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A SURE
GUIDE TO
PHYSICK AND
CHYRURGERY
RIOLAN
1657

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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 whol 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* Ancient Method.

2 *Describing the* Belly, *and all its* Parts *and* Bowels, *with their* respective Diseases.

3 *Describing the* Chest, *and all its* Parts *and* Contents, *with their* respective Diseases.

4 *Describing the* Head, *and* Face, *with all their* Parts Containing *and* Contained, *and their* respective Diseases.

5 *Describing the* Limbs *of the Body, with the many* Regiments *of* Muscles, *and their* Diseases.

6. *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 the Six Books, are added twenty four Tables, cut in Brass, containing one hundred eighty four Figures, with an Explanation of them; which are referred to in above a thousand places in the Books, for the Help of yong Artists.

Written in Latine, by *Johannes Riolanus*, Junior; Doctor of Physick, Physitian in ordinary to the *Queen Mother of France* many years together, and the last she had: And also the *Kings Professor* of *Anatomy* and *Herbarism*, in the University of *Paris*.

Englished by [redacted], Gent. and *W. R.* Doctor of the *Liberal Arts*, and of *Physick*.

London: Printed by *Peter Cole*, and are to be sold at his Shop, at the Sign of the Printing-Press in Cornhil, neer the Royal Exchange. 1657.

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The Use of the Letters and Figures, directing to the twenty four Tables, or Brass Cuts; and the hundred eighty four Figures in those Tables, representing the Parts of the Body.

Every Brass Cut, or Print, is called a Table; and the said Prints or Tables, are twenty four, and have their respective Numbers set at the Foot of the Table, or Print, on the corner that is outmost, and against the Readers right hand. Each particular Figure is also numbred, and the Number set over its Head, and the several parts of each Figure, are distinguished by Letters of the Alphabet, for the easier finding. To compare therefore, the Discourse with the Tables, I shall teach you by an Example or two. In Chap. 8. page 9. line 21. The word Coronalis, *is marked with the Letter* [a]; *to which Letter, looking at the end of the said Chapter, you find* [a] *T. 15. f. 3. a a a.* = *intimating that you must turn to Table 15. Figure 3. and that part of the Figure which is marked a a a. which represents the Coronal Suture of the Skull: The Mark* = *shews that the former Citation is ended. Again, in the next line of page 9. by the word* Lambdoides, *you find Letter* [b], *to which looking at the end of the said Chapter, you find* [b] *f. 4. b b.* = *to teach you that in the 15 Table foregoing, Figure 4. and on that part of the Figure marked b b. you shall find the Suture of the Skull called* Lambdoides: *and this mark* = *after b b. shews again that the Citation is ended. Again, in the same line, by the word* Sagittalis, *you find Letter* [c], *to which turning at the end of the Chapter, you shall there find* [c] *f. 3. b b. f. 4. a a. intimating that in* Figure 3. *of the forenamed Table 15. and in that part of the Figure which is marked b b. Also in* Figure 4. *of the same Table, on that part which is marked a a you shall find the Sagittal Suture described. The mark* = *shews the Citation is ended.*

Note that where you find not among the Directory Letters, T. *for Table, that* Figure *belongs to the fore-mentioned Table. Also you are to take notice that between two Citations, you shall find this mark* =.

Finally: He that would make his most advantage by the use of this Boo should, having been present at some Anatomical Dissections of the whol F study the Tables first, with their Explanations on the opposite Pages; c read the Discourse of Riolanus, *and compare it all along with th which may be best done, if the Tables be bound up by themselves, so as pen alwaies while he is reading the respective Chapters, referrin Table.*

To the Right Honorable,

HENRY LAWRENCE, Esquire; *Lord President* of the Councel to his *Highness*, the *Lord Protector*.

Right Honorable,

IT being my hap some years since to find in the Stationers shop at Amsterdam, your Lordships Elegant Treatise of Baptisme, and being upon Enquiry, informed touching the quality of the Author; I wondred what Gentleman it was, that having a stock of Honor & Repute in the world, had withal so much Christian Courage, as to venture it in that kind. For I judged (and I suppose rightly) that for a Gentleman of name and note, at that time to dare to vindicate the true Christian Baptisme, contemning the clamorous censures of the weake Multitude of Pretenders to Religion and Learning, was an Act of more true and high Courage than to storm a Town. And I humbly conceive, Experience has evidenced the Truth hereof, since hundreds (not to say thousands) that have adventured their Lives to gain Honor and Riches in the Field, have in their hearts found it too hard an Adventure (however otherwise convinc't in their understandings) to own and acknowledg the true Christian *Baptisme*, and subject themselves to the scorned practice thereof, with the evident hazard of much of their acquired Honor, and of their future Repute, and the advacement depending there upon.

That this action, nevertheless, of yours (my Lord) has not been attended, with al that Ignominy and Prejudice, which was only to be expected from Men; is the singular providence of God, giving Courage and Ingenuity, to many others of note, soon after (much animated doubtless by so noble and generous a Leader as your Lordship) to acknowledg and submit to the Divine verity, and beautiful, and most

lovely Rationality of that ſolemn Inſtitution of our Mr. Chriſt; and his eminent bleſsing that part of the ſoldiery, Characteriſed thereby. Much affected therefore with your Lordſhips Chriſtian Vertue in this kind, and deſirous to commend the ſame to Poſterity; It has not been ſince that time in my power to do it more effectually, than by prefixing your truly honorable Name in the Front of this excellent Anatomical Treatiſe, and beſt Foundation of the Art of Healing, commonly though corruptly called Phyſick. The fitneſs of which Dedication, I ſhal with your Honors gentle Patience, thus demonſtrate.

Seeing this book is nothing (for the moſt part) but a Declaration and Expoſition of the ſtupendiouſly admirable wiſdom of the *Eternal* our *Maker*, ſhining forth in the moſt curious Fabrick of Mans body; to confirm and ſeal the beleefe of the Reſurrection whereof (which is the very Foundation of Chriſtianity) baptiſme ſeems (by the Scripture) to have been cheifly ordained, by our great Mr. Chriſt; that as we had one ſolemn Ceremony to repreſent his ſufferings and death, we might not want another to ſet forth and ſolemnize his burial and Reſurrection (without which his own death and his Diſciples Faith had been in vain) and to take poſſeſsion in and by a Figure of our own Reſurrection to come (For, *we are*, ſaith *Paul*, *Buryed with Chriſt, in our Baptiſme, and therein alſo riſen with him*; That is, in a figure, being through a ſolemn Ceremonious poſſeſsion of our future Reſurrection from the grave, inſtated into eternal life.) This being ſo (my Lord) to whom ſhould this excellent Deſcription of the body of Man in general, with al its parts, and their Reſpective Diſeaſes, be dedicated, rather than to him that has vindicated to the Chriſtian world, that excellent pledge of the Reſurrection thereof; to wit, the Baptiſme of Chriſt rightly ſolemnized: whereby al true beleevers are mightily aſſured, that though this curiouſly built Houſe of our Earthly Tabernacle, be ſowen in the duſt, yet it ſhal not there abide for ever, as the beaſts that periſh. Accept therefore (Generous Sir) from your moſt humble ſervant, this Teſtimony of your Chriſtian

1 Cor. 13. 15, 16 17. 28. 30. 31. 32.

Colo. 2. 12.

Courage

Courage and sincerity, and suffer this excelleut Treatise to shelter it self under your honorable Patronage. And though this testimony of your vertue so publickly given, may (I fear) afford some disgust to your Modesty, yet I beseech your Lordship to let it pass, for the glory of our great Mr. Christ, and the Edification of Christendom. And I have much reason to hope, it may be a Monument of your honorable Memory, when probably the royal and Magnificent tombes at Westminster, shal pledge the Fate of them in *Pauls*, and be overwhelmed with Dust and Ruins. Such is the desire and Hopes (my Lord) of him that craves leave to subscribe himself,

From my House neer
Cripple-Gate in *London.*
December, 22. 1656.

Your Honors,

Most humble Servant, and true
Admirer of your Christian Ingenuity, Sincerity, and Courage,

WILLIAM RAND.

Mris. *Culpepers* Information, Vindication, and Testimony, concerning her Husbands Books to be Published after his Death.

SO great are, the *Afflictions wherewith our* Heavenly Father *hath been pleased to exercise me his poor* Handmaid, *that I have not only lived to see my* dear Husband, (*the* Stay *and* Solace *of my Life) taken from me: but it hath been my hard hap also to see his* Reputation, *and* Memory (*which wil be dear to al Posterity, for the Works he hath written for the Common Good of this Nation*) *blemished, and Eclipsed, by the* covetous *and* unjust Forgeries *of one, who, though he calls himself* Nathaniel, *is far from being* an Israelite in whom there is no guile; *who was not content to publish a* Hodgpodg *of* undigested Collections, *and* Observations *of my deer Husband deceased, under the Title of* Culpeper's last Legacy; *but to make the Deceit more taking, he steeled his Forehead so far, and brased it so hard, as not to be ashamed to forge* two Epistles, *one in mine, and the other in my* Husbands *Name; of the penning of which, he nor I, never so much as dreamed: And yet he* impudently *affirmeth in my Name, that my Husband* Laid a severe Injunction on me to publish them for the general good, after his decease; and that they are his last Experiences in Physick and Chyrurgery. *And in the Title of his Book, he said,* They are the choycest, and most profitable secrets, resolved never to be published til after his Death. *Al which Expressions in the Title and Epistles, are as fals as the Father of Lyes; and every word in them, forged and feigned. And he knew wel enough, that no discreet, honest man, that was a friend to my* Husband, *or me, would ever have agreed to such infamous and dishonest practices; and therefore I desire all Courteous Readers of the writings of my Husband, to take notice of this* Deceit, *and to assure themselvs that it never entred into his head, to publish such an undigested* Gallimoffery, *under the promising and solemn Name of his* Last Legacy, *and that* whereby he gained his Reputation in the World, *as the Impostor makes him speak in his forged Epistle. And I desire any in different Reader, that hath observed my* Husbands *lofty, and Masculine manner of expressing himself in his Prefaces, and Epistles Dedicatory, whether in case he had been minded or disposed to take so solemn a farewel of the world, as the* Forger *makes him to do; whether, I say, he would have done it in such a* whining fashion, *and so in the Stile of a* Balade-maker, *as to say,* And now, if it please Heaven to put a period to my Life, and Studies, that I must bid al things under the Sun farewel: Farewel to my dear Wife and Child, farewel Arts and Sciences, farewel al worldly Glories, adiew Readers. *Certainly my Husband would have been far more serious, and material, in such a case, as any discreet man wil Judg. Neither can it be thought, that in such a solemn* Valediction, *he could possibly forget his wonted respects to the* Colledg of Doctors, *to whom he did so frequently address himself, in divers of his writings.*

Courteous Reader, *I shal say no more touching the abuse of the Book-seller, only to prevent (as much as concerns me) thy being abused for the future, know, That my* Husband *left seventy-nine Books of his own making, or Translating, in my hand, and I have deposited them into the hands of his, and my much honored Friend, Mr.* Peter Cole, *Book-seller, at the* Printing-Press, *neer the* Royal Exchange *(for the good of my Child) from whom thou mayest expect to receive in print, such of them as shal be thought fit to serve thee in due season, without any Disguises or Forgeries, unto which I do hereby give my attestation. Also my Husband left seventeen Books compleatly perfected, in the hands of the said Mr.* Cole, *for which he paid my Husband in his life-time: And Mr.* Cole *is ready and willing (on any good occasion) to shew any of the said seventy-nine Books, or the seventeen, to such as doubt thereof.*

And if any Person shal question the Truth of any part of this Vindication, or Epistle; if they wil take pains to come to me, I wil face to face, justifie the truth of every word thereof, as I *have subscribed my Hand thereunto in the presence of many witnesses.*

I profess in the presence of the great God, the searcher of al hearts, before whom Mr. Brooks *and* I *must one day give an account of al our Actions: That* I *have not published this Epistle or Vindication, out of any dis-respect to Mr.* Brooks (*for* I *much respect the man, and would be glad to serve him to my power*) *but only to cleer my Husband from the folly and weakness cast upon him by the means above expressed. And out of tenderness to Mr.* Brooks, *I first tried other means of keeping, and afterwards of repairing my Husbands Credit, and then stayed long to see if he would repair (in any measure) the wrong done to my Husband, and my self. I desire to be.*

From my House, neare door to the Red Lyon in Spittle-fields, *October*, 18. 1655.

Your Servant (in, and for the Truth)

Alice Culpeper.

