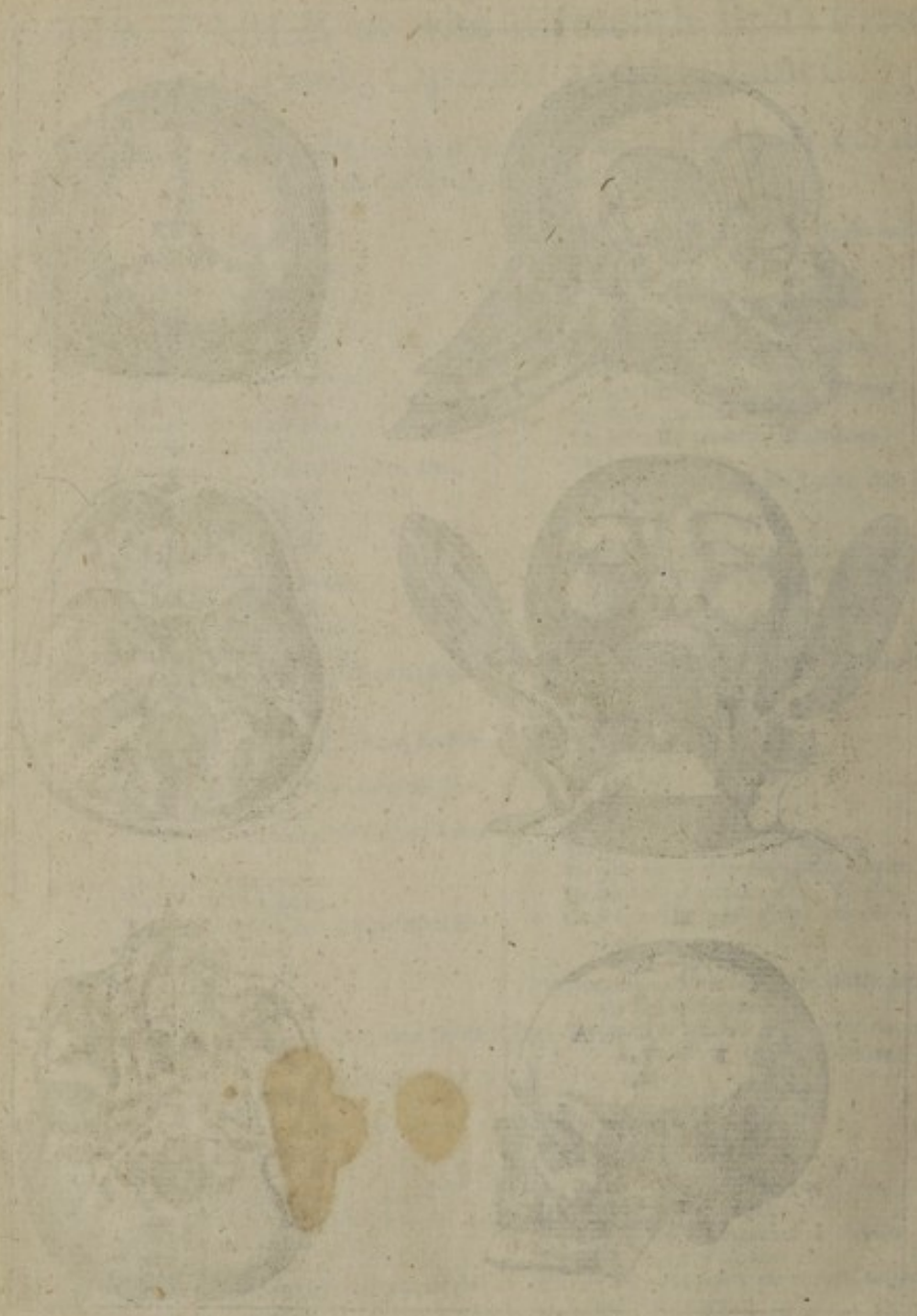
FIG. V.

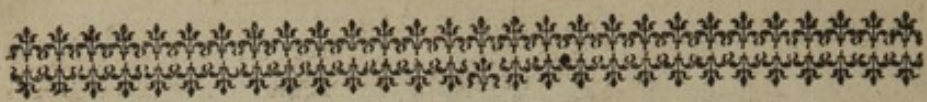
- AA The cavity of the bone of the hinder part of the
Head within the Skull, in which the Cere-
bellum lies.
 B The internal face of the Os Sphenois.
 CC The Os Ethmois.
 D The cavity of the bone of the forehead above the
Nose.
 aa The first hole in the wedgelike bone.
 aa The second hole.
 bb The third hole.
 cc The sixth hole.
 + The seventh hole.
 dd The fifth hole.
 ee The first hole of the bone of the Temples.
 ff The rocky process of the bones of the Temples.
 gg The third hole of the bones of the Temples.
 hh The fourth and fifth hole of the hinder part of the
Head.

FIG. VI.

- AA The lower part of the bone of the hinder part of
the Head conspicuous.
 aa The process by which the hinder part of the Head
is joyned to the first Vertebra of the
Neck.
 BB Part of the bone of the Temples.
 CC The duglike process.
 DD The bodkinlike appendix.
 EE The jugal process.
 F The External face of the wedgelike bone.
 GH The winglike processes.
 I The bone which distinguisheth the Nostrils.
 KK The sixth bone of the upper Jaw.
 kk The hole which passeth the Nerve of the fourth
pair to the Pallat.
 LL Part of the fourth bone of the superior Jaw.
 m The four Teeth called Cutters.
 nn The two dog teeth.
 oo The rest of the Teeth called Grinders.






**The TABLE of the Sixteenth Brass Plate
 in this Book, Opened and Explained.**

This Table shews the Brain laid bare from the Skull, with the *Dura* and *Pia Mater*; also its Cavities and Processes.

FIG. I.

- AA* The *Dura mater* covering the Brain.
aa The Veins and Arteries distributed on it.
B The brain covered only with the *Pia Mater*.
bb The Circumvolutions of the brain.
ccc The Vessels distributing to the *Pia Mater* from the third Cavity.
C The *Dura Mater* drawn backwards.

FIG. II.

- AA* The longer Process of the *Dura Mater* called *Falk*, turned out of its situation.
aa The third cavity of the *Dura Mater* open.
bb The lesser inferior cavity of the same.
BB A portion of the callous body laid to view.
cccc The vessels in the fourth cavity, stretched over the callous body.
DD The *Dura Mater* hanging down on each side.

FIG. III.

- AA* The substance of the brain.
BB The callous body drawn a little outwards.
bb The two Legs of the Vault something uncovered.
C The hooklike process drawn backwards.
DD The right fore ventricle opened on the upper part.
EE The left fore ventricle opened on the upper part.
FF The Plexus Choroides.
G Part of the Speculum Lucidum.
HH The *Dura Meninx* detrahted on each side.

FIG. IV.

- AA* The brain explained by equal Section.

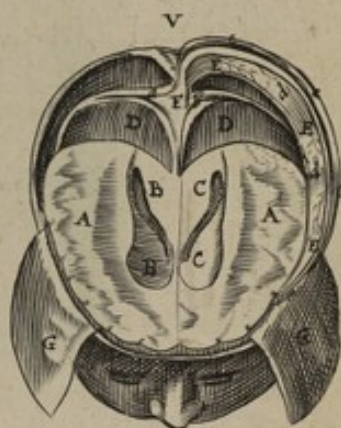
- B* The Fornix taken up and bowed downwards.
CC The superior part of the left fore Ventricle deducted.
DD The superior part of the left fore Ventricle in like manner explained.
E The chink designing the third Ventricle.
FF The *Dura Mater*.
a The Glandula Pinealis.
bb The Protuberances, called Buttocks.
cc The Protuberances called Testicles.
d The Protuberance likened to a womans Privities. These are better expressed in the first Figure of the following Table.

FIG. V.

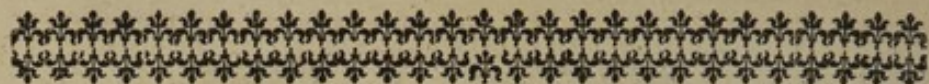
- AA BB CC* The brain and foremost ventricles explained in their upper part.
f A portion of the Plexus Choroides stretched upwards by the foremost ventricles.
D The shorter process of the *Dura Mater*.
EEE The longer process thereof.
F The Torcular of Herophilus.
G The *Dura Mater* detrahted.
a The first cavity of the *Dura Mater*.
b The second cavity of the *Dura Mater*.
ccc The third cavity of the *Dura Mater*.
ddd The lesser cavity in the hooklike process.
e The fourth cavity of the *Dura Mater*.

FIG. VI.

- AA BB CC ff* Signifie the same they did in the fifth Figure.
DD The Cerebellum conspicuous in his natural place
E The wormlike process of the Cerebellum.
FF The *Dura Mater* hanging down.
GG The same with the cavities routed downwards.







The TABLE of the Seventeenth Brass Plate in this Book, Opened and Explained.

This Table presents in larger Figures the Cavities both of the Brain and
Cerebellum, as they are shewed by the Dissections of the Antients.

FIG. I.

Shews the inferior Cavity of the foremost Ventricles of the Brain, the Original of the Optick Nerves,
the fourth Ventricle with its Protuberances, the Legs of the Vault, and whatsoever
Arantius compared by the Sea-horse, or Silk-worm.