Mris. *Culpeper* did the 18. of *October*, subscribe this Epistle in Vindication of her Husband's *Reputation*, before Ten Witnesses, as she had done another Epistle on the ninth of *October*, almost in the same words with this, except neer the Conclusion.

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 waies, *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, & that the * Work-master may be admired in his work; and therefore the knowledg of the Parts alone does content him. But the Physitian, besides the knowledg of this, brings al into a Practical way, and searcheth after the Natural dispositions of every Part, that so by veiwing the Anatomy of the Carkases 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 wil 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 wil be an abler, and more skilful Phisitian that is wel skiled in this Anatomy, than he that contents himself, with the bare knowledg of the Parts.

Both which are necessary.

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

seeing the Natural Constitution of every Part which *Hippocrates* cals *Euphuian*, 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, Scituation, 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 wil declare in al the Parts; afterwards I wil lay down in a few words, what may be gathered from this Sound Constitution, for the Knowledg, fore knowledg, and Cure of a Diseased Constitution; And *Anatomy* handled in this Method, wil be the beginning, Middle, and end of the whol 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 wel verst in my Fathers writings, or in the *Institutions* of *Sennertus*. for by this Method, I shal unlock, & display the treasures in Anatomy of Physick. But perhaps some Fool, that is unskilled, wil reprove our Disigne, & Object, that we confound the whol Art of Medicine, seing *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 prattle such things against us, they wil quickly hold their peace, if they read *Gal. Lib.* 2 *admin. Anatom.* Relateing, That Antient Physitians regarded *Anatomy* so much, that in al their Books of the Cure of Diseases, they inserted Anatomy; and this we see *Hippocrates* did in al 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. Ad 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 administred diversly, according to the Parts Afflicted. Therefore *Galen* wrote his *Therapeutick* of the composition of Medicines, according to the Parts afflicted: and *Avicenna* did wisely, when perceving that *the Seats of Diseases could not be known without skil in Anatomy*, before the Diseases of the particular Parts he set down their Anatomy. And if we beleeve *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 al Diseases, and Symptomes, both Internal, and External; and the particular way of Cure according to the order of Anatomy, which is publickly observed. A notable peice of Workmanship to learn Physick by, by which 'tis easie to manifest, and bring to light the Errours, in the Cures of Diseases and to instruct and inform such as are Studious in Physick, by that time they have been hearers and beholders two yeares, of two Anatomies in a year, with diligent reading of Books,

Books, and excercize of the knowing of Plants, and other Drugs, and visiting of the Sick with him that is their teacher. Excellently said *Johannes Fernelius* in the beginning of his Pathology, *I shal never think any man wel skilled in the knowledg 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 knowledg 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. q. Lib. 1. de fract. et Cap. 1. Lib. Synops. de Puls.* The first is called *Synopticus*, when the Matter is briefly laid down; The other *Diexodicus*, when it is Copiously unfolded, nothing being passed by which is profitable to be declared: The former helps the memory; the latter cleers the matter to the understanding. For which Cause *Galen* divided his Books into Isagogical, 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 Physitians to teach easie things to young students, and such as may be quickly learned; ad hereunto; That al men desire to learn apace, according to *Aristot. Lib. 2 de Rhetor. Chap. 10.* And the Method of breise 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 cals back to their memory what they have learned before, and almost forgotten, *Gal. Lib. 4. de diff. puls.* *The Method of teaching double.*

Wisely, and Elegantly, did the Emperor *Justinian* judg, That a compendium of the Lawes was first to be propounded, to invite Novices to knowledg. *Then are al 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 beginning, 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 wil describe a breife, and cleer 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 al the Parts of the whol Body, which is substained, 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 knowledg of the Bones, before he come to behold the Anatomy of the whole Body: otherwise he wil be ignorant in designing the original, and insertion of the Muscles, and the sticking of other Parts to certain Conceptacles 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 cal that the Theory, which is converſant in the knowledg 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 *Sceleton*; *Ossifragium* is that which ſearches out the joining, and knitting together of the Bones, and Joynts, by Ligaments, and Cartilages, and by breaking, and deviding them; ſearches out their internal, and hiden 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.* The Matter of the Bone is Proper, or Diverſe.

Proper is conſidered Generally, or Specially.

Generation. Proper Matter, taken Generally, is double; the one for Generation, the other for Nouriſhment; the Bones are made of the Seed by conſent of al Phyſitians. 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 two fold; Remote, and Neer: Remote, is Blood, by which al the Parts of our Body are nouriſhed: Neer, is the Marrow contained in the Cavity of the Bones, or a Marrowy Juyce ſhut up in the Spongious Bones.

Conſtitution. The Proper Matter conſidered ſpecially, regards the Bone already made, which is various in reſpect of ſubſtance, and quallity; 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 whol Bone, if it be Sollid, is harder without, then it is within. If it be hollow, the Internal Superficies is hardeſt.

As for what belongs to Quallity, and Namely Color; the Bone, the more Sollid 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 dryes the Matter of the Bone. *Gal Lib.* 1. *de facul. 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

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 Physitians, 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 found in al 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 whol 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. General. 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 form and settlement of the whole Body.* *Definition.*

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 from their Birth til seven years of Age, differ in many things from such as are grown up: the other of men of perfect Age, which we now handle. *Doctrine of Bones Double, Of Infants and men grown up.*

And seeing al Doctrin of Bones, is referred to Physical use, we must know the Condicions, and affections of Bones, wel and Naturally affected, which are either common to al, or Proper to some.

The common are nine which shal be Described, and Demonstrated, in our new *Osteology*, at the latter end of this Manual. In dry Bones wel 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 Veines, and arteries, for Nourishment and life. 3. A cartilaginous Crust at the Extremities, and the *Periostion*, which compasseth about the whol Bone, the Cartilaginous extremities excepted. 4. Continuity, and Equallity in its whol substance; wherefore the callous, by which broken Bones are united, is not Natural. 5. A fit and convenient joyning of one Bone with another. *Affections of the Bones are Common.*

The affections Proper to the several Bones, are twofold; either such as regard every Bone severally; or such as regard more Bones 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 extreme 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] *Omoplata* 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 Skul is rough behind for the [e] insertion of Muscles, in other places 'tis smooth, and Polished: Al which affections, if they are such as Nature made them, they are according to Nature; if otherwise, they are beside Nature. *1. of Bones seperated.*

Also a Cavity is deep, or superficiary; that which is deep, is called [f] *Cotyle*; the superficiary [g] *Glene*. 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 Named a [h] Head; but if it be short, and depressed, it is called [i] *Condylus*. The Heads or *Condyli* of smal 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 poynt, and called *Corone*; or simply long, and that according to the Figure of it, hath diverse Names; or [k] *Styloides* [l] *Coracoides*, [m] *Odontoides*; or else tis terminated in a Head, and then is called [n] *Cervix* or a Neck.

Whether Apophyses have hollownesses.

It is not absurd, that some *Apophysis* should be hollow, Seeing al Cavities are, as it were, ingraved in the *Apophysis*; or else are made of two or three *Apophyses*, as in the Cavity of the *Ischium*, or Huckle-bone: and although somtimes a Cavity make the Body of the Bone, yet it is formed by a bony Circumference; which Seeing it sticks out obliquely, and orbicularly, without the plain superficies, it is worthily accounted an *Apophysis*; *Gal. Lib. de Ossibus* acknowledgeth the *Omoplata* to be an *Apophysis*, which is a *Cervix*, the extremity of which, ends in the [o] *Glene*; therefore Cavities ought to be referred to *Apophysis*; 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 Ossib.*

The Body and Extremities, which are Apophysis, and Epithysis.

In every Bone, which being joyned 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 wil 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 sought 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 a pumice, and bloody; but the *Apophyses* are alwais harder.

2. *The Joynting of Bones.*

The second sort of Affections are, the Articulations of bones, one with another, which in diverse 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. II. [k], T. 15. f. b. D. [l], T. 21. f. 2. d. [m], T. 13. f. 21. a. [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. q. 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 comly for man, that Divine Creature, to creep along like Worms, and Serpents; Nature hath set his body bolt upright, with firm, and sollid 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 Joyned 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 Anatomists; some contending that the touching of two bones one with another, makes a Joynt; others, besides touching, ad motion. So, that it is the movable touching of two bones, which makes a Joynt.

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

with mainfeſt 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 Definition of Articulation, refer to the third ſpecies of Articulation, which they cal Neutral, or mean, between *Diarthroſis* and *Synarthroſis*. Some give it a new Name, *Amphiarthroſis*, to wit, when the ſtructure is ſo Obſcure, and the Motion ſo hidden, that you know not whether it appertain to *Diarthroſis*, or *Synarthroſis*. But that place of *Galen* being il underſtood, deceives many Anatomiſts. This Doctrine of *Galen* ſeems more probable, thus.

Conjunction of Bones is either by Articulation the Differences of which are Diarthroſis & 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 none at al; 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; Judg 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 wil give an example of them Both. The Motion of *Enarthroſis Diarthrodes*, is manifeſt in the Joynt of the *Iſchium*: the Motion of *Enarthroſis Synarthrodes*, is Obſcure in the Articulation of the Ancle with the *Scaphois*.

1, *Enarthroſis.*

When a depreſſed, and plain Head, is received by a ſhallow and ſuperficial Cavity, this Joynting is called *Arthrodia*. an exemple of *Arthrodia Diarthrodes*, is in the conjunction of the Shoulder with the *Omoplata*. 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 ſhal 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 Ancle to the Heel. Modern writers add a fourth to thoſe three, which they cal *Trochois*, 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 *Ginglimus*, and its various differences, we wil thus Methodically handle them: *Ginglimus* 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 off 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 *Vertebræ* of the Neck. A compound *Ginglymos* by a double Articulation in places diſtant is ſeen in the *Cubitus* and *Radius*, in diſtant places of three bones is ſeen in al the *Vertebræ* of the Back and Loynes.

3. *Ginglymus.*

Which is Simple or Compound.

Beſides *Synarthroſis*, containes 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 manyfold. [b] *Sutura*, is the joyning of bones: as though the Teeth of two Jawes, 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 immovably in another, like a Naile in a Poſt.

Proper ſpecies of Synarthroſis.

1. *Harmonia.*

3. *Gomphoſis.*

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

Or by Sym-

Physis whose differences are three.

physis divided, yet afterward in process of time, they grow together. Som are united without any discernable *Medium*, others with a *Medium* interposed. And therefore, the simple differences of *Symphysis* are three; *Syssarcosis Syneurosis, Synchondrosis.* A mixed or compound *Symphysis*; is only one, *viz.* By a Nerve and Cartilage, which *Galen* cals *Neurochondrodis.* [d]Of these you may see more in. *Com. at Gal. Lib. de Ossibus.*

Galens Doctrine of Joynts.

According to *Galen*, I thus expound the Doctrine of Joynts, Methodically. The Conjunction of al 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 some substance, or distinguishing of parts, or to secure them from hurting, as apeares 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 apparent Medium, because it is Obliterated, as in the *Sternum, Os-sacrum*, or *Ischium*, and the bony portions of the inferiour Jaw: and therefore the Conjunction of bones is divided into *Articulus*, and *Symphysis*, 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*, whersoever 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 this 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 al the rest: which are framed in respect of largness, according to the proportion of the Head.

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

What the Head is.

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

It's Division.

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

What the Skul is.

The Skul, is a globous, and round body; hollow within, but this roundness is not exactly, spoehircal, by Reason of those Eminencies, which stick out before, and behind, which make the Skul somwhat longish, and compressed on the sides towards the Temples. If the Skul be not somwhat 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 deparved, 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.

Its Natural figure.