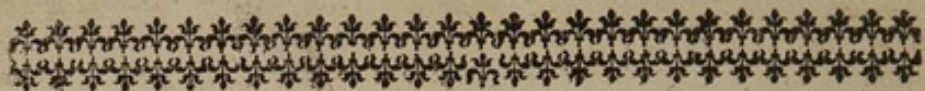
<i>AAAA</i>	The Dura Mater detraffed.		
<i>B</i>	The Proceſs of the ſieve-like baſe like a criſt.	<i>QQQQ</i>	Part of the Plexus Chorois bowed back- wards, which is carried by the ſuperior cavity of the ventricles.
<i>CC</i>	Part of the Os Sphenois, ſhewing it ſelf under the membrane, the brain being ta- ken away.	<i>PP</i>	The foremoſt portion of the Baſis of the Brain.
<i>DD</i>	The foremoſt proceſs of the Os Sphenois, making the Cavity of the Saddle.	<i>Q</i>	The bottom of the third ventricle in which behind is the hole likned to the Funda- ment; it tends to the beginning of the marrow of the back; before is the hole compared to the womb, and is carried to the Funnel.
<i>EEEE</i>	A portion of the brain liſt.	<i>RRRR</i>	A portion of the Plexus Chorois turned backwards, which is extended to the fourth inferior cavity.
<i>F</i>	The foremoſt leg of the Vault bowed fore- wards.	<i>SS</i>	The roots of the optick Nerves.
<i>GG</i>	The hinder legs of the Vault.	<i>T</i>	The uniting of the optick Nerves.
<i>HH</i>	The Sea-horſe, or Silk-worms of Arantius	<i>UUU</i>	The optick Nerves again ſepered and paſ- ing towards the Eyes.
<i>III</i>	The inferior Cavity of the foremoſt Ven- tricles.		
<i>K</i>	The extremity of the callous body ſticking out like Buttocks.		
<i>L</i>	The Glandula Pinealis.		
<i>MM</i>	The Protuberances called Teſticles.		
<i>NN</i>	The cavity between the brain and Cere- bellum commonly called the fourth Ven- tricle.		

FIG. II.

This Figure ſhews the proper Ventricle of the *Cerebellum*, which the beſt
Anatomists call the fourth Ventricle.

<i>AAAA</i>	Each lobe of the <i>Cerebellum</i> whole.		
<i>BBBB</i>	The internal ſide of the <i>Cerebellum</i> laid open by incision.	<i>E</i>	The promience conſpicuous between the two cavities.
<i>CC</i>	The worm like Proceſs of the <i>Cerebellum</i> whoſe ſuperior and round part is taken away.	<i>F</i>	The paſſage from the third ventricle to the marrow of the back.
<i>DD</i>	The proper Ventricle of the <i>Cerebellum</i> , with its two Cavities.	<i>G</i>	The Cavity of the marrow of the back like a Pen.
		<i>H</i>	The chink in the ſaid cavity.
		<i>I</i>	The deſcending trunk of the marrow of the back cut off.




**The TABLE of the Eighteenth Brass Plate
 in this Book, Opened and Explained.**

This Table shews the rise of the Nerves within the Skull, also the principal branches of the third and fourth pairs, the *Glandula Pituitaria* with the Funnel, the *Rete Mirabile*, the fourth Ventricle and the most special Veins arising from the marrow of the Back.

FIG. I.

Shews the Brain a great portion of it being taken away above with the *Cerebellum* diducted to the side.

- A The Nerve of smelling.
- a Its process called *Mamillaris*.
- B The Optick Nerve or first pair.
- CC The Nerve of the second pair.
- DD The Nerve of the third pair.
- EE The Nerve of the fourth pair.
- FF The Nerve of the fifth pair.
- GG The Nerve of the sixth pair. The Nerve of the seventh pair by reason of its deep rise appears not.

FIG. II.

The side of the Skull being broken off, together with the Eye whole, and the cheek divided, is shewed.

- A The Nerve of the third pair.
- B Its branch which goes out at the hole of the bone of the forehead.
- C A branch of the same pair which goes out by the hole of the fourth bone of the upper Jaw.
- D The Nerve of the fourth pair.
- E Its branch which goes to the teeth and gums of the upper Jaw.
- F Its branch which is carried to the Tongue.
- G Its branch which enters into the lower Jaw.
- H The same branch which passeth out at the hole of the lower Jaw.

FIG. III.

The Brain with the Marrow of the back being turned, these things come to view.

- AA The Nerves of smelling.
- aa Their *Dug-like* processes.
- BB The two legs of the Nerves of the first pair.
- CC The greater branch of the Artery *Carotis*, the interior being joyned to the *Vertebral Artery* OO
- D The *Glandula Pituitaria*.
- E The Funnel.
- F The Protuberances of the Brain, set before the passage which carries the *Serum* to the Funnel.
- GG The Nerves of the second pair cut off.
- HH The beginnings of the Nerves of the third pair.
- II The beginning of the Nerves of the fourth pair.

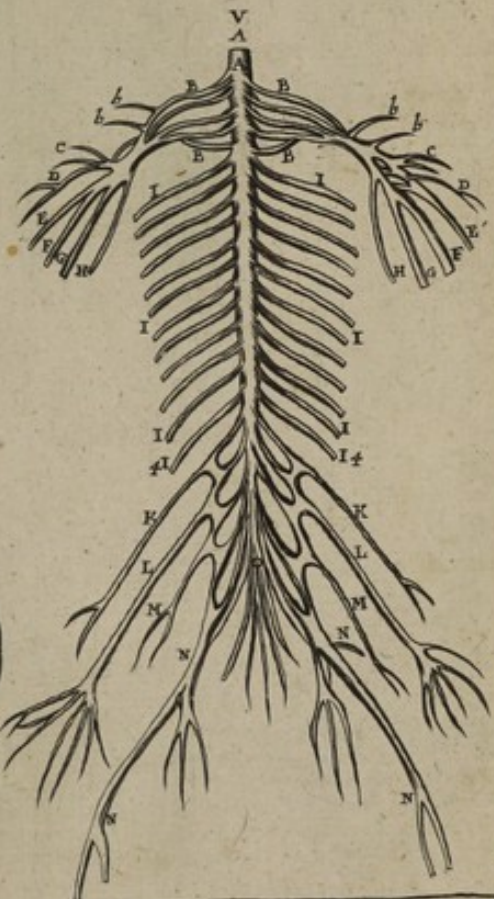
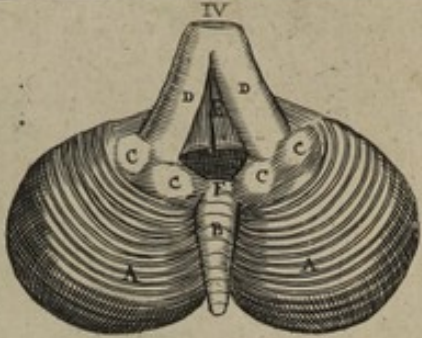
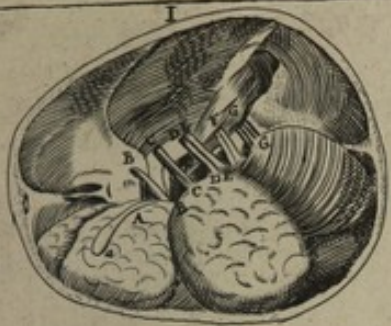
- KK The beginning of the Nerves of the fifth pair.
- LL The beginning of the Nerves of the sixth pair.
- MM The beginning of the Nerves of the seventh pair.
- NNN The beginning of the marrow of the back, between the Skull and the first *Vertebra*.
- OO The common branch of the *Vertebral artery*, which being divided after its union with the *Carotis artery* CC makes up the *Rete mirabile* with it, about the seat of the *Wedge-like bone*.
- PPP Small branches of Arteries called the *Rete mirabile*.

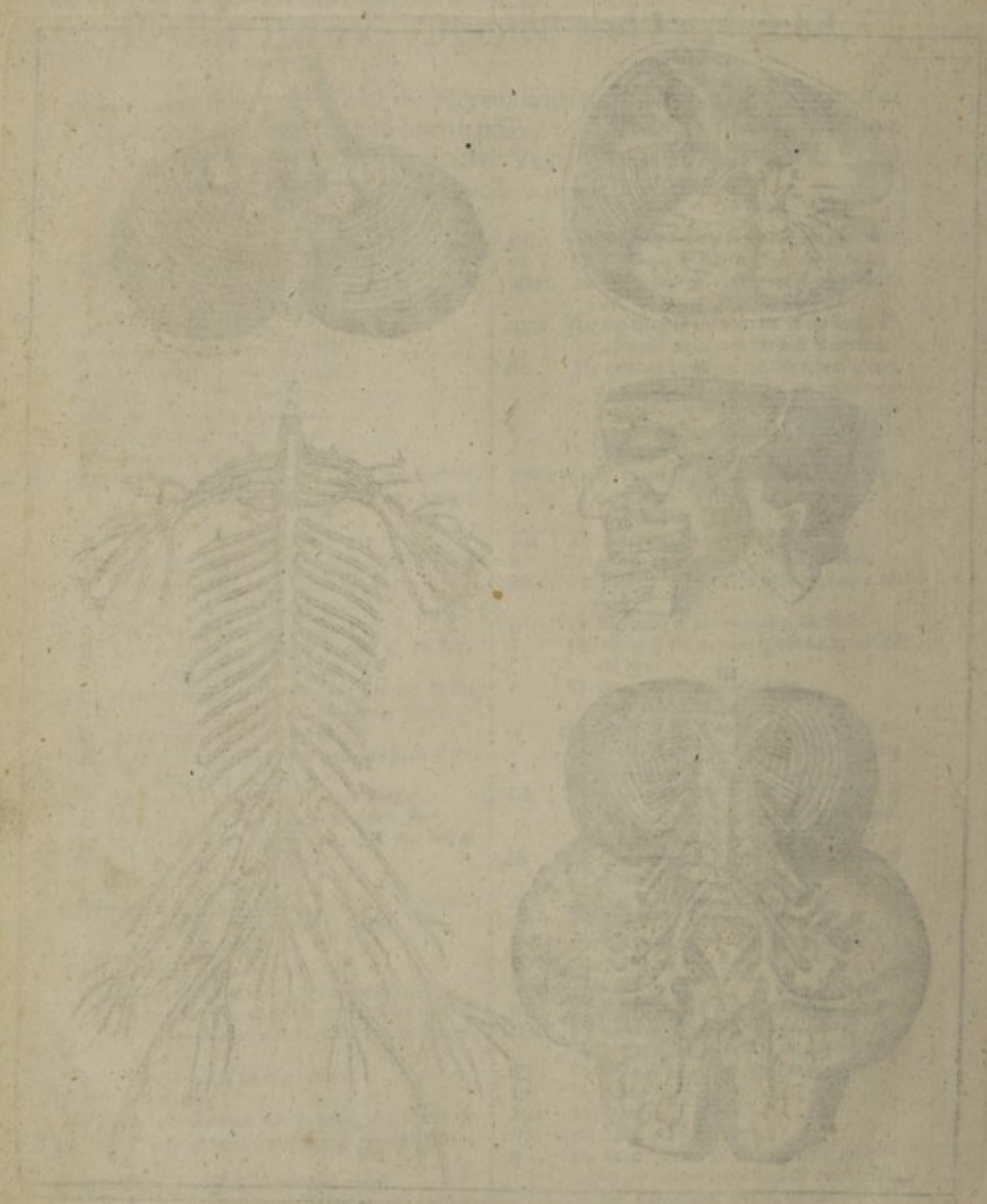
FIG. IV.


- AA The *Cerebellum* and his globes.
- B The wormlike process of the *Cerebellum*.
- CCCC The process of the *Cerebellum*, called the *bridg*.
- DD The beginning of the marrow of the back.
- E The cavity of the marrow of the back, called the *Pen*.
- F The fourth Ventricle laid open.

FIG. V.

- A The trunk of the marrow of the back descending as it may be publickly shewed being taken out of the body.
- BB The branches arising from the three pairs of Nerves of the Neck, and two of the Breast, to be distributed to the hands.
- bb The small branches running to the muscles of the shoulder.
- CC The first pair of Nerves of the hands.
- DD The second pair.
- EE The third pair.
- FF The fourth pair.
- GG The fifth pair.
- HH The sixth pair called *Subcutaneous*.
- III The pairs of *intercostal Nerves*, the two lowermost of which pertain to the *Lungs*.
- K The first pair which is carried to the *Foot*.
- LL The second pair.
- MM The third pair.
- NN The fourth and greatest pair.
- Q The small Nerves of the marrow of the back which are carried to the bladder and muscles of the *Fundament*, and to the *Genitals* of both Sexes.






The TABLE of the Ninteenth Brass Plate
in this Book, Opened and Explained.

This Table comprehends the Eye-lids with the Muscle called *Levator*; also the proper Muscles of the Eyes; the Membranes and the Humors included in the Membranes.

FIG. I.

- AA The *Levator* muscle of the superior Eye-lid.
- B Its tendon thinly spread.
- CC The Cartilages of the Eye-lids.
- DD The Caruncle in the internal angle.
- dd The Puncta Lacrimalia.
- E The external angle of the Eye-lid.

FIG. II.

- AA The Fat behind the Eyes.
- BBB The muscles of the Eyes not separated.
- CC Part of the Eye covered with the tendons of the muscles.

FIG. III.

- A The right muscle lifting up the Eye.
- aaa &c. Small Nerves carrying motion, sense, and spirit.
- B The right muscle depressing the Eye.
- C The right muscle drawing to the Eye.
- D The right muscle drawing the Eye from.
- E The inferior oblique muscle, whose tendon is but only separated from the part of that which follows.
- F The superior oblique muscle.
- G The Trochlea of the same muscle.
- H The Sclerotes covering the hinder part of the Eye.
- II A portion of the Optick Nerve inserted into the Eye.

FIG. IV.

Shows a Sheeps Eye, and in the seventh muscle which Man needs not.

- ABCD The four right muscle.
- E The inferior oblique muscle, which here is large.
- F The superior oblique muscle which is slender.
- G The Trochlea of the superior oblique muscle.
- H The seventh muscle of Brutes drawing the Eye to.
- I The hinder part of the Eye covered with the ten-

don of the seventh muscle.

- K A Part of the optick Nerve included in the seventh muscle.

FIG. V.

- ABCD Shew the same with the former, the oblique muscles being removed.
- aaaa The common membran called *Innominata*.
- bb The Iris transparent through the Conca.

FIG. VI.

- AAA The Membrane Sclerotes dissected.
- B The Membrane Cornca.
- C A part of the optick Nerve.

FIG. VII.

- A The Membrana Uvea.
- a The hole in the Uvea or Pupilla.
- BB The Ciliar Ligament with its strings.
- CC The Membrana Choroides, looking black.

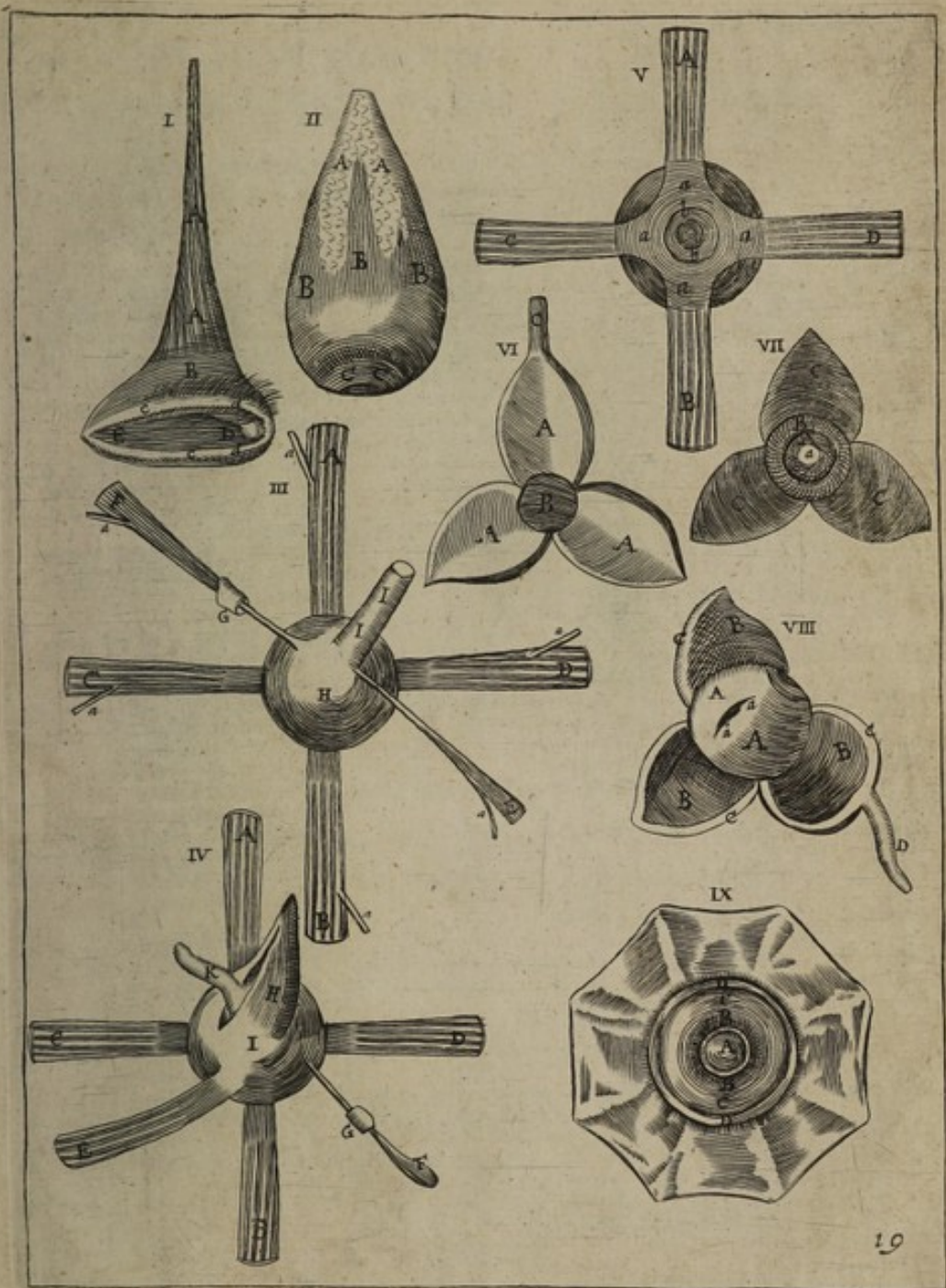
FIG. VIII.