Not

Not only one Bone, but many make the structure of the Skul, the number of which is various in Authors, *Galen* Atributes seven thereto, and *Sylvius* follows him: others hold 14. As *Bauhinus*, by adding the six bones, of each eare, which are Parts of the rocky bone, and included in the Cavities of the Eare, and add nothing at al to make the globe of the Scul. But more rightly *Paræus* ads fourteen bones to the Skul, but distinguisheth them, into containing, and contained, the containing are eight, the contained are the six smal 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*, Fallopius, from whom we wil 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 *Suturæ*, which knit and unite the Bones together. *Sutura what.*

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 uper Jaw. The Proper are divided into true, and false: the true, are the Saw-like Conjunctions of the bones intertexed, like the Teeth of a Comb. They are held by Anatomists, to be in number three. 1. [a] *Coronalis* is on the forepart of the Skul, which passeth transversly from one temple to the other. 2. oppolite 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 concourse of the sagittal and coronal suture, the Greeks cal *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] *Squamosæ*, 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] *Sphenoidea*, which Circumcribes the *Os-sphenois*, beginning at the hinder part of the Head, and ending at the furthermost Tooth of the upper Jaw. The third is called [g] *Ethmoidea*, and compasseth about the *Os Ethmois*, on every side; it seems rather to be Proper than Common, and belongs rather to *Harmonia* than *Sutura*. *How many-fold.* *Proper are.* *Three true ones.* 1. *Coronalis.* 2. *Lambdoides.* 3. *Sagittalis.* *Two false ones.* *Common are three.* 1. *Frontalis.* 2. *Sphenoidea.* 3. *Ethmoidea.*

The Sutures being wel 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 Nostrels, and passeth through the middle of the Frontal bone; which is often seen in the Skuls of such as are grown up: al of them are Proper, none common, unless the *Sphenois*, according to *Galen*. *The Eight Bones of the Skul.*

1. The bone of the [h] Forehead distinguished by the first, Common, and coronal Suture, which sometime is Cut into two parts by the Sagittal Suture is that Eminent seat of the Eye-brows; it includes two Cavities derived into the Nostrels. *Os Frontis.*

The Second and third are called the bones of the [i] fore part of the Head, and are seperated from one another by the sagittal Suture; below, by the Scaly Suture; before by the coronal: behind by the *Lambdois*. *Os Simipitis.*

Under these are the bones of the [k] Temples, which on the uper part are arremured 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 Eare.
1. *passage of hearing.*
2. *Concha.*
3. *Labyrinthus.*
4. *Cochlea.*

In this last *Apophysis*, are the three Cavities of the Eare contained: The first is external, and called the [p] Passage of hearing, The second is called [q] *Concha*, and containes the internal Aire, and the three smal bones called [r] *Malleolus Incus* and *Stapes*, as also a hole passing into the Cavity of the *Mastois*. The extremity of this Cavity is directly opposite to the *Timpanum* and hath two small holes; of which the greater is called the [s] oval window and is the ingress into the third Cavity, which is called the [t] Labirinth, by reason of its various Circulations and turnings; the other hole is narrower, and is the Passage to the fourth [v] Cavity which is called [x] *Cochlea*, from its rough and wreathed Figure.

Os Occipitale.

The sixt bone of the Skul is called [y] *Lambdoides* and *Occipitale*, and is compassed about with the Suture *Lambdois*, the Extremities of which, are called Horns by the Antients; but by *Galen*, Aditions to the *Lambdois*. To these are Caustick somtimes applyed.

Is Sphenoides.

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 hollowness of a ship, are called [c] *Naviculares*, by *Galen* they are called *Pterigoides*: the other pass under the *Zygomata*, to the Temples, and are called *Temporalls*. Between the two Tables, or Plates, is an empty [d] Cavity passable to the Nose by a double hole, and severed within by a Bridg in the midst; this is alwaies wanting when the bone of the Forehead is sollid.

Its Apophyses.

Os Ethmoides.

The eight bone is called *Ethmoides*, or according to *Galen Spongides*; it consists of seven different portions, The first is pierced thorugh like a [e] 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 Nostrells, from the same Sieve-like Table, depends that bony substance, which makes the [g] Bridg between the Nostrels; and this is accounted the third portion of the bone: To this Bridg of the Nose, stick two Spongy bones, which make the fourth; and fift part of the *Ethmoides*: The sixt, 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 *Canthus*, and underneath they cover three, and somtimes four cells, disposed from the great *Canthus*, even to the lower-most *Orbita*.

Tabula cribrosa.
Crista galli.
Septum Nasi.
Two Spongy Bones.

In the basis of the Skul, both internally and externally, certain Cavities are observed; of which some are called *Sinus*, others holes, others *Fossa* or pits; of which, see *Sylvius*, who was the first that handled them Methodically: we give them here Names according to their places, and Natures.

Eight Sinus.

The *Sinus* are eight; two *Maxillares* in the uper Jaw, as many *Frontals* in the bone of the Forehead, so many *Sphenoides* in the bone *Sphenois*, and no fewer *Maistoides* in the *Apophyses* of the *Mastois*.

Holes internal. 27.

Holes are internal, or external; Internal are twenty five commonly, somtimes 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 the second, [i] *Sphenoideus*; the third, [k] *Opticus*; the fourth, [l] *Scissura Orbitalis*; the fift, [m] *Temporal*, from the nerve of the third conjugation which passeth to the temporal muscle; the sixt, [n] *Gustativus*; the seventh, *Gustativus Secundus*; the eight, [o] *Cervical*; the ninth, *Caroticus*; the tenth, [p] *Ariditorium*; the Eleventh, [q] *Jugulare*; the twelfth, [r] *Motivum Linguæ*, or *Linguosum*; the thirteenth, and last, [s] *Impar*, or *Occipitale*. The external holes are ten on each side, according to *Silvius*; to which I ad an eleventh, to wit, the external hole of the Eare; 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

External holes. 10.

the,

the first is called, *Superciliare*: the second *Lacrimale*, the third, *Orbitarium externum*; the fourth, *Orbitarium Ethmoideum*; the fift, above the palat; the sixt in the extremity of the Pallat; the seventh, the cleft under the *Zygoma*; the eight, and ninth, *Supra Pterigoides*; the tenth *Mastoides*; the eleventh, the external hole of the Eare.

Pits internal. External.

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 eight, to wit, the Cavity of the Nose: The first, *Orbitaria*; the second, *Nasalia*; the third, *Zygomatica*, the fourth, above the Pallat; the fift, under the Pallat; the sixt, *Pterigoidea*; the seventh, in the joynting of the inner jaw; the eight, in the hole of the sixt Conjugation.

[a] T. 15. f. 3. *aaa.* [b] f4. *bb.* [c] f3. *bb.* f4. *aa.* [d] F 15. f. 3. *cc.* [e] T. 15. f. 3. *Supra K.* [f] T. 15. f. 5. *aa.* f. 6. *oo.* [g] f4. *AB.* [h] f. 3. *D.* [i] f. 6. *cc.* f3. *d.* [k] f. 6. *DD.* [l] f. 6. *EE.* f3. *F.* [m] T. 15. f. 5. *ff.* [n] T. 20. f. 6. *A.* f3. *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.* [v] T. 15. f4. *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 uper Jaw.*

The Face what

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.

How many Bones in the uper Jaw.

The uper Jaw consists of many bones, about the number of which is some controversie amongst Anatomists; but passing by the vain and foolish opinions of modern Authors, I admit only of Eleven, passing by those portions of the *Ethmoides*, 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 form the *Orbita* of the Jaw; with other bones are portions of the bones of the head, as the productions of the *Sphenois*, the broad portion of the *Ethmois*; and therefore they are Childishly referred to the 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 it self. And when *Galen* reckons the *Os Sphenois* amongst the bones of the Jaw, he reckons it as a Supernumerary. And therefore we must reckon but Eleven bones of the Jaw.

The first Bone 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 Oss.* Cals [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 *Osficulum Lacrimale.* *The 2.*

3. *male.* The third is called the [c] greatest bone, and containes the middle part of the Teeth; and finisheth the inferior part of the *Orbita*, and the internal
4. part of the Nose. The fourth bone forms the [d] Nose, and so the Nose is formed of four bones, two are Proper, which we mentioned last; and two common. Modern Anatomists ad the bone called [e] *Vomer*, which is placed under the *Sphenois*, and Palat, which was not unknown to *Hippocraces*. It is like a Plow-share, and holds up the bridg of the Nose, to which it is Joyned by *Sutura*, or *Harmonia*.

[a] T. 15. f3. E. [b] f. 3. G. [c] f3. I. [d] f. 3. K. [e] f. 6. j.

Chap. 10. *Of the Orbitary Bone.*

The Orbitary Bones of the Eye how many. THe orbitary bones, which *Hippocrates Lib. de Ossibus* cals *Hypopia* by which the Eye holes are made, were first of al by *Picolominus* 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 ungular, or Lacrymal bone, but partly portions of the bones of the Skul, partly portions of the bones
The error of Picolominus, touching their number. of the uper Jaw. The first is the [a] Frontal bone, which makes the fornace of this vault. The second is a portion of the *Sphenois*, situated in the deep external side of the Eye hole, even to the lesser corner. The third is [b] *Lygomaticum*, which makes the lesser corner, and the middle pavement of the *Orbita*, or Eye hole. The fourth is [c] *Maxillare*. The fift [d] *Lacrimale*. The sixt the Scaly table, of the os *Ethmois* 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. THe inferior Jaw in such as are grown up, is but one bone; in which is to
Basis. be noted, its basis, and its extremities. Its basis is the middle part of it, hollow within sticking out outwardly and is called the [a] Chin. The extre-
Apophyses. mities are Angles, each extremity tends out two *Apophyses*, of which one is Sharp called [b] *Corone*, and receive the tendon of the temporal Muscle; the other is a [c] *Condyle*, and may be called *Articulatoria*, because it serves for Articulation of the Jaw. Below these *Apophyses* is a Singular [d] hole by which Veins, Arteries, and Nerves pass to the Teeth; one portion of which passeth back again, neer the [e] 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. THe *Os Hyois* may be refered to the bones of the Head, because it is fastned by Nervous bones to the *Apophyses* of the *Styloin*. It is Compounded of
Basis. five smal bones, of which that which is greatest and hollow is called the [a] basis, they which ad a sixt 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 extream parts of the greater and Fundamental

mental bone, one Cartilaginous [b]Horn, which is seldom bony, springs on the top, on each side it is fastned to the Cartilage *Tyroïs*, which two Horns are usually numbred for the eight and ninth bones. *Horn.*

The *Os Hyoïs* is the foundation of the *Larinx* and Tongue and by the Judgment of al Anatomists receives the Tongue in its Cavity, but if a man may beleeve his own Eyes, they wil shew him that the *Epiglottis* only is received in its Cavity, and that the Tongue resteth on the uper side of its Basis. *Eror of Anatomists.*

[a] T. 13. f. 11. 12. *A A.* [b] T. 13. f. 11. 12. *B B.*

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 sollid but hollow, and so hollow, that it receives a smal Vein, a smal artery, and a smal Nerve. *Parts, Basis and Root.*

The Roots of the Teeth are various in number and disverse in figure. The Root of the Cutters is alwaies simple and right, distinguished only with a smal 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 somtimes 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 til they are two years Old and upwards; twenty of them usually come out by degrees one after another, and before they are wel 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 Jawes. *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 *Gomphosis*. *Their Orders.*

[a] T. 15. f. 6. M. [b] T. 15. f. 6. n. [c] T. 15. f. 6. oo.

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

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 cal *Spondils*, and the latins *Vertebræ*. *The Back-bone 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 joyned together by *Ginglymos* 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 al the *Vertebræ*, are seven *Apophyses* found. The whol *Rachis* or Back-bone, is divided into four Parts. The *Neck*, *Back*, *Loyns* and *Os Sacrum*: The Neck hath seven *Vertebæ*, the Back twelve, the Loyns five, the *Os Sacrum* is either one, or three-fold in such as are grown up; in Chilldren it is divided into five or six Parts: Wherefore the Back-bone in such as are grown up, is composed of twenty four *Vertebræ*; 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 Carkass the Flesh of the Back being taken away it may; in the *Vertebræ* of the Neck, this peculiar thing is to be noted, That al the transverse [d] *Apophyses* are peirced 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 rise and insertion of Nerves; but the two superiors have another structure and conformation, by reason of the motion of the Head; for the first wants a [f] *Spina*, and hath a thick round Body; the second sends out a [g] Tooth like *Apophysis*. Al the *Vertebræ* of the Neck are strickly joyned and implicated lest they should slip asunder in the vehement Motions of the Neck.

The Vertebræ of the Neck.

The vertebræ of the Back.

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

The Vertebræ of the Loyns.

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

Os Sacrum.

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 somtimes into six.

Coccyx.

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. cccc. [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. 6. [m] T. 2. f. 5. bb. c.

Chap. 15. *Of the Chest.*

The Breast what.

THe Chest, together with the Back-bone, make up the trunk of the Sceleton.

It is four-fold.

The Chest is a bony Circumference, which holds the vital Parts, and is constituted of a four-fold kind of bones; the *Sternum* before the Ribs on each side, the *Claviculæ* at top, and the Back-bone behind, to which the Ribs stick.

The Sternum.

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 footsteps of the Antient 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 bruites.

The Cartilage called Sword-like.

The Ribs.

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

ferior, are called [d] *Bastard*, because they are never joyned to the Breast-bone, but are joyned in a Cartilage, that they may the better give way to the swellings of the Liver and Spleen, and yeild to the Motions of the *Diaphragma*.