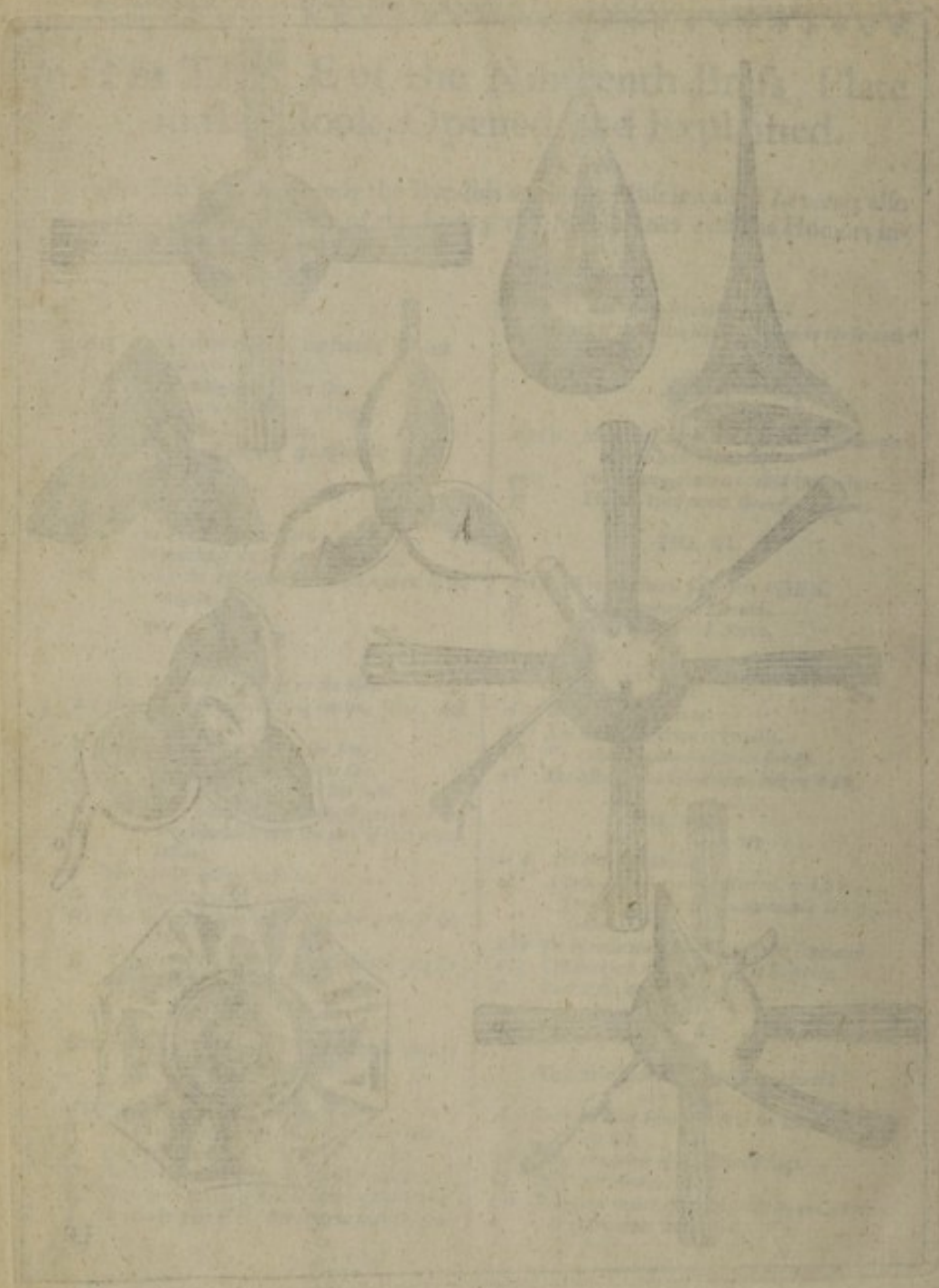
- AA The Net-like Membrane.
- aa A Rupture in it upon the Vitrial, which by reason of its softness is unavoidable in a Dissection.
- BBB The Membrana Choroides not yet separated.
- CCC The thickness of the Membrane Sclerotes.
- D Part of the Optick Nerve.

FIG. IX.

The three humors of the Eyes received in a Vessel.

- A The Crystalline Humor posited in the Cavity of the Vitrial.
- BB Some appearance of the Ciliar strings.
- CC The Vitrial humor.
- DD The aqual humor, being but little, and placed round about the Vitrial.





The Table of the twentieth Brass Plate in this Book, Opened and Explained.

This Table represents the external Ear with his Muscles and Cartilages, as also the internal or chief Organ of Hearing, its Cavities, Bones, Passages and Nerves, as they are found out by Dissection of such Bodies as are grown up.

FIG. I.
Shews the external Ear whole, with its muscles and Cavities.

- AA The Helix of the Ear.
- BB The Anthelix.
- C The Tragus, or beard of the Ear.
- D The Antitragus.
- E The external lobe of the Ear.
- FF The external Concha of the Ear.
- GG The cavity between the Helices called Innominata.
- H The muscle moving Ear right upwards.
- III The threefold muscle with his tendon moving the Ear obliquely upwards, divided into so many parts.

FIG. II.
Shews the external Ear conspicuous behind.

- AA The skin with the Membrane stretched upwards and downwards.
- BB The Cartilage which makes the Ear.
- C The hole for the passage of hearing.
- D A portion of the Ligament of the external Ear.
- E Part of the Lobus of the Ear.

FIG. III.
Shews the fore part of the internal Ear.

- A Part of the bone of the Temples containing the rocky process.
- B The passage of hearing.
- C The beginning of the passage or hive.
- D The duglike process.
- E The bodkinlike process broke off.

FIG. IV.
The bone of the fore-going Figure is shewed, in which the passage of hearing is cut off, that so the membrane of the Tympanum may be seen.

- AA The beginning of the passage of hearing.
- B The membrane of the Tympanum.
- C The little foot of the Malleus transpires by the membrane.

- D The duglike process.
- E The bodkinlike appendix.

FIG. V.
Shews the Muscles of the internal Ear.

- A The muscle moving the membrane and Malleolus outwards.
- B The membrane of the Tympanum.
- CC The muscle moving the Malleolus and membrane inwards.
- E The head of the Malleolus.

FIG. VI.
A Part of the passage of Hearing passing to the Tympanum.

- BC The cavity of the Tympanum, in which
- B The oval hole.
- C The round hole.

FIG. VII.
Shews the rocky process with the small bones of the Tympanum in their situation.

- A The Malleolus.
- B The Anvil.
- C The superior part of the Stirrop conspicuous.
- DD The bowing of the Cochlea.

FIG. 7.
Shews the three small bones out of their situation.

- A The Malleolus with its two processes, its short and long.
- B The Anvil applied to the Malleolus.
- C The Stirrop.
- D The small bone joined to the Ligament of the stirrop.

FIG. VIII.
Shews the inferior face of the bone of the Temples.

- AA The extremity of a quill thrust through that passage of Hearing which is carried to the pallet.
- BB Shews the same passage broke off from the next part.

FIG. IX.
AA The cavity of the Cochlea, whose broader part goes to the Labyrinth.
BB The cavity of the Labyrinth, in which the oval hole is conspicuous:

also four other holes which open themselves in the circles are obambred by a black colour: the fifth in the extremity of the circle of the Cochlea, is broken off. If you would see how they are in Infants, look the eighth Table, and the seventh figure.

FIG. X.
AA The beginning of the passage of the first hole of the bone of the Temples, into which the Nerve of Hearing passeth.

- BB The rocky process of the bone of the Temples, in which the cavities are contained.

FIG. XI.
ABCD The end of the passage into which the Nerve of Hearing proceeds laid open, the bone being taken away.

- B The cavity in which the softer portion of the Nerve of Hearing lies in in the Centre of the Cochlea.
- C The process between each portion of the Nerve standing up like a bridge.
- D Another cavity called Cæcum by the Ancients, Aquæductus by Fallopius, by which the harder portion of the nerve of hearing obliquely descends.
- EE Two footsteps of the circles in the Labyrinth, which you may see whole, Table 8. figure 7. 8.

FIG. XII.
Contains a portion of the bone of the Temples, in which the Tympanum being taken away, and the passage which contains the Nerve of hearing there appears.

- AA The softer portion of the Nerve of Hearing.
- BB The harder portion of the Nerve of Hearing, obliquely descending under the Tympanum, being thicker about the place it goes out.
- CC A small Nerve from the fourth pair joining it self to the harder nerve of Hearing.