The [e] *Claviculæ* are two, one on each side; whose Figure represents an *Italica S*. They retain the *Scapula* in its Proper seat that it fal not upon the Breast. *Claviculæ.*

[a] T. 10. f. 2. *A A.* [b] f. 2. *B.* [c] f. 2. 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 Sceleton: and first, of the Scapula.*

SEeing the *Scapula Omoplata*, or shoulder-blade, belongs nothing at al to the constitution of the Breast, I seperate 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] Interior. 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 whol 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 *Apophysis* 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 *Apophysis* of the *Spina*. The pits on each side of the *Spina* are called *interscapulium*; one pit is above it, the other below it, but the middle prominence of the *Spina* which is bowed, is commonly called *Pterygium* or the Crist. The other extremity of the *Scapula*, which is great, subject to the *Acromium*, and opposite to the Basis, is called the [g] Neck; in it you shal note, that *Apophyses* called [h] *Coracoides*, which was made for the security, and firmness of the Joynt of the Shoulder, the Cavity of the Neck, is called *Glenoides*.

Its Parts. *Basis.* *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 *Cubit* and the *Hand*. In the Shoulder are two extremities for the insertion of Muscles; the upermost is called the Head, which a membranous Ligament, bred from the Cavity of the *Glenois*, 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* ariseth. In the other extremity of the Arm, you may observe the *Trochlea*, about which the *Cubit* is turned: About the *Trochlea* are two [a] Cavities, of which the external, is wider than the internal; in these are the Coronal *Apophyses* of the Cubit received: with the *Trochlea* are two *Apophyses*, which are called *Condili* 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.* *Apophyses*

[a] f. 2. f.

CHAP.

Chap. 18. *Of the Cubitus, and Radius.*

Radius *Cubitus*

The second Part of the hand is called *Cubitus*, & 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 whol [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 invertion; 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 shal 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.

Why there are two bones.

Cavity. *Apophyses.*

There is somthing worthy the noting in the extremity of the *Cubitus*: For in the uper 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] *Olecranum*: 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.

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

Carpus.

[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 al: the first order makes *Arthrodia Diarthrodis*, 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 Synarthrodis*: So that this Motion, is either none at al, 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 endewed 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 *Ginglymos*; 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*.

[a] *f.* 1. FF. *f.* 2. F. [b] T. 21. *f.* 1. GG. *f.* 2. G. [c] F. 8. *f.* 12. C D E.

CHAP.

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 whol Trunk, are by the greateſt Part called *Oſſa 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 halfe, 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] the Funnel. *Its Parts.* *Ilium.* *Pubis.* *Iſchium.*

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 cal 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*, *upermoſt Spine*. There is under this, another called the former and nether Spine. *Back.* *Rib.* *Lips.* *Spines.*

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

[a] T. 8. f. 12. C D E. [b] T. 2. f. 3. A. [c] f. 3. C. [d] f. 3. B B. [e] T. 21. f. 4. B. [f] T 2. f. 4. aa.

Chap. 21. *Of the Bone of the Thigh.*

THe Feet, as wel 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 al the Body. In the ſuperior excremity, 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 upermoſt, on the ſide, the greater [c] *Trochanter*. The other extremity of the Thigh, hath two [d] *Condyli*: a [e] Cavity being left beteween, which admits the [f] middle, and eminents *Apophyſis* of the Leg; and in like manner the *Condyli* 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 ſtrenghtned before, with a ſmal bone, called the [i] Knee-pan, which is Articulated to no bone. *The Thigh Bone.* *Head.* *Neck.* *Apophyſes.* *Knee.* *Ham.* *Knee-pan.*

[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. hh. f. 4. e e. [e] f. 4 d. [f] f 4 f. [g] f. 1. hh. f 4. ee. [h] f. 8. cc. [i] f. 1. LL. f. 8. d.

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 inferior, and bunchy Parts of them both, are called *Ancles*; of which, the *Fibia* makes the [c] internal, and the *Fibula*, the [d] external. *Two Bones of the Leg.* *Tibia.* *Fibula.*

[a] f. 1. M. f. 4. D. [b] f. i. M. f 4. D. [c] f. 1. ii. f 4. gg. [d] f. 1. K K. f 4. h.

Chap. 23. *Of the Foot.*

Division. Tarsus. THe Foot is divided into the *Tarsus*, *Metatarsus*, and *Toes*. The *Tarsus* consists of seven Bones, which *Rufffus Ephesius* cals *Ostracodea*, by reason of their hardnes: 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*, *Schapboides*: 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 Elle are called [e] *Calcoidea*. The [f] *Metatarsus* follows the *Tarsus*, and is formed of five Bones, and answers to the [g] *Metacarpus* of the Hand.

Metatarsus.

Toes. The *Toes* succeed the *Metatarsus*, constituted of [h] three Bones apiece, except the great Toe, which hath only two Bones: smal Bones fil up and strengthen the internodes of the Fingers and Toes in such as are grown up, which are uncertain in number, and called [i] *Sesamoidea*.

In the second Articulation of the great Toe, are two smal Bones worth the noting, and indifferent big, which are alwaies found in al Carcasses, and two at the original of the two Muscles of the Feet, mentioned by *Vessalius*, 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.* — [i]

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 *Bauhinus* follows him; but by their leaves, they noted many differences which are not found, and omitted some that are: we shal speak of them both severally.

In Substance of the Bone. It is true, al 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 al 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 alik, having neither more, nor fewer Sutures; although *Aristotle* thought otherwise; Namely, that Males had more Sutures then Females, *Ch. 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 Woman, passeth to the Nase, 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] *Larinx* (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.

Clavicula. The [g] *Clavicula* in Women are not so crooked, for the more comliness of their Neck and Breast.

Sternum. The inferior Part of the [h] *Sternum*, is broader then in Men, and many times hath a manifest hole in it; and the lower Bone upon which the [i] Sword-like Cartilage depends, is cleft like a crescent Moon and makes a large hole for the Egrets 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 yeares 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 poynted, by reason of the weight of their Breasts. That

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

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

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

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* [n] *Ilium* most commonly is larger, but that largness bends more outward; by which means the *Ossa Ilium* are more hollowed outwardly. *Buttocks.* *Os Ilium.*

Upon this largness 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.* 14. *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 that the portion of the *Os Pubis*, neer the *Symphysis*, may be larger; but the *Spina* of the *Os Pubis* is turned outwards. *Os Pubis.*

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

The space between the *Os Sacrum*, *Ilium*, and [p] *Pubis*, where they are joyned together, is larger in Women then in Men, least the narrowness of the Passage should hinder the comming 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. mno. [d] T. 13. ad f. 10. [e] f. 8. A. [f] T. 10. [g] T. 21. f. 1. R. [h] T. 10. f. 2. A A. [i] f. 2. B. [k] f. 2. C C. [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 nnmber of the Bones in a Mans Body.*

THe number of the Bones of mans Body amongst Anatomists is uncertain *Vesalius* held 307. *Galen* 242. But in the *Sceleton* 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; *Claviculæ*, two; Ribs, twenty four; of the *Sternum*, three; of each Hand, divided into four Parts, sixty two; *Omoplata*, two; Armes, two; Cubits, four; both Wrists, sixteen; both *Metacarpus*, eight; of al 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 *Sceleton* is made, there are eighteen other manifest smal 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 smal that they consum or vanish away in boyling the Bones to make a *Sceleton*.

There is in each Eare three smal Bones, which ought to be kept apart with the *Sesamoida*; neither come they into the structure of the *Sceleton*. 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 til seven years of Age, differ much from the Bones of such as are grown up, both in number, and figure, and

especially in the Multitude of *Epiphyses*, and defect of *Apophyses*, therefore I thought it wel worth the while, to ad the Bones of Infants, to the Bones of men grown up, that the difference between them may apear more evidently, for this comparison makes much to take away the differences amongst Anatomists; and to unty the difficult knots, you shal find in *Galens* Doctrine of the Bones.

Is Ancient. 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 unskilfulness either of the Midwife, or Nurse. We see diverse Children at this day Borne, with great Heads, Bunches, Bow-Legs, great Ancles, Vnseemly 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 *Lib. 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 whol 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, in taking of it up laying it down, or carrying of it, or washing of it, or binding it up; in al 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 waight 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 heard, that the breast becomes sharp, and they look as though they were broken backt; and somtimes are crook Shouldred.*

You see by *Galen*, what nuseries 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 other wise ill formed; *The Women that go with such Children are ill, or like to miscarry, in the eight month, for the maimed Embrion was greavous Sick, in the eight month; and the Disease, Caused, Impostumation, 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. The greather Bones of Infants are hollow, 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 yet been very sollicitus about, the counting of the number.

Their Epiphyses. I never observed any Bone, of any bignes or length; which ended not in an *Epiphyses*; now al 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

How they wax hard.

they

they are joyned, 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 *Harmoniæ*, distinguished by a Line, and not joyned together like Teeth of a Saw by mutual ingress. 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 [a] *Fontanella*

The Sutures

Sagittal.

Coronal.

Fontanella.

The temperal 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 Eare, but beyond it, about the *Apophysis Mastois*.

Bones of the Skul.

The Bones of the Skul are very thin, neither shal you find the two tables or plates in them, before one year be Elapsed, 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 concourse 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.

Their thicknest.

Of the Forehead.

The [c] 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 til they are a year Old. The first is the whol 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 *Fontanella*.

Bregma.

Bones of the Temples.

The Bones of the Temples are manifestly seperated into two Parts, scaly and rocky, neither the *Epiphysis* called *Styloïs* nor the *Apophysis* called *Mastois* appear in it, only the *Zygomatica* is seen, but that part of the rocky Bone subject to the hole of the Eare, makes the basis of the Skul, it is called next to the *Sphenoïs* and next to the *Lithoïs* by some, but may be called *Auricularis*, because it comprehends the whol structure of the Eare, in Children it is an *Epiphysis* which easily is severed, and this is often observed in the Sculs of bruit Beasts that are grown up, in which not with standing it is other wise framed.

Passage of the Eare.

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

Bony Circle.

But proceeding inwards to the extremity of this passage their is a bony [d] circle to which the *Timpanum* is fastned, this also is easily severed, but when the passag of hearing grows hard, the bony circle is so strongly knit to it, that it is inseperable. The [e] Cavities are very straight, neither can the admirable structure of the Labyrinth be perceived in Boies, and yet that which is wonderful the three little Bones of the Eare [f] *Malleolus* & *Incus* and [h] *Stapes*, are of the same substance, bigness and form, even from the birth to extrame Old Age.

Os Sphenoïs.

The *Os Sphenoïs* is divided into four Parts according to *Fallopius* of which the

proces

proces 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 *Fallopius* very ill decribed these portions of the *Sphenois*; for the third comprehends the seat, or Saddle, and also is subservient to the optick Nerves: The fourth is streched out below the Saddle, even to the *Corone* of the hinder part of the Head, and that division remains Conspicuous, even til three or four years be passed. In this Bone, are no winding Cavities; and the *Os Ethmois*, is totally Cartilaginous; the bridg 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, *Zygomaticum*, *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 *Harmoniæ* of the upper Jaw, are like those, in such as are grown up, a certain cleft only apears 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 cels of the Teeth are covered, and as it were stopped up with a membrane.

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

Teeth. 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 al want Roots.

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

At what time they apear. 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 al 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 al their Teeth; neither indeed have they more, before they are three or four years of Age.

Where the hinder Teeth ly. But when Anatomists say, that there is only twenty Teeth contained in the Gums, They do not tel 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 hapen 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, remaines stil 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. This 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 transversly 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 Judgment wrote more truly, that there was a new Tooth in Children, which did expel the former, and sometimes grew out besides it, either aboue, or below it.

The middle part of the *Hyois*, being the basis of the whol 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. T. 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 *Vertebræ*, the *Os Sacrum* excepted: al 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. *Fallopius* 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 Vertebræ.* *Fallopius his Observation.*

In al the *Vertebræ*, 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.

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

Al the *Vertebræ* consist of three parts, as al the Spines of the *Vertebræ*. The *Os Coccix* is altogether Cartilaginous, and undivided; Age divides it into three or four parts, which remain Cartilaginous til seven years be expired. *Os Coccix.*

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 compased about with a Cartilage one each side, and resembles so many bony Knots in a board. *Ribs.* *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.

Fallopius 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 apearing by that time the Child is seven years of Age; and though *Fallopius* think six alwaies remain, yet I have alwaies observed fewer. *Fallopius his Observations.*

Fallopius

Fallopius 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 apear, one bone being made of the fourth and fifth and another of the sixt 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 *Omoplata* 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 seperated but it is an *Apophysis* incrusted and terminated with much Cartilage, which is dryed after three or four years, and changed into a bony *Epiphyses*. called *Acromium*, as it is, described by *Hypocrates* 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 then the superior parts: the superior part of the Cubit called *Olecramen*, 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 eight bone of the Wrist, turns bony last of al.

Metacarpus and Fingers. The extremities of the [c] bones of the *Metacarpus* and Wrist are Cartilaginous, which are hardned within less then 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 til they are seven years of Age, to which the Ancients gave proper Names. [a] The first bone comprehends that widness which passeth to the midst of the Funnel, the other part is equally divided into two parts, a line being drawn by that Cleft of the Funnel Cros 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 Ischium*, the Lips of which are Cartilaginous.

Pubis. *Ischium.*

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 seperated even to the tenth year and upwards.

Tarsus. In the Foot al the bones of the [c] *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.*

The Number.

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

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 smal bones of the *Os Hyois*, which al joyned together make seventy. The Trunk comprehends sixty seven, *Vertebræ* twenty four, *Scapulæ* two, *Ingulæ* two, *Sternum* three, *Ilium* two. These joyned together make sixty seven. But if the *Os Sacrum* consist of five and the *Coccyx* of three, (as often it doth) then there wil 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 wil be three hundred and five; form 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 *Vertebræ* of the Back-bone and *Os 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 fourty 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* fourty eight; each Knee-pan and Hyois eight (the three smal 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 ad to three hunded fourty five, the Body of the Infant wil be composed of six hundred seventy Bones.

The End of the First Book.

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

Chap. 1. *General Precepts, which he that would be an Anatomist, must be first Acquainted with.*

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

How Anatomists Consider the Body of Man. 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 whol 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. *Its Parts.* But in the Anatomical dissection of a dead Body, the Humors and Spirits, are not considered, the Speculation of which belongs to Physiology, only the Sollid 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. *Sollid Parts how many fold.* The sollid 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. *Similar Parts what how many.* The similar Parts according to Anatomists are Bones, Cartilages, Ligaments, Membranes, *Fibres*, Veins, Arteries, Nerves, Flesh, Fat. These are found almost in al Compound and dissimilar Parts, and the Corpulency of the Parts is formed of them. The Hairs, and Naills are excrements of the external Parts: Therefore an Anatomist ought to be

be wel 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, Terrestial; 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 somtimes 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 *Claviculæ*, in the *Sternum*, in the Articulation of the *Tibia* to the Thigh; besides the Cartilages of the *Larinx*, Wind-pipe, and such as are placed to prop up other soft Parts, as the Nostrels, 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 other parts, or the Receptacle of somthing; as the Stomach, Bladder of *Gal*: It being a hollow body, it receiving somthing, it may be called *Tunica*, a Coat; If it Embrace and cover a sollid body, it is propperly called *Membrana*. *4. Membrane.*

5. A *Fibræ* is like a threed stretched over a Membrane, or Interwoven therewith, to strengthen it: and becaus of its various Scituation, it is called *Right*, *Oblique*, and *Transverse*; not only to help the Membrane, but also to strenghten 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 in these by the *Fibres*. *5. Fibræ.*

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

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

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

9. The *Flesh* is the foundation of organical, and dissimilary 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 wel concocted, if it be red; but of blood, and Seed, if it be white. *9. Flesh.*

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 somthing, 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 substane of the *Glandulæ*, is called Flesh; but especially the substance of the Muscles deserves the Name of Flesh.

10. The Fat although it appear not til the whol body be formed, and when the Child is big, and grows to the Parts; yet becaus 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 Oyly, 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*, shal be treated of, as they are shewed in a Carcass, from top to Toe, after we have shewed the Muscles; because they are so joyned together, that one cannot be shewed without another.

But I desire al such as are studious in Physick, first to be wel 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 wil the better understand the whol 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 shal be shewed severally in the explication of the dissimilar Parts, seeing of the similary Parts aforesaid, viz. *Bones*, *Cartilages*, *Ligaments*, *Membranes*, *Fibres*, *Veins*, *Arteries*, *Nerves*, *Flesh* and *Fat*, the Bulk, or Material substance of the dissimilar Parts, is made up, and therefore you shal hear similary Parts often mentioned, in the explication of them; howbeit, in some places they exist apart, no waies joined, 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 concourse and Union of similary Parts is necessary. Wherefore, every Movable action, belongs truly, and poperly to an Organical Part; and none unless it be alteration, belongs to a similiar 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.* More over, organical Parts according to the dignity of their action, are divided into *Principal*, and *Administring*. They are called principal, which supply the whol body with matter and faculty: Physitians 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 al 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*. Connection differs from communion; for Connexion is the sticking of one Part to anther, of one or more Parts by which they depend; it is somtimes 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 neer, which is done by Veins, Arteries, and Nerves, by intervening of which, al the Parts have community with one another; or Particular, when some Particular Part communitates its self to some neer, or remote Parts, and so the Gal 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 al with those things that are common to the whol Organ, then with those things which are Proper to the same Organ: but in describing the Fabrick of the body of Man, we wil follow the common order of Dissection.

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

SEeing my design and intent of handling Anatomy, doth not consist in a bear 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 judg of the Sicknesses 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 Soldiers. And this knowledg is necessary even to this day; for in some *Monasteries* such as desire to lead a Religious life, the *Physitian* 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 Physitians for the education of Children, I mean the Children of Princes. *The necessariness of it.*

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

As for that which belongs to Sex, Man-kind is twofold: Male and Female. The Latin word *Homo* comprehends both: and a Women has been called *Vira*, and therefore a stout Women is called *Virago*: the differences of both I have Accurately expounded in my *Anthopographiæ*. *Lib.* 2. 1. *Sex.*

The substance of the Boby in Man ought to be fleshy not Fat; firm and sollid, 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 Physitians is called *Idiosyncrasia*; which if *Galen* could exactly have known, he would have thought himself equal with *Æsculapius*: 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 Dimension of the body. We shal consider cheifly 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 *Vitruvius* 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. *Vegetius* Writes that Soldiers 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 parts, as *Denmark*, the Low-Countries and those of upper *Germany* are tallest. 4. *Magnitude.*

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

The Latitude or thickness in a wel 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 smal body cannot be fair; yet if you regard, understanding,

understanding, there is little Wit commonly in those Tal bodies.

Elegantly said *Celsus*, *Lib.* 2. *Ch.* 1. The best disposed body is wel ser, neither slender nor Fat, a tal stature is comely in youth but not so in Age, a slender body is weak, a Fat body dul.

5. *Color.* The Color of the body is diligently to be marked, for such a Color as flourisheth in the Skin and countenance, the same is predominant in the Humors, and therefore sanguine people are Red, Chollerick Yellow, Mellancholly Black or brown and dusky, Flegmatick are pale: a brown and ruddy Color are preferred before pale, which argues softness of body.

There is some difference in Authors about the Color to be Chosen in a Nurse, *Aristotle* perfers brown, others a Mingled Color of Red and white.

6. *Form. of the Head.* Now the Natural and Legitimate form of the Head, Brest, 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 somwhat 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 Fleshy, because they are the Emunctories of the breast if the Woman give not Suck. If the Duggs be smal 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 *Moschio*, 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 tal, before such as are of a mean Stature: *Aristotle Lib.* 3. *de hist. animal.*

White colored 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 Physitians, 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 wel disposed, may easily Purge; but such as are slender, take strong Medicines with danger.

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

Privities. As for what belongs to the Privities; *Heliogabalus* chose such for Soldiers 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 wil beleeve *Galen*; or because the Muscles

Limbs. are tyred, by erecting a great, and long Yard. A mean Yard is most fruitful, and gives most & longest pleasure in the act of Copulation. A long Yard, though indeed it fil 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.

We pass to the Limbs, *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 whol body be six Foot long, the Foot is three: both Hands and Feet, are somwhat 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 wel formed, is to be Read in *Sidonius Apollinaris*,

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 whol 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.

Division of the Body.

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

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 shal shew, when I come to speak of each Region apart.

The Medicinal Consideration.

I wil not stand here in rehearsing & designing the external Parts of the whol 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 favoredly within. This habit of the whol body, makes the third Region of the body, to which the Humors come from the deepest Parts; the ill effects of which, are cleerly seen in the Diseases, and Symptomes which appear outwardly. The juyce which is seen in the leaf and branch comes from the Root.

I shal reckon up the cheife Diseases which use to infest the outward habit of the body. *Viz.* Immoderate Fatness, or Leanness, Defluxions, Gouts, Dropsy, Cachexia, the whores Pocks, Plenty, or defect of Sweat, by reason of the openness, or closeness of the pores, Palsie, Convulsion, Unquietness, and wearisness and al kind of swellings.

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

Flesh, seeing it is Porous and Musculous, 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 whol body, and other Diseases of the Skin.

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

Therefore seeing the smal Pocks and Measles, are but the scum of the whol habit of body, that is, of the Flesh, and sollid parts, their coming out is to be furthered, either at the beginning, or at any other time, with Sweating Medicamants, 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 Feaver, 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 smal Cupping-Glasses fastned al 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 Packs 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 soonnest Putrifies and stinks.

It is called in Greek *Coilia* because it is coile that is hollow; in latin *Venter*, in English the *Belly*.

Its Substance. Its substance is fleshy composed of various similar parts, which we shal propound in order hereafter.

Temperature. The belly seeing it is a most compound part, its own temperature is none at al, but it follows the temperament of the parts contained in it, and especially of the Liver.

Original. It hath its Original from the first comformation with the rest of the Parts.

Situation. It is Situated in the inferior part of the Trunk of the Body.

Quantity. Its Quantity or widnes 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 whol widnes of the belly is distinguished into three Regions; the superior called [a] *Stomachal*, the middle called [b] *Umbiliar*, 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 stomachal Region are called [d] *Hypochondria*, of the middle Region [e] *Ilia*. The middle is called the [f] *Navil* which is the centre both of the belly and of the whol 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 bashfulnes commands us to conceal.

In respect of number, the belly is but one; yet by the *Peritonæum* it is divided into to 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.

Parts containing. 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.

Common.

Proper. Proper are, the Muscles of the [n] *Abdomen*, and the [o] *Peritoneum*.

Diverse. Diverse are, partly Fleshy, partly bony: bony are the [p] *Vertebræ*, and [q] *Pelvis*, which are parts of the *Os Sacrum*, and *Ilium*. Fleshy are, the Muscles [r] *Psoas*, [s] *Sacrolumbus* [t] *Latissimus*, [v] *Sacer* [x] *Semispinatus*, [y] *Quadratus*. I cal them diverse, because those bones and Muscles, being Situated 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 Parts. 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.

Figure. 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 cal 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.

Connexion. It is outwardly knit to the breast, and inferior limbs by the Skin; inwardly by the *Peritoneum*.

It

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

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

Action. 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. [f] *infra.* C C. [g] f. 1. F F. [h] f. 1. g. f 2. D D. [i] f. 2. B B. [k] f. 2. C C. [l] f. 2. D D. [m] T. 2. f. 8. 9. [n] T. 2. f. 3. *and* 4. [o] T. 10. f. 10. O O. [p] T. 23. f. 1. A. [q] T. 14. f. 2. L L. f. 3. B B. [r] T. 14. f. 1. C C. D D. [s] f. 4. B B. [t] f. 3. D D. f. 4. A A. [v] f. 2. O O. [x] f. 4. C C. [y] 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*, an Aldermans Belly.

He whoſe Belly grows to a great bigneſs, is called *Ventroſus*, Fat Guts. Some we read of, whoſe Bellies grew to a monſtrous bigneſs, as *Nichomachus Smyrnæus*, in *Galen*; *in Athenæus*, Lib. 12. *Deipnoſophiſt*, we read of a King that was choked with fatneſs. But famous is that Hiſtory in *Michael Neander*, *in Erot. Hebr. ex. Talmud. 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.

Swelling in the Abdomen. By reaſon of the Fleſhy, and fatty ſubſtance of the Belly, it is ſubject to diverſe ſwellings, Eſpecially Apoſthemes, either from the liver by the Vmbilicar Vein; or elſe the matter is ſent from the Suppuration of the Reins; which being ſhut up in the Doublings of the *Peritonæum*, may ſend their impurities into the external parts of the Belly.

Its conſtitution what it ſhould be. This fleſhy and fatty ſubſtance, ought to be mean; if it be greater, 'tis a diſcomdity 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 ſomwhat groſs, then to ſlender; for if they conſume, tis very evil: therefore Phyſitians were wont to handle the whol belly, eſpecially the *Hypochondria*, which ought to be ſoft, equal, and fleſhy.

The Scituation of the Parts in the Belly.