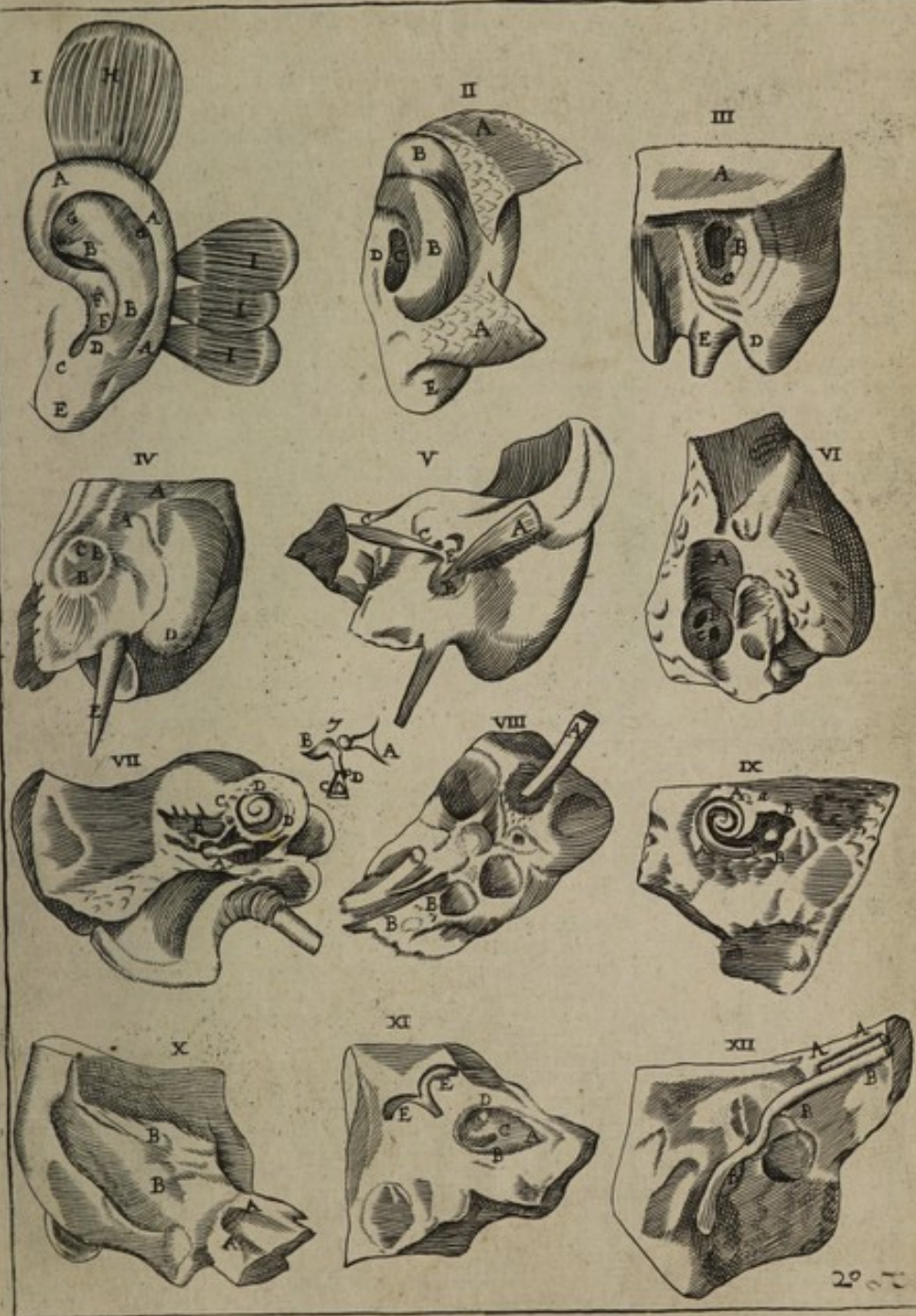
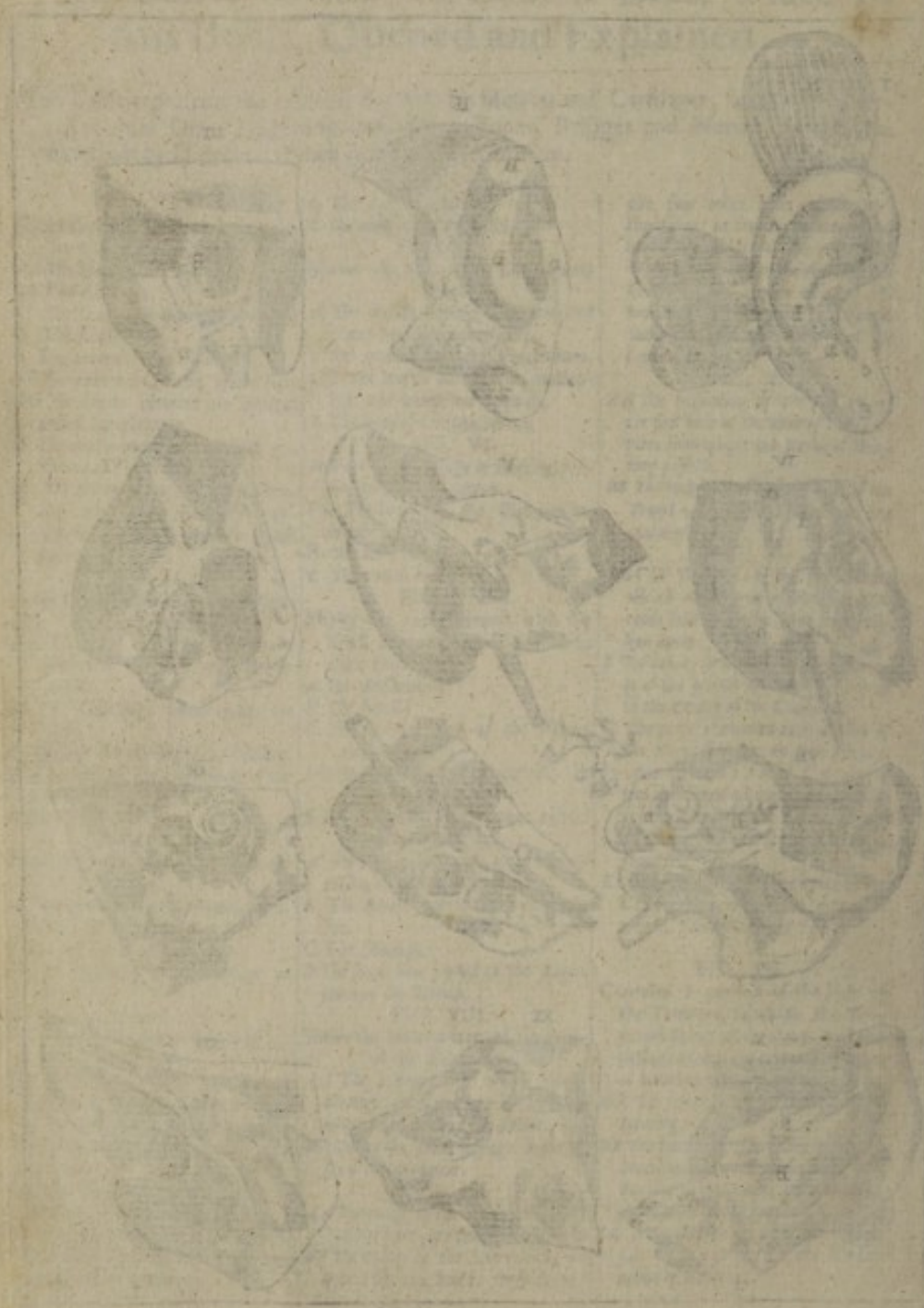


PLATE I
The Human Brain, Part I
Cut and Explained



The Table of the One and twentieth Brass Plate in this Book, Opened and Explained.

This Table exactly presents the Bones of Man to your view, so that the Composition of the Bones we mentioned before in the *Abdomen*, *Breast*, and *Head* are here seen, especially the Bones of the *Hands* and *Feet* are seen both before and behind; also the *Ligaments* of the *Thigh* and *Tibia*: Lastly, the Bones called *Sesamoides* are curiously represented.

FIG. I.
Shows the Skeleton of a body grown up.

AA The internal side of each Scapula.
BB Both the Claviculæ.
CC The bone of the shoulder, otherwise called the bone of the arm.
aa The head of the shoulder produced from the appendix.
bb The external branch of each shoulder.
cc The internal bunch of the shoulder.
DD The bone of the Cubit called Radius.
EE The bone of the Cubit called Ulna.
FF The eight bones of the Carpus.
GG The thumb composed of three bones.
HH The Metacarpus composed of four bones.
II The four fingers composed of three bones.
KK The thigh which some call Crus.
LL The Mola, or Kneecap.
dd The head of the bone of the thigh, or superior appendix.
ee The neck of the bone of the thigh.
ff Trochanter or Rotator major.
gg Trochanter or Rotator minor.
bb The appendix, or inferior head of the thigh.
MM The Tibia.
NN The Fibula.
ii The internal ancle.
kk The external ancle.
OO The seven bones of the Tarsus conspicuous before.
PP The five bones of the Metatarsus.
QQ The bones of the Toes, of which the great Toe hath two, and the rest three a piece.
*** &c.* The appendices of the shoulder, Radius, Ulna, Tibia, distinguished by a small line from the rest of the bone.

FIG. II.
Contains the Scapula with the Clavicula, to which the bones of the Shoulder, Cubit, and Hand are joyned.

A The left Clavicula, in which
a The head which is lightly sinuous where it is committed to the Sternum.
b The other extremity of the Clavicula, whereby it is joyned to the process of the Scapula.
B The Scapula.
c The short process of the Scapula receiving the shoulder.
d The process of the Scapula called Coracois.
e The process of the Scapula called Spina.
f The superior angle.
g The inferior angle.
bb The basis of the Scapula.
C The notable hinder bone of the shoulder.
f The greater or backward cavity of the base of the shoulder.
g The crooked process of the bone of the Ulna.
D The bone Ulna.
E The Radius.
F The external face of the wrist.
G The Metacarpus consisting of four bones.
H The Thumb consisting of three bones.
II The orders of the fingers.

FIG. III.
Contains the eight bones of the Wrist expressed largely, that so they might be the better distinguished.

FIG. VI.
Shows the Os Isthium, Ilium, and Pubis, and under them, the thigh leg, and foot.

A The external face of the Os Ilium.
B The Acetabulum which receives the head of the thigh.
C The thigh conspicuous behind; in which
a The superior appendix.
b Trochanter major.
Δ The rough line of the thigh.
c Trochanter minor.
d The posterior cavity of the inferior appendix.

e The heads of the inferior appendix.
f The protuberances distinguishing the cavities of the Tibia.
D The Tibia conspicuous behind.
g The internal ancle.
E The Fibula.
h The external ancle.
**** The appendices of the Tibia.
F The Tarsus.
G The Metatarsus.
H The great Toe consisting of two bones.

FIG. V:
Propounds the bones of the Tarsus distinctly, in which
A Os Astragali.
B Os Calcanei.
C Os Cymbiforme.
D Os Cubiforme.
EEE The three other Wedlike bones.

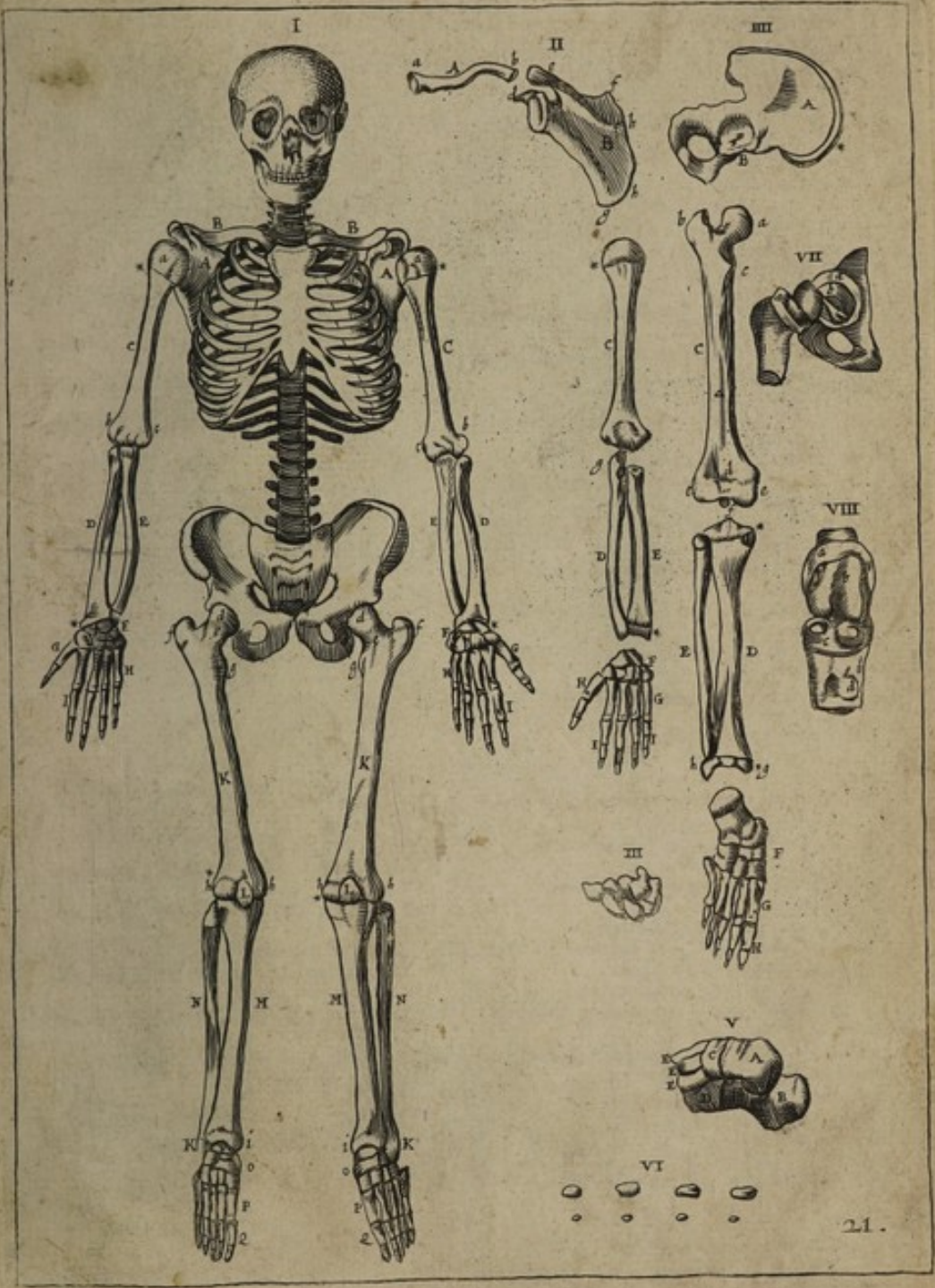
FIG. VI.
Shows the four greater & four lesser bones called Sesamoides.

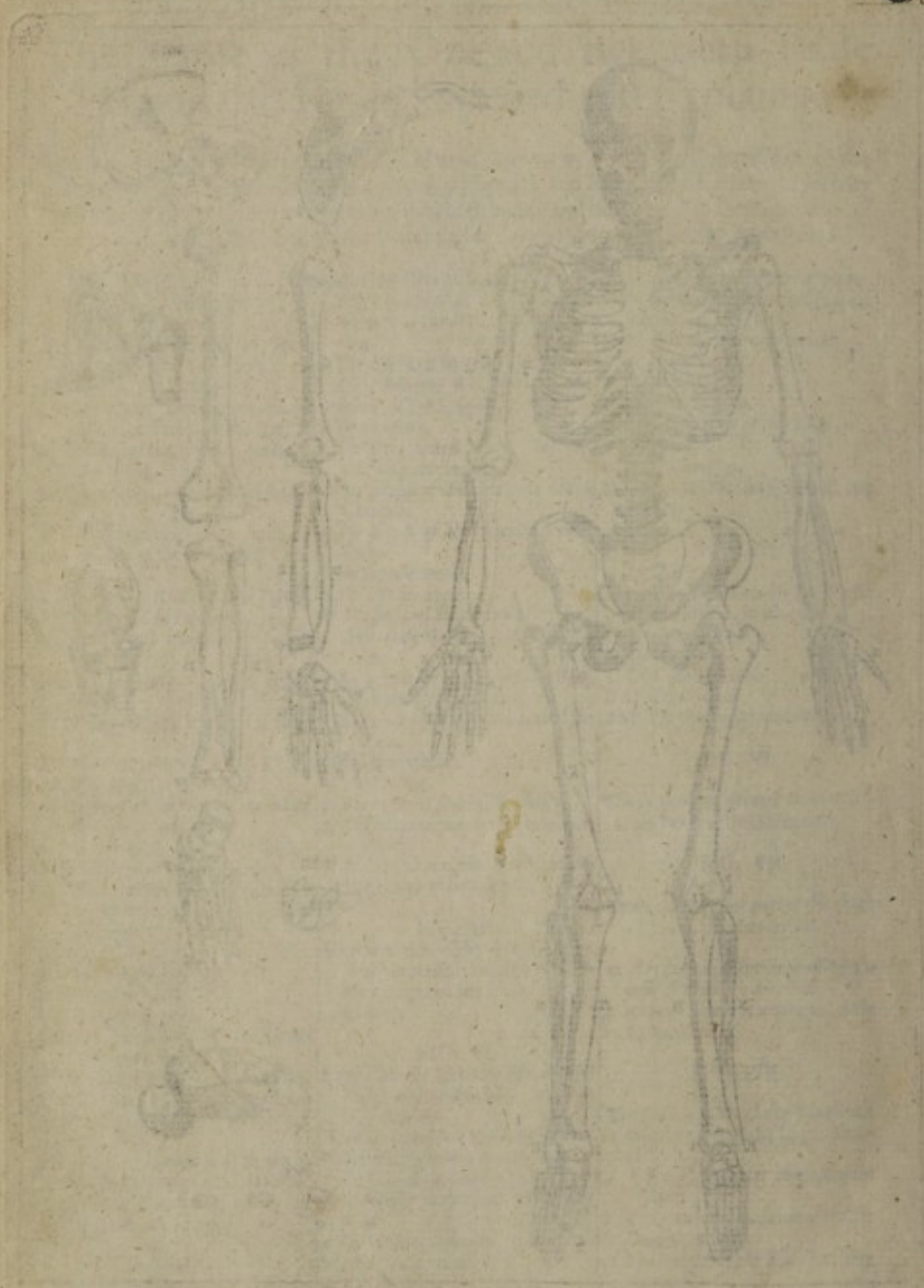
FIG. VII.
Shows the superior part of the thigh with the Acetabulum.

aa A broad Ligament compassing the joint of the thigh dissolved.
b A round Ligament arising out of the Acetabulum.

FIG. VIII.
The inferior part of the Thigh and superior part of the Leg is shewed.

a A broad Ligament compassing the Joint.
b A Ligament produced out of the Scapulum.
cc The cavities of the Tibia receiving the thigh.
d The kneecap with a portion of the tendon joyned to it.





* * * * *

The Table of the Two and twentieth Brass Plate in this Book, Opened and Explained.

This Table comprehends the Muscles which move the Shoulder, Cubit, and Hand of which the greater part stick to their beginnings and ends.

FIG. I.

- A Musculus deltoideus separated from the beginning
 B Infraclapularis separated.
 C Rotundus minor.
 D Rotundus major.
 E The pectoral muscle separated from the breast, vide Chap. 9.
 F The fleshy portion of the broadest muscle of the back, vide chap. 12.
 G Musculus Biceps.
 H The lesser muscle lifting up the shoulder in his situation.
 II The Brachixus under the Biceps.
 K The muscles Palmaris hanging from its original.
 L A portion of the Supinator.
 M The external bow of the wrist.
 N The internal bow of the wrist.
 O The bow of the second Internodium of the fingers.
 P The bow of the third Internodium of the fingers.
 Q The bows of the first Internodium of the thumb in their first situation.
 R The bows of the second Internodium of the thumb in their situation.
 S The Abductor of the little finger.
 aa The internal face of the Scapula.
 b The tendon of the muscle Palmaris.
 c A portion of the tendon which bows the third Internodium of the thumb.
 d The Ligament of the wrist in its situation.

FIG. II.

- A The lesser muscle lifting up the shoulder.
 B The muscle Brachixus whole.
 C The round Pronator of the Radius.
 D The bow of the third Internodium of the thumb out of its situation.
 E The square Pronator of the Radius.
 F The bows of the first Internodium of the thumb out of their situation.
 G The bows of the second Internodium of the thumb out of their situation.
 aa The internal side of the Scapula.
 b Os Humeri.
 c Os Radij.
 d Os Ulnæ.
 ce The membranous Ligament of the Ulna and Radius.
 ffff The muscles commonly called Abductors.
 b The Abductor of the little finger.

FIG. III.

- A The first Suprascapularis removed out of his place.
 B The second Suprascapularis.
 C Rotundus minor.