The Scituation of the Parts in the lower Ventricle. 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.

Viz. 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 forewards, two fingers. In the middle region, is the Stomach placed, which inclineſs more to the left *Hypochondrium*, and deſcends four fingers breadth below the baſtard Ribs. *Liver. Stomach.*

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

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

Kidneies. 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* concontained; In the bottom of the belly, the bladder, under which lies the right Gut.

Bladder.

Right Gut.

Womb. In Women, the Womb lies betwen the bladder, and the right Gut: under the Guts, lies the *Mesenterium*, as the Sweat-bread doth under the Stomach. A little below the Navel, the *Omentum* is stretched about al the Guts, and divides all the internal parts with the *Peritonæum*, 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 al sortsof Tumors, Impostumes, Rumblings of the Guts, and Croaking; which proceed either from Tumors of the Parts conteined, or from wind, or collection of Water.

It is Cut on the sides towards the *Hypogastrium*, in the Cæsarian dissection, to draw out the Child in a difficult labor. It is pricked neer the *Os Pubis*, to draw out Vrine, when a *Catheter* cannot be put in. It is pierced in the bottom of the *Hypogastrium*, neer the Navel, to draw out Water in the Dropsie *Ascites*, which Operation is called *Paracentesis*.

Chap. 5. *Of the Scarfe Skin.*

AMongst the parts which make the *Abdomen*, the first that comes to view, the Greeks cal *Epidermis*, the Latins *Cuticula* and we the Scarf-Skin.

Substance. Although, by its substance it seems to be Spermatical yet it differs much from it.

Original. It's Temperature is none at al, 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 appeares simple, yet *Fabricius ab Aqua pendente* wil have it double, one which is inseperably fixed to the pores of the Skin, the other seperable, without any offence to the Skin it self, but the thickness of the *Cuticula*, be it more or less, doth not encrease it's number, for though in some places it may be divided into many smal 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 color with the Skin, and yet in Black Mores this being pulled of, the Skin it self is white.

Connexion. It sticks firmely 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 bewtiful, polished and even.

The Medicinal Consideration.

By these things thus considered, a Physitian may see that the scarse 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 Scarſe-skin, pertain moſt of al to the dignorion 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, ſmal Pocks, purple ſpots in Feavers, or any Spots of other Color; ſometimes without a Feaver, when Nature ſends any Wheyiſh ſubſtance of another Color into the Scarf-Skin.

Diſeated 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 firmely to the Skin, as wel as to the Scarf-Skin.

This Scarf-Skin may be beautified; which *Galen* denies to be done, by an honeſt, and honorable Phyſician; but allowes it to be done, by Court Phyſicians, and Bauds, and Chamber-Maids that wait upon their Ladies. In Women, the *Cuticula* is thick, ſmooth, and many time ſtops the pores of the Skin, and hinders free perſpiration. In men it's uſually ful of pores, that ſo the Hairs may paſs out. *It may be Beautified.*

Laſtly, as the Scarf Skin of the Body, being wel looked after, and adorned, procures beauty and and comlineſs to the Body; ſo being made rough with Spots, or burnt by the Sun, it unhandſoms a man. It is ridiculous to draw it off with bliſters, that ſo it may come again the cleerer, you looſe 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 it ſelf in Leproſies, and diverſe that have the french pocks; The Skin it ſelf comes off by fleakes in ſuch as are Leprous, and in ſome that are troubled with the Whore-maſters Pox.

Chap. 6. *Of the Skin.*

AFter the Scarf-Skin, followes the Skin called in Greek *Derma*; it hath a ſubſtance diverſe from other Membranes, the like of which you ſhal 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 Names.* *Subſtance.*

Is temperature is cold and dry, or more properly, exquiſitly temperate, yet ſo it may be the Judg of feeling. *Temperature.*

It is extended over the whol body, and on wraps it like a garment, and therefore its dimention is as the dimention 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 ſeperable, only it may be cut into many parts by reaſon of its thickneſs. *Number.*

It hath the ſame Figure which the body hath, that it cloatheth. Its textur is Slight, and very ful of ſmal holes, for inſenſible tranſpiration, and the paſſing out of excrements: and in diverſe places, it hath viſible great holes; as in the eares, Eyes, Noſe, mouth, fundament, and privities of Men and Women. *Figure.*

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

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

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. *Communion.*

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? *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 clense the Body of filth 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. It's number is viciated, when the *Cuticula* is viciated, or gnawn through; or the Skin it self lost.

Figure. Often times its smoothness, is turned into roughness; or it is disfigured by pustles.

Somtimes its passages are stopped, or more open then they should be.

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

use. Somtimes it's use is hurt, when it is insensible; or when it receives not only the excrements of the third concoction, but also of the whol Body.

Therefore the Skin, seeing it is the breathing place of the whol 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 perspration, 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 Feavers, 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 Color of the Skin, *Hippocrates* propounded two prognosticks: *Lib.* 5 *Aph.* 71. and *Lib. præn. Part.* 7. and 8.

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

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

Of divination by the Moles of the Skin, wrote *Polemon*, a Greek Author; and 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 through the pores of the Skin.

whether Skin lost, can be regained. The Skin grows hard and dry, through burning Feavers, and somtimes it becomes as thick as an Elephants Hide: especially about the Back, Limbs, and Thighs, as I have seen it in many, like a rand 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. The Greeks cal it *Stear*, and *Pimele*; it makes a common membrane, by reason of its consistence: in Bruits it is called *Aruina*; and why not so then in men?

Substance. Its substance, although it be somthing sollid, yet is it soft, and Oyly, as you may perceive

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

Original. 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 obtaine its consistence by heat, or cold. Al acknowledg a moderate heat about the membranes, compelling, and applying this same fatty, and Oyly Liquor.

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

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

Therefore the Fatty membrane, is large, as the Skin is.

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

Figure. It hath no Proper Figure.

Color. In Color 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 al three of them pass through the Fat, that so they may come at the Skin.

Use. 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 Cushion for men to sit on, and in long fasting, it is turned to Nourishment of the Fleshy Parts neer to it, which Suck out its juyce.

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 it Fleshy substance, as is evident about the Loynes, Cods, Forehead, and Neck. *Substance.*

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

Scituation. It is scituated under the Fat, and stretched out over the whol 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.

Number. It is one single Membrane.

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

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

Connexion. It is joyned to the Fat inseperably in some places; so that the Fleshy, and Fatty Membrane, seem to make but one: in other places it may be seperated.

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

Action. 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.*

Use. 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

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 fift common covering of the body, which comprehends al the Muscles in the body, (beside the proper Membrane of every Muscle) least in their Motion, they should pass out of their places.

Substance. Its Substance is very strong, yet thin and Nervous.

Temper. It is spermatical, cold and dry, in temperature.

Original. It hath its original, from the first formation.

Situation. It immediatly covers, and straitly binds in the Muscles, over which it is stretched.

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

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

Figure. It acquires its Figure, from the Parts it contains.

Color. In Color, it is whitish.

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

It hath no peculiar Nerves, Veins, nor Arteries

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

Use. 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 somthing 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 immediatly 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 wil premise the general Doctrine of the Muscles.

Definition. A Muscle is an instrument of voluntary motion, which depends upon our own wil, and because it governs the actions. It is a dissimilar part, compounded of many similar ones; but of those Parts, Flesh is predominante. 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 antient 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. Seeing then they are Fleshy, their Temperature it hot and moist.

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

This original and insertion, is known by the ducture and series of the *Fibres*, by which you may Judg of the Situation of the Muscle, whether right, Oblique, or transverse; for in these positions al 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. There are aboundance 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 their are without fellows, such as are the Sphincters;

cters; and the *Diaphragma*, or Midrif.

Their Figure is various, [a] Square, [b] Triangular, [c] round, [d] Long, [e] *Trapezia*, Lozing faſhond, [f] *Deltois*, like the Greek Delta Δ [g] *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. *Figure.*

For the moſt parts, you ſhal 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 *Aponeuroſis*, 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 al the long Muſcles: the Belly is fleſhy, and Seldom Nervous. *Belly. Head, Tendon.*

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

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

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. *Communion.*

The Action of the Muſcles, is either univerſal, or particular. Univerſal action, is that which agrees to al 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 ſwels outwardly; and this agrees withal the Muſcles, thoſe of the *Abdomen* excepted, which being drawn back, ſwel within, becauſe they have no oppoſite bone to with-hold them. *Action:*

Therefore the true action of a Muſcle, is contraction, or conſervation of what is drawn; which motion is called *Tonicus*, in one Muſcle remaining long in on figure; or in more Muſcles extended, and acting togerher, as when the whol hand is long held elevated, and extended.

The motion of others Muſcles, as extention and relaxation, 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 Scituation is either larger, and that right, and is called *Extenſio*; or Oblique, and that is either lateral, as the *Abductor*, and *Adductor* of the fingers; or with inverſion, as the *Pronatio*, and *Supinatio* in the hand and *Radius*. *Diverſity.*

Alſo the Muſcles, by reaſon of their like motion, are called fellows, Or páirs; fellows are ſomtimes in diverſe & oppoſite places, & yet perform the ſame actionas; 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 thoſe 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 waight of the Part moved, or the vehemence of the action.

The ducture of the *Fibres*, ſhews the manner of action in every Muſcle; and by them you may eaſily diſtinguiſh a right Muſcle from a tranſverſe, and Oblique. *How it is known.*

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 *Tranpezium*; 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.

Chap. 11. *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 wil beleeve them) tels him, that they are from the first formation, and that they are the cheifest Part of the Muscle, and take their beginning where the Muscle begins, and are disseminated through its whol Body. if it be a Nervous Tendon in the beginning, such it is in the end; if it be like smal strings at beginning, they are united to forme 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 sollid 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. Somtimes they are Nervous at the end of the Muscle, though the Head of it be Fleshy.

The hardness of a Sollid, long and Membranous Tendon, its thickness and Silver color is excellent: So that *Fallopius* 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 wel deserves to be called the cheifest 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*.

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.

Figure. 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 then the Ascending, and the Ascending then the transverse: the lenght of the right Muscle, reacheth from the sword-like Cartilage to the *Os Pubis*.

Original. Although their Original be different, yet they al joyn so at the white line, that
The white line. 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 al inſerted at the white line of the Belly; and at the *Os Pubis*, each of them receives peculiar Veins, Arteries, and Nervs. *Connexion.*

The action of the Belly, is common, or particular. That is common which al 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. *Action. Common. Particular.*

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

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

The [a] Oblique deſcending being ſcituate Obliquely, by reaſon of its *Fibres*, Oblique deſcending ariſeth from the [b] ſeven or eight inferior Ribs, by certain fleſhy interſections 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. *Oblique deſcending.*

The Oblique [d] Aſcending, ariſeth from the [e] *Os Pubis*, and *Ilium*, and being knit to the brims of al the baſtard and true Ribs, even to the ſword-like Cartilage, it ends in the [f] white line dy 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 inſeperable. *Oblique aſcending.*

The right Muſcle remains [g] fleſhy from the *Sternum*, neer the [g] Sword-like Cartilage, and being extended along the longitude of the Belly, it is inſerted with a Nervous end into the *Os Pubis*. *Right.*

In it you may obſerve three Nervous [h] Interſections which ſtrengthen it, and Veins which run a long 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, ly two ſmal Muſcles, called [m] *Pyramidales*, which ſometimes are wanting, eſpecial lie 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 ſtil in ſuch as are grown up. *Pyramidales.*

The [o] tranſverſe Muſcle, ariſing from the [p] tranſverſe *Apophyſes* of the *Vertebræ* of the loyns, 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. *Tranſverſe.*

Beſides the Muſcles which compreſs the Belly, neer 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 fingers breadth; it is involved with the *Peritoneum*, even til it come to the Teſticle, and makes the Tunicle called [s] *Erithroïs*. *Cremaſter.*

You ſhal 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 shal faithfully describe the motion of them, and the Muscles appoynted 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 forewards, and backwards; the right and Oblique descending Muscles move them forewards, the breast resting, or very lightly moving, and that by longer intervals; the Muscles, [t] *Sacer*, and [v] *Semispinatus*, move them Backwards.

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

[a] T. 1. f. 2. G G. H H. I I. [b] T. 2. f. 2. G. H H. f. 8. a a. [c] T. 1. f. 2. I I I I. T. 2. f. 8. B B. [d] T. 2. f. 8. B. [e] T. 2. f. 8. c c c c. [f] T. 2. f. 8. d d. [g] T. 2. f. 8. e e. f. 9. B. [h] T. 2. f. 9. c. [i] f. 9. e. [k] f. 9. d d d d. [l] T. 2. f. 9. d. [m] T. 2. f. 9. f. [n] T. 2. f. 9. e. [o] T. 2. f. 9. D D. [p] T. 8. f. 2. C. [q] f. 9. A. [r] f. 9. a a a. [s] f. 9. b. b. [t] b. f. 2. D D. [v] T. 14. f. 4. B B. f. 3. D D. f. 4. A A.