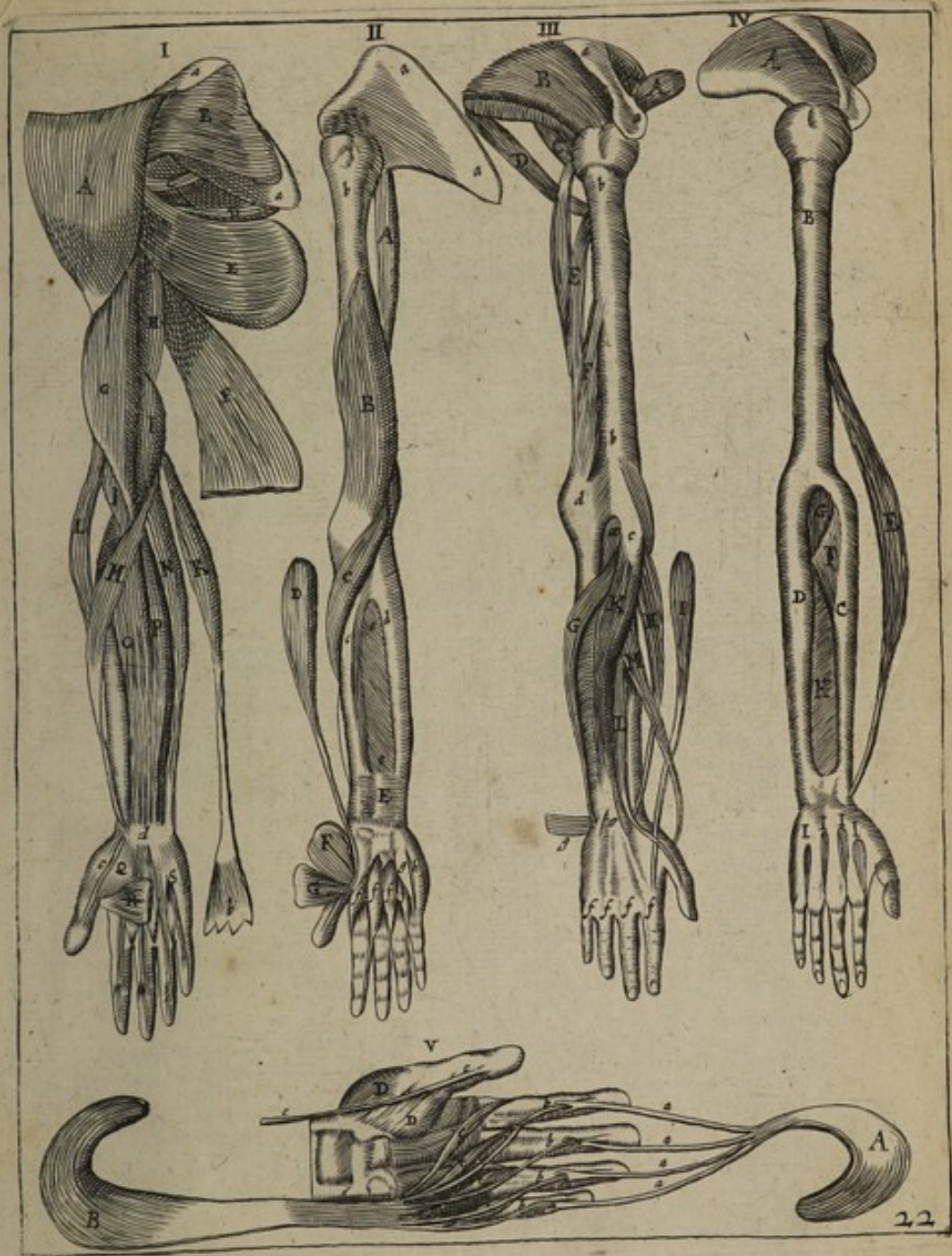
- D Rotundus major.
 E The long muscle extending the Cubit.
 F The short extender of the Cubit.
 G The internal extender of the wrist.
 H The external extender of the wrist, having here but one tendon.
 I The special Abductor of the fore finger with but one tendon.
 K The extensors of the second and third Internodij of the fingers united.
 L The extensor of the third Internodium of the thumb.
 M The extensor of the first Internodium of the thumb, having here but one single body and tendon.
 aa The process of the Scapula called Spiniformis.
 a The muscle Anconæus.
 bb The base of the shoulder.
 c The external knob of the shoulder.
 d The internal knob of the shoulder.
 e The tendines which extend the second and third Internodium gathered together.
 ff &c. The tendons of the same muscles applying to the Internodij.
 g The annular Ligament of the wrist loosed.

FIG. IV.

- A The external face of the Scapula.
 B The bone of the shoulder covered with Periosteum.
 C O: Radij.
 D Os Ulnæ.
 E The muscle of the Radius called Supinator longus.
 F The muscle of the Radius called Supinator brevis.
 G The muscle Anconæus.
 H The membranous Ligament of the Radius and Ulna.
 IIII The three interosseal muscles with the Auxiliary.
 K The Abductor of the thumb.

FIG. V.

- A The muscle bowing the second Internodium of the fingers called Perforatus.
 aa &c. Their tendons.
 B The muscle bowing the third Internodium of the fingers called Perforans.
 bb Its tendines passing through the cleft of the tendines of the former.
 cccc The muscles bowing the first Internodium or Lumbricals.
 DD The bows of the thumb in their situation.
 cc A portion of the tendon bowing the third Internodium of the thumb.





The Table of the Three and twentieth Brass Plate in this Book, Opened and Explained.

This Table shews the Muscles produced by Nature for the various motions of the Thighs, Legs, and Feet.

FIG. I.

- A* The greater part of the muscle called Psoas, which you may see in Table X. Figure 1 in its Natural situation, here it is separated from its beginning, and joyned to the internal Iliack muscle, and descends to the thigh.
- B* The internal Iliack muscle.
- CC* The muscle Triceps something uncovered; you may see it whole in the next Figure.
- D* Musculus Lividus.
- E* The membranous muscle conspicuous with a fleshy body about his beginning, whose broad tendon is separated from the parts under it.
- FF* The right muscle.
- GG* Musculus vastus externus.
- HH* Musculus vastus internus.
- I* Musculus facialis.
- K* Musculus Tibialis anticus.
- LL* Musculus Peroneus secundus.
- MM* The extender of the third internodium of the Toe.
- N* The extender of the third internodium of the great Toe.
- aa* The apparition of the Os Ilium laid open before.
- b* The extremity of the Os Pubis.
- cccc* The tendon of the membranous Muscle.
- dd* A portion of the muscle Gastrocnemius hanging out, the leg being depressed; the third Figure shows it hanging out of its situation; under the character *KK*.
- e* The membranous Ligament of the Tibia and Fibula.
- ffff* The tendons of the muscles extending the third Internodium.
- g* The transverse Ligament of the foot separated.

FIG. II.

- A* The internal face of the Os Ilium.
- B* A portion of the great muscle Gluteus, which the following figure represents separated from the middle Gluteus.
- CCC* Musculus Triceps.
- DD* A portion of the Gastrocnemius and Soleus as yet joyned.
- EE* Tibialis posticus.
- FF* Peroneus primus.
- G* The extender of the second internodium of the Toes in its situation.
- aaaa* The interosseal muscles.

FIG. III.

- A* Gluteus major separated and depressed to the side.
- B* Gluteus medius in his situation.
- C* Musculus Pyramiformis.
- D* The fourth muscle moving the thigh about.
- L* Obturator internus entering the fleshy pulse.

- FF* Musculus gracilis.
- GG* Musculus Semimembranosus.
- HH* Musculus Semimembranosus elegantly expressed.
- III* Musculus Biceps.
- KK* The Gastrocnemius turned backwards, to whose beginnings two small bones called Sossamoides stick.
- LL* Musculus solcus in his situation.
- M* The little muscle called Plantaris.
- N* The tendon spread abroad from the heel under the sole of the foot.
- O* The Abductor of the great Toe.
- P* The Abductor of the little Toe.
- Q* The interosseal muscle pertaining to the little Toe.
- aa* The brim of the Os Ilium.
- b* The fleshy pulse.

FIG. IV.

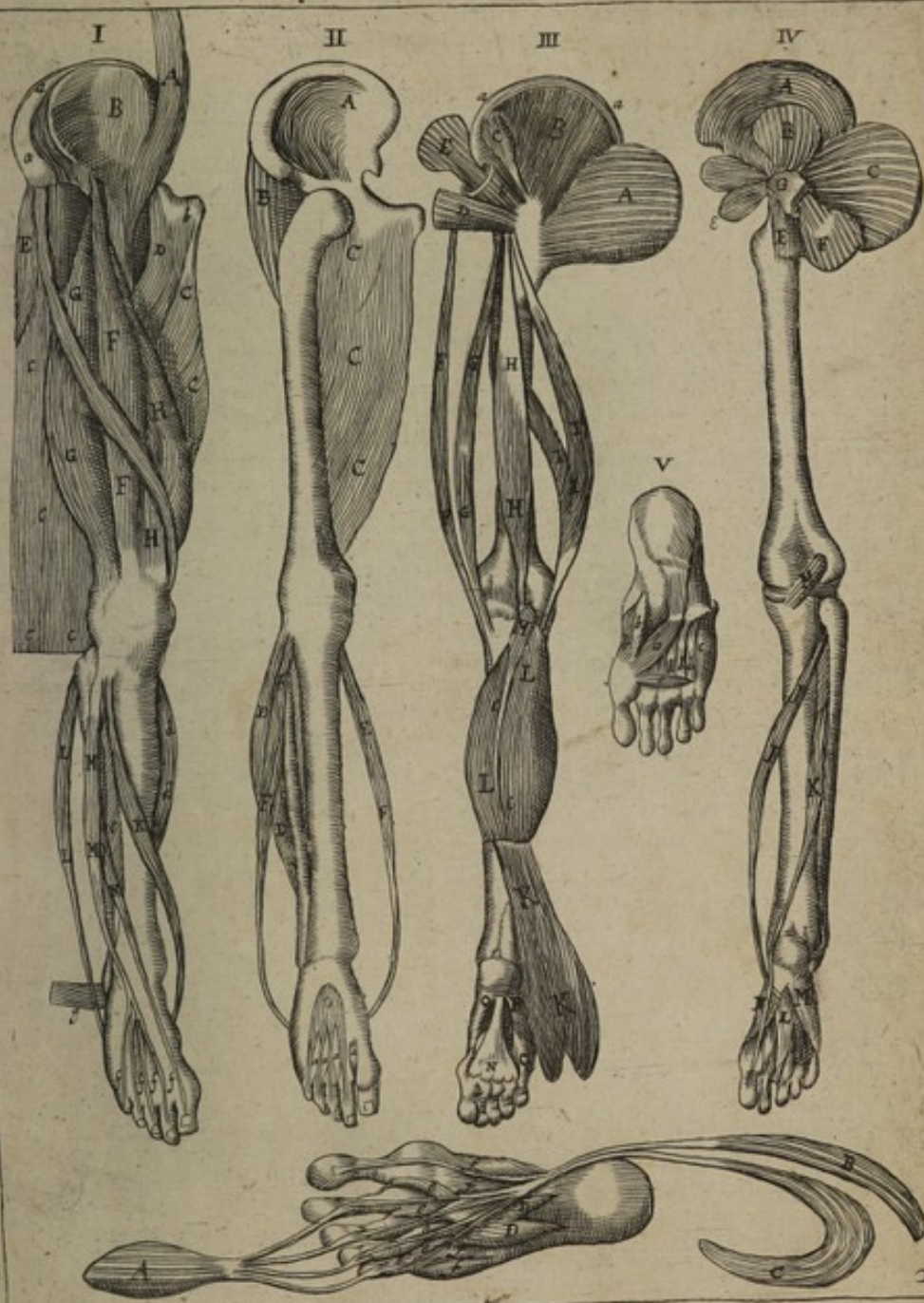
- A* The internal face of the Os Ilium.
- B* Musculus Gluteus minor in his situation.
- C* Musculus Gluteus medius out of his situation.
- D* Musculus Pyramiformis.
- E* The fourth muscle moving the thigh about.
- E* The external Obturator.
- F* The internal Obturator.
- G* The fleshy pulse.
- H* Musculus Popliteus.
- I* Musculus perforans.
- K* The muscle bowing the third internodium of the great Toe.
- L* Musculus perforatus in his situation.
- M* The Abductor of the little Toe.
- N* The Abductor of the great Toe in his situation.