The Medicinal Consideration.

In the Muscles of the Belly, are often Inflamations, 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 somtimes 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 al the Parts of the Bowels, or Guts; from which extension, it hath it's Greek Name.

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

Substance. 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, the Reins and Vreters, the *Vena Cava*, and the great Artery, and the Seminal Vessels in its duobling.

The inequallity 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 ful.

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 *Pleura*, so the *Pleura* should the *Peritoneum*; and so their should be a continuation of these Membranes throughout the Body, as their is of the Skin.

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

Quantity. It is the largest Membrane in the whol 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 that tunicle called *Erythroïs*, and in its progreſs makes a ſmal Channel by which the Spermatick Veſſels paſs.

The ſame production of the external tunicle, is obſerved in the groin of Women, and is diduced even to the [c] *Clitoris*, and the round and lower Ligament of the [d] Womb.

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

Its continuity is not pierced, it being an admirable piece of workmanſhip; for although Veſſels paſs into it, and out from it, yet al 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 Color of the *Peritoneum* is white, as the Color of other Membranes is. *Color.*

It is firmely knit to the *Vertebræ* of the loyns, I mean the external Membrane, the internal hath 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. *Connexion.*

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

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

[a] *T. 2. f. 9. g g.* [b] *T. 6. f. 2. C C. E E.* [c] *T. 7. f. 4. I I. K. f. 5. A.* [d] *T. 7. f. 2. S S. f. 4 F F.*

The *Medicinal Conſideration.*

Let us now bring this contemplation of the *Peritoneum*, to a Phyſical uſe. By reaſon of its doubling, you ſhall perceive Seroſus and ſharp Cholerick Humors to get into thoſe ſpaces, which make a baſtard Collick, but have no foundation at al within the Guts, as a true Collick hath, but between the *Peritoneum* 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 impoſthumate, unleſs they were turned into Quittor before they fel into this Part. *Collick.*

Such Collical pains lie uſually on the top of the Belly, and not deep; neither wil 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 *Peritoneum*, and then the danger is the greater.

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

You muſt diligently obſerve the production of the *Peritoneum* 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 Groine, called *Entero-Cele*, or that called *Epiplo-Cele*; or when both the Gut and the Call do fal down, that other called *Entero-Epiplo-Cele*.

Cha. 14. *The Division of the Parts of the Belly.*

Parts first. THe Parts of the Paunch included within the *Peritoneum*, I thus divide. They al 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] *Gal*, [d] *Stomach*, [e] *Spleen*, [f] *Sweet-bread*, [g] *Bowels*, [h] *Mesenterium*, and [i] *Vena Porta*, and the [k] *Cœliacal Artery*, make the *First Region* of the Body, contained within the *Abdomen*. The other Parts which are included within the doubling of the *Peritoneum*, are referred to the Second Region, which comprehends the [l] *Reins*, *Second.* [m] *Vreters*, [n] *Bladder*, [o] *Genitals* in Men; and the [p] *Womb*, with the Parts annexed, in Women.

It is extended even to the upper Part of the Breast, and [q] comprehends the *Diaphragma*, [r] *Mediastinum*, [s] the Heart, and [t] *Pericardium*, [v] *Lungs*, [x] *Trachea Arteria*, [y] *Oesophagus*, [z] Tongue, [α] *Larinx*, 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. EE. [g] T. 3. f. 1. and 4. [h] f. 1. AA. [i] T. 4. f. 1. FF. f. 6. AA. [k] F. 5. K. [l] T. 5. f. 1. BC. [m] f. 1. FF. GG. [n] f. 1. K. [o] T. 6. tota. [p] t. 7. tota. [q] T. 7. f. 1. II. f. 6. AA. FF. [r] f. 4. AA. [s] t. 11. f. 2. B. f. 5. I. [t] f. 1. A. f. 2. A. [v] f. 1. BB. f. 2. KK. f. 7. FF. [x] f. 7. E. f. 8. ABC. T. 13. f. 10. 9. [y] T. 3. f. 2. EE. [z] T. 13. f. 14. A. [α] T. 13. f. 9. 10. [β] T. 12. f. 1. 4. BB. [γ] f. 1. 4. DD.

Chap. 15. *Of the Navel.*

What it is. THe Navel from the birth, even to extream 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 improfitable; 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 ancient Office; and therefore it is to be considered under another Notion, in one that is grown up.

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

The [d] Umbilicar Vein passeth to the [e] cleft of the Liver, The Umbilicar [f] Arteries are [g] two, and descend to the Iliack [h] Arteries, Somtimes 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 Umbilicar Vessels. The *Urachos* is like a long and round Ligament, and its use is to hold up the Bladder.

Use. The Umbilicar Vein puls the Liver foreward, lest by its waight it should depress the Parts under it, The Umbilicar Artery upholds the [l] Bladder that it fal not down, although it be included in the doubling of the *Peritonum*.

[a] T. 8. f. 2. D. D. [b] T. 8. f. 2. ABBC. [c] T. 9. f. 2. P. [d] T. 2. f. 8. G. T. 4. f. 1. [α] f. 6. aa, T. 8. f. 2. A. [e] T. 4 f. 5. C. [f] f. T. 8. f. 2. BB. f. 4. ss. [g] T. 2. f. 10. [h] f. 4. ♂♂. [i] f. 4. ♀♀ vel. ζζ. [k] T. 8. f. 2. C. T. 9. f. 2: O. [l] t. 2. f. 10. H. I.

The

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 breakes 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 whol 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 Umbilicar Vein being ſhorter doth not ſufficiently, pul back the Liver, which, by its waight, compreſſeth the Stomach and Parts under it.

Chap. 16. *Of the Omentum, or Call.*

BEfore you proceed to the *Omentum* or cal you muſt view how it covers al the Parts of the Belly, then their Scituation, which is of no ſmal moment to the art of Phyſick.

Number.

The [a] *Omentum*, or *Epiploon*, or Cal, 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 neer 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.

Scituation.

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

Original.

It may be divided into four Parts, the firſt is called [b] *Inteſtinal* which is ſtretched out over the Guts; the Second [c] *Hepatical*, which ariſeth from the Cavity of the Liver, including the ſmal Lobe of the Liver, and turns down to the deep Cavities thereof, the third is called [d] *Lienal*, becauſe it lies upon the Spleen, the fourth [e] *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 c d.* T. 3. *f.* 1. *D D.* [b] T. 2. *f.* 10. *d d.* [c] *f.* 10. *b.* [d] *f.* 10. *c.* [e] T. 3. *f.* 1. T. 4. *f.* 1.

The Medicinal Conſideration.

Diſeaſes. Similar.

The *Omentum* hath its Diſeaſes, both *Similar*, *Organical*, and *Common*, for ſomtimes it is diſtempered and inflamed, and yet but ſeldome, it is oftner troubled with Impoſthumes or Apoſthemes which you wil, becauſe it receives the filth of of the Liver and Spleen. Somtimes 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, Suppuration is to be ſought, which ſeldom ſucceeds as it ſhould do, although you open the Part with a Cauſtic.

Organical.

Somtimes a dropſical 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 drunck up by the Meſeraick Veins; or by the Spunginеſs of the Spleen, the paſſages being firſt opened, and thoſe Parts ſtirred up to it by ſome convenient Medicine.

The

Common. The *Omentum* Fals down into the groine 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 neer the Belly and so cut of, 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 ful 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 wrinckles. 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 certaine Flegmatick Slime, least the Membrane should be hurt by the passage of Choler.

Slimy. Besides these two proper Membranes there is a [c] common one, added from the *Peritoneum*, which it bestowes upon al the Parts it containes.

Situation. The Guts are placed in the *Abdomen* and fil its whol 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. They are seven times as long as the Body, and somthing longer.

General Division. This Longitude is divided into [e] thin, and [f] thick, not according to Scituation, but in respect of the Membranes: The thin which is taken from the inferiore Orifice of the Stomach, is the first & supreme in order, it consists of thin Membranes, the thick, is the Inferior in order, But the superior and shorter in Scituation, 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] *Cæcum*: The second [l] *Colon*. The third [m] *Rectum*.

Cavity. Al the Guts are hollow, that they may give passag to Chyle and Excrements. They are [n] wrinckled round about within, al 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 al the Guts: It remains that we speak of them al 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 Intertexture is diligently to be noted, because oftentimes the cause of obstructions & vomitings is without any failing of the *Pylorus*: but the choler flowing by the [p] Biliar Pore is hindred 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 Choler pierceth the Gut, and creeps downward a little way between the Membranes before it peirceth the Inner Membrane, neer which the [q] *Channel* of the *Sweet-bread* is observed by *Virsungus*.

Where

Where the Guts begin to be turned toward the left side, their the [r] *Jejunum* begins, which is thought to be emptier than the *Ilium*, by reason of his neerness to the Liver, and its Multitude of Metaraick Veins: It lies altogeather in the umbilical Region, and is in length about a Cubit, and an half. *2. Jejunum.*

The [s] *Ilium* follows, which is more slender, but in length surpasses al the rest of the Guts. It occupies the *Ilium*, and *Hypogastrium*, and compasseth about the *Jejunum* it selt with its inferior Part. In this Gut is that Disease which is called the twisting of the Guts, and the *Iliack passion.* *3. Ilium.*

The fourth Gut in order, and the first of the thick Guts, is called [t] *Cæcum* by Ancient Anatomists, and does retaine 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 *Cæcum.* *Thick Guts. 1. Cæcum.*

The Gut [v] *Colon* succeeds this; in which are many things worth our Consideration, to wit, its Largness, Scituation, Use, Shutters, two Ligaments, Its fringes of Fat, and its Connexion. *2. Colon.*

Of al the Guts, none more large, and Capacious, then this. It begins at the right Kidney neer the [x] Appendix; and being turned upwards, it lies under the Liver and Stomach, and passeth to the left *Hypochondrium*, where it is wreathed, and made narrower. *Largness.*

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.* *Scituation.*

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

Least 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 wrinckles in this Gut, then 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. *Ligaments. Fat.*

That [y] Volve, or Shutter 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 towards the Inferior Parts, that it may let the Dung pass out, and hinder it from flowing back. *Shutters.*

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

The last of the Guts is called [z] 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 [a] 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. *3. Right Gut.*

[a] T. 2. f. b. R. [b] f. 5. Q. [c] T. 3. f. 5. P P. [d] f. 1. A A. [e] f. 4. from B. to I. [f] f. 4. from 1. to O. [g] f. 4. F. [h] f. 4. G G. [i] f. 4. H H. [k] T. 2. f. 4. H H. [l] f. 4. K. [m] f. 4. M. [n] f. 6. R. [n] T. 3. f. 4. F. [o] T. 4. f. 5. H H. [p] f. 3. D D. [q] f. 3. C. f. 5. H H. [r] T. 3. f. 4. G G. [s] f. 3. E. [t] f. 3. B B. [v] T. 3. f. 4. H H. [x] f. 4. I. [y] f. 4. K K. [z] f. 1. C C. [a] f. 4. I.

The

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 distempered by heat and cold, either with or without Humor. They are inflamed, wounded, Ulcerated, dryed, bound, loosened, made smooth the wrinckles being taken away, as in fluxes and bloody fluxes. Somtimes they are so stopped that the Excrements are Vomited up.

Peculiar Diseases. Besides these the common Diseases, the Guts severally considerd, 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 houres after it is eaten; because the passage is stopped.

Ilium. The *Ilium* is subject to the Iliack passion, which is an Inflamation and not a twisting of that Gut; Somtime it fals down into the groyn, and somtimes into the Cods, which causeth Ruptures in those places.

Jejunum. Somtimes the *Peritoneum* being loosed or broken neer the Navel, the Disease called *Omphalocele* commeth, in which the *Jejunum* slipps down.

Colon. The *Colon* is subject to the Collick, which ariseth either through sharp Humors, or wind, or extreamcold Air. In it wormes are bred, which somtimes 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 joyned to the right Gut is more fleshy, painful Impostums are bred there, which suppurate and are sooner cured then they would be, if they came from the Mesentery.

Somtimes 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*, Inflamation, Impostumes, 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 Somtimes so perverted, that the Dung flowes upward, and Glysters are cast up at the Mouth. And so are suppositaries also, if you wil believe some Practitioners, but then the shutter of the *Colon* must needs be broken.