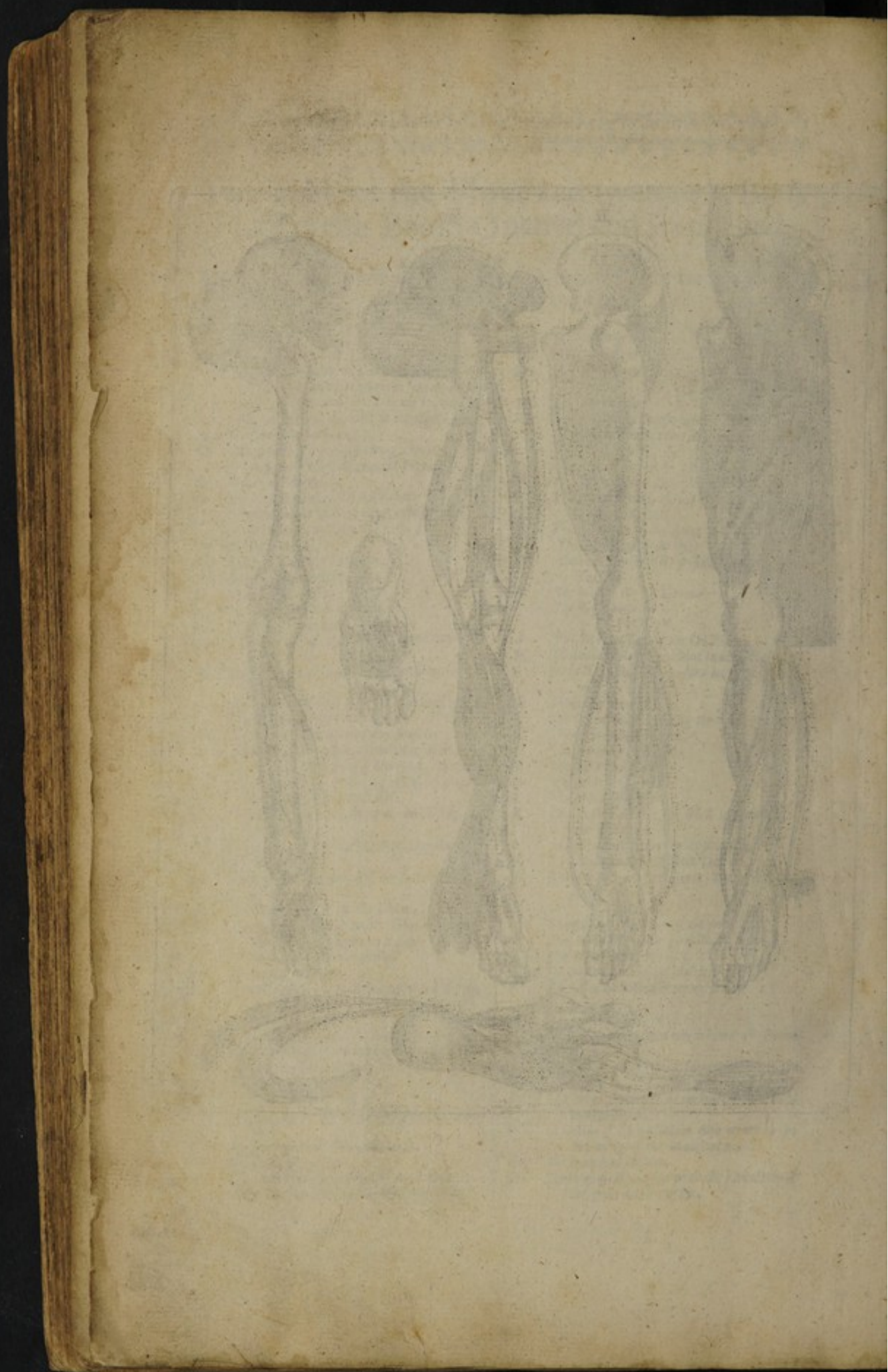
FIG. V.

- a* The greater Abductor of the great Toe.
- bb* The Abductor of the great Toe.
- c* The Abductor of the little Toe.
- dddd* The internal interosseal Muscles.
- e* The lesser Abductor of the great Toe.

FIG. VI.

- A* The Muscle Perforatus which bows the second internodium.
- B* The lower of the third internodium of the great Toe.
- C* Musculus perforans, or the lower of the third internodium.
- DD* A portion of the muscular flesh joyned to the beginnings of the lumbrical muscles.
- cccc* The lumbrical muscles.
- ffff* The interosseal muscles with the Abductors of the great and little Toe.





The Table of the Four and twentieth Brass Plate in this Book, Opened and Explained.

This last Table shews the Veins Arteries, and Nerves of the extrem Parts, benign or, carefull of the smallest branches, the huge multitude of which would obscure the greater, and dull the Brain of the Learner: The most famous are delineated, such as are shewed publickly in the *Theater* in Dissection of Men of perfect age.

FIG. I.
Shews the Veins distributed to the Hand.

- A The axillar branch of the Vena Cava.
- BBB Vena Cephalica.
- CCC Vena Basilica.
- a The external Scapular.
- b The branch of the Cephalica, which is carried to the Deltoid.
- cd Branches of the Cephalica distributed to the bowers of the arm.
- e The deep branch of the Cephalica.
- ff The internal branch of the Cephalica making the Media.
- g The Median vein descending.
- h The Cephalica of the Head.
- ii The external branch of the Cephalica.
- æ The Salvatella of the Hand.
- k The internal Scapular.
- l The superior breast-vein.
- m The inferior breast-vein.
- nn The Basilic branches carried to the Extensors of the Cubit.
- oo The deep branch of the Basilica.
- p A singular branch of the deep branch, which is carried out to the cubit, with the fourth pair of Nerves.
- q The external branch of the deep basilical.
- y The internal branch of the same.
- f The Subcutaneous branch of the Basilica.
- tt The internal branch of the Subcutaneous branch, which is with the cephalical, procursth the media.
- u Its branch joining it self to the common vein.
- x The external vein of the Subcutaneous branch of the Basilica.
- yy The greater branch of the external Subcutaneous.
- z The lesser branch of the same.

FIG. II.

The arteries distributed to the Arm.

- A The axillar branch of the artery.
- a The internal scapular.
- b The external scapular.
- c The superior Breast-artery.
- d The inferior breast artery.
- e f g Branches of the artery distributed to the muscles of the shoulder.
- hob Branches of the artery distributed to the joint of the Elbow.
- i The external branch of the artery in the cubit.
- c The internal branch.

- ii The branch which is carried to the muscles of the Radius.
- k The branch carried to the muscles of the Ulna.
- l m n o Branches carried from the internal branch to the wrist, little, ring and middle finger.
- pp Branches carried to the hands from the external branch.
- q q r s Branches pertaining to the thumb, fore, and middle finger.

FIG. III.

Designs the Nerves distributed to the hand.

- 4 5 6 7. The four Vertebrae of the Neck.
- 1. The first Vertebra of the breast
- ab c d The five Nerves proceeding out of the holes of the Vertebrae.
- ff The first pair of Nerves descending from the plexure ++.
- gg The second pair.
- hh The third pair.
- ii The fourth pair bigger than the rest.
- kk The fifth pair.
- ll The sixth pair which is subcutaneous.

FIG. IV.

Contains the veins of the Foot.

- A The crural branch of the Vena Cava.
- aaaa The Vein Saphena.
- bbb The branches of the Saphena distributed by the interior part of the thigh.
- cc The Vein Ischias.
- ddd The internal Muscula.
- ee The external Muscula.
- fff The vein Poplitea consisting of a double beginning.
- gg The internal branch of the crural vein.
- hh The external branch of the same.
- i The first branch of the external crural.
- kk The second branch of the same.
- ll The remainder of the same.
- m The vein of the foot called Ischias.

FIG. V.

Contains the Arteries of the foot.

- AAA The crural Artery produced from the external Iliac branch of the great Artery.
- a The artery Puderda.
- b The artery carried to the internal Iliac muscle.
- c The artery Ischias.
- dd The external Muscula.
- e The internal Muscula.
- fff The arteries distributed to the

- membrane and fat.
- gg The artery Poplitea.
- hh The arteries called Surals.
- ii The foremost branch of the crural artery.
- kk The first hindmost branch of the same.
- ll The second hindermost branch of the same.

FIG. VI.

Represents the Nerves of the Foot.

- 2. 3. 4. 5. The four Vertebrae of the Loins.
- 66 The Os Sacrum.
- A A pair of Nerves pertaining to the transverse muscles of the Abdomen
- BB The first pair of Nerves of the foot.
- CC The second pair.
- aaa A branch of the same which accompanies the Saphena.
- bb The remainder of the same branch.
- DD The third pair of the Nerves of the foot.
- EEE The fourth pair, which is the greatest.

c Its Branch which turns back to the Buttocks and skin of the Thigh.

ddd Branches sent to the bowers of the leg.

eecc Branches sent to the bowers of the thigh.

f A branch sent to the muscle Plantaris and the extensors of the Tarsus.

g h Two external branches sent to the Toes and the muscles of the Fibula.

i The internal branch carried to the great and second Toe.

k l The internal branches sent to the sural muscles.

m The remainder of the Nerve of the sixth pair, dispersed by a double branch under the Foot to the Toes.

FIG. VII.

Shews the Basilica vein open; in which three shutters appear.

FIG. VIII.

Shews a branch of the crural vein open, and three double, and one single shutter.

FIG. IX. and X.

Shew a portion of the Nerve of the fourth pair divided into small Nerves like Threads, in gathering together of which, the wonderful power of Nature appears.