Symptomes. Al 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 Cœliacal, or Mesenterical, or Intestinal. When it comes with Ulceration, Paine 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 al these Diseases yea may find in al Practtioners, and therefore we will make no longer stay upon them.

The internal Tunicle of the Guts Somtimes is severed & lost, which is thought to be turned into a long worm of two or three Cubits long, caled *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 there places, that they pass not into confusion and be thereby deprived of there action and use.

It

It is a double Membrane, between which, is Fat, and many [b] *Glandulæ*, 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 *Vertebræ* by Ligaments: thence is its original. *Situation.*

It ſticks ſo firmely to the [d] Guts, that no diviſion at al appears: between its two Membraines, innumerable [e] Veins paſs, which are called meſeraick or Meſenterick. Alſo an infinite number of [f] Arteries from the Cæliacal Artery. Alſo it hath [f] Nerves from the Lumbals, or Nerves of the Loines. *Veſſels.*

The fourth kind of Veſſels, are called [g] *Venæ lacteæ*, by *Aſelbus*, the firſt finder of them out; of which we need not doubt, ſeeing it is now a common received truth. *Vena Lacteæ.*

This one thing troubles many, Namely, the diverſity of their diſtribution: For in a beaſt ful 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 Trunck 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, al 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 the [h] *Vena Porta*; with the Spleen by the [i] *Cæliacal Arteries*; and the Splenical [k] Vein; with the Guts by their Connexions, and hath a fatty Glandulous ſubſtance fit to receive Humors, and to retain al the impurities of the firſt Region; Phyſitians well cal it the Nurſe of Diſeaſes; for from that, as from a Fountain, do al the Diſeaſes of the Bowels proceed: and al Phyſitians in preſcribing Purges, and Remedies, have a ſpecial eye to that.

[a] *T. 3. f. 1. A A. T. 4. f. 1. H H.* [b] *T. 3. f. 1. a a a a.* [c] *f. 1. B B.* [d] *T. 9 f. 1. M M.* [e] *T. 4. f. 1. a a a. T. 9. f. 1. c c c.* [f] *f. 1. b b b.* [g] *f. 8. n n.* [h] *t. 9. f. 1. a a a. b b b.* [i] *T. 4. f. 1. F F. f. b. A A A.* [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 ſwels to a great hard ſwelling, and is the Foundation of al Kings evil Swellings; which ſeldom come in great Number, but the Foundation is here.

It is ſubject to baſtard Collicks, which proceed of ſharp Choler, and degenerate into Palſies in the interior Limbs, and ſomtimes in the ſuperior; and hence comes the *Morbus Rachnoſus*, mentioned by *Hippocrates*, and *Morbus Siccatorius*. Of the Diſeaſes of the *Meſenterium*, you may read *Daniel Sennertus*, and *Matthew Martinius*, who treats expreſly of the Diſeaſes thereof. Although the Meſaraick, 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 Meſaraick Veins to the Guts; there ore both of them may be diverſly obſtructed.

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

If the obſtruction be in the whol paſſage al along, then there ariſeth a Chylous Flux, &c. *How the Milky Veins are affected.*

Flux, either white, or tauny in Color. If in their Roots, either within, or neer the Liver, the Chyle hath a light Tincture of Blood.

How the Meseraick. If the Mesarick Veins be stopped within the Liver, the Liver cannot disburden it self of his Excrements, but they remaine either in the Liver, or in the Mesaraick 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 Trunck, but are seperated when they enter the hollow Part of the Liver; and therefore they are not so easily obstructed. And therefore al Humoral Fluxes of the Belly flow from the Liver or from distempers of the Mesaraick 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 Mesaraick 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.

Chap. 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 betwen both: Yet it is very Syongy, that so it may receive the Excrements of the Spleen and Liver.

Scituation. 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 Natural conformation, it is as broad as the Palm of the Hand.

Vessels. It receives the [e] Trunck of the *Vena Porta*; the Milky Veins, and the [f] Splenical Vein, passeth to the [g] Spleen through its Cavity.

A new Channel Besides, *Virsungus* Discovered a new [h] Channel in the Sweet-bread, passing a long the length of it; which is inserted into the [i] *Jejunum*, neer the [k] passage of Choler: but for what end this was framed is yet uncertaine, whether it be to cleanse the Excrements of the Sweet-bread; or rather of the spleen, which are carried thither.

Its Use. So *Fallopius* 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, for a particular making of Blood: but if this Channel do not touch 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 wel be called the Spleens deputy. There is the Seat of Hypochondriacal Melancholy, & it is the entertainer of many Diseases, as wel as the *Mesenterium*: both of them breed Sicknesses 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. b b b. [g] f. 1. I. [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. 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, nether passeth it further. The

and Cava. other is called [b] *Cava*, which nourisheth the whol 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 Loines, with the great [c] 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 seared 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 Gal, and the last [f] branch it sends to the right side of the Stomach. *Branches of the Vena Porta. Superior.*

These branches thus produced, the Trunck is divided into two famous branches; the [g] *Splenical* and [h] *Mesenterical*. This again, is divided into fower branches, of which, the greatest keeps the name *Mesenterical*: The second is called [i] *Hæmorrhoida*, and passeth to the right Gut: The third is called *Cæcalis*, and passeth to the Gut *Cæcum*, or else to the beginning of the *Colon*: and the fourth passeth to, and nourisheth the remainder of the *Colon*. *Inferior.*

The Splenical branch, when it hath passed through the Sweet-bread, produceth four opposite Veins, aboue and below. The first is called [k] *Gastrica Major*, which ascends to the left side of the Stomack. Opposite to this is the right [l] *Epiploica*, which is distributed to the *Omentum*. The *Coronaria* succeeds this, and is distributed to the Somach, 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. e e [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. *Place.*

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 Cæliacal Artery, have a have transflux, and transvasation. *Blood.*

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. *Office.*

4. That within the Liver, it hath either very smal, or no Communion at al 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 subtile, fit for circulation, which nourisheth the parts of the second, and third Region. *Communion.*

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. *Largeness.*

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

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

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 waies, 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.

Chap. 22. *Of the Cæliacal Artery.*

Original. 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 injoyes not the benifit of circulation, as other Arteries do, so that it seems like a seperated Artery, Somtimes his motion is hindered, when there is an Inflamation in the *Abdomen*; the rest of the Arteries gently mooving, as is often observed in Hypocondriack Melancholy, and other inflamations of the *Hypochondrium*.

Motion.

Anastomosis. 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 vital 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 belly, neer the Navel; and in his Prognosticks he makes mention of the same; *If the Veins about the Midrife beat, they foreshew either trouble of mind, or Madness.*

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

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

From the Splenical Artery, neer the Spleen, pass two smal 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 *Plautus*, he complained, that *he had a Splenitick Heart, it leaped, and beat his Brest.*

[a] *T. 12. f. 2. p. q. r.* [b] *f. 2. t.*

Chap. 23. *Of the Stomach.*

Membranes of the Stomach. THe Stomach is the Kitchin of the first Concoction; it consists of proper Membranes, and one [a] common, one which it receivs from the *Peritoneum*. The [b] internal is rugged, and hairy, like a peice 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 slackened with store of Meat, they do contract it again, so soon as the digested Aliment is forced out of the Stomach.

Its Scituation. [a] *T. 12. f. 2. t.* [b] *T. 3. f. 4. C C.* [c] *T. 3. f. 4. E.*

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 natural

Its Size. 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 exhauſt, 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 containe ſix pints of Drink, with a Pound or two of Meat, as is daily ſeen in Gluttons, and Toſſ-Pots.

Number. There is but one Stomach in Mankind, which is ſomtimes 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. Shal 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.

Figure. 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.

Two Orifices. 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 upper. The *Ingreſs*, or upper [a] *Orifice* of the *Stomach*, is in a ſpecial manner termed *Somachus*, being the Seat of *Hunger* and *Thirſt*, becauſe it is crowned with two *Nerves*, called [b] *Stomachici Nervi*; and is conſequently of an Exquiſite ſenſe.

The Lower. The lower Orifice, is called [c] *Pylorus*; in which you ſhal obſerve a *Valve*, round in ſhape, and as viſible and remarkable as the *Valve* in the Gut *Colon*. This *Valve* is to hinder the *Chyle* from returning back again into the *Stomach*.

Its Bottom. Beſides theſe two *Orifices* in the *Stomach*, there is obſervable its [d] *Bottom*, or Inferior Part, more fleſhy than the reſt; becauſe therein the Meat is boyled or digeſted.

Inner Surface. The internal [e] ſurface of the *Stomach* is wrinckled, 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.*

Action. The Action of the *Stomach* is the *Coction* 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 Creme; which is called Chylus. *How that is done, I have already examined in my Anthropographia; and in my Anſwer to* Wallæus, *a very learned Phyſitian of* Leyden. *Digeſtion how Cauſed.*

Communion with other parts. The Stomach has Communion, by reaſon of neighbour hood, with the *Liver*, the *Gal*, the *Spleen*, the *Sweet-bread*, the *uppermoſt Guts*, *upper Part of the Meſentery*; and alſo by the veynes which it has from the Trunk of *Vena Porta*, and the *Splenical Branch*. It Communicates alſo with the *Heart* and *Lungs*, by the [f] *Stomachical Nerves*; of which ſome Part is Communicated to the *Heart* and *Lungs*: it Communicates alſo with the *Brain*, by the *Stomachical Nerves*, which proceed from the *ſixt Conjugation*.

Great Sympathy with the Kidnies. It does cheifly Sympathiſe with the *Kidneis*, when they are miſaffected, either by want of Appetite, or by frequent Vomiting, by reaſon of a complication of the *Coſtal* and *Stomachical Nerves*, diſpoſed between the two *Kidneis*. From whence are derived Nerves, that are diſperſed into al Parts of the Belly.

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

The

The Medicinal Consideration.

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

Inflamation. Apostumation. Ulcer. Incision of its Bottom. Also, it is *Inflamed*, *Impostumated*, and *Ulcerated*; and these three happen chiefly in the upper, or lower *Orifices*, because of their fleshyness: 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 down ward: as we read in that story of a *Prusian*, who had swallowed a Knife.

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

Bred by the Gall. 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*.

Distended. 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 turn the same into good *Chylus*: which is the Cause of crudity, and weakness in the Stomach.

Straitned. And when the *Substance* thereof is so streitghned, 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.

Widened and slackned. But the *Stomach* is more frequently Diseased by *Dilatation*, and *Exolution*, or *Flaggyness*, and *Slapness*, 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 loosness 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 Materiæ* a Disease in the matter; and it must be Cured with strengthning 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 *Astriction*, the Cheife things observable in al Diseases.

Changes posture. Sometime the *Stomach* changes its natural Scituation, and is drawn back towards the *Midrife*, which Causes shortness of Breath after Meales. 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*.

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

Made smooth. 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 loosness of the Belly, that the Meat comes away unchanged, just as it was Eaten.

Divers Symptomes infest 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. *Action Hurt.* *Want of Appetite.*

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* termes *Malacia*; and *Galen*, cally it *Citta*; in Latin Pica, the *Mag-pie*. *Dog appetite.* *Absurd longings.*

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, tis called *Bradupepsia*, slow Digestion. When the Meat is corrupted, its called *Dyspepsia*, ill digestion. *Undigestion.* *Slow digestion.* *Ill digestion.*

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

Feeling, is *Abolished*, and *Diminished*, when there is need of hungring 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 *Mortification*, unless the Patient be distracted. *Refusing Meat.*

The sence of feeling is depraved in the Pain of the whol Stomach, or of the upper Orifice thereof, which drawes the Heart and noble Parts to Sympathise therewith: wherefore this pain of the Stomach, is called *Cardiogmos*, *Cardialgia* and the aking of the Heart, or Heart-burning; and causes that kind of swouning, which is called *Syncope Stomachica*, the Stomach swouning; and comes through the Hearts Sympathising with the Stomach. *Heart-burning.*

And to this Pain of the Stomach, belongs Anxiety, and Unquiet tumblings and tossings; which the Greekes terme *Riptasmos*, or *Asse*; from whence the Feaver *Assodes*, has its Name; in which the Sick are ful of unquietness, *Anxiety.*

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 ful and fasting. *Want of Contraction upon the Meat.*

The motion of the Stomach is depraved in *Hiccupings*, and *Belchings*. Hiccuping is more trouble some then Belching, and is an il sign in feavers, whether it come by fault of the Stomach it self, or by its Sympathising with some other Part, especially the Liver. *Hippocrates* mentions a Disease called *Morbus Ructuosus*, the Belching Disease. *Hiccuping.* *Belching.*

Disorders in point of Excretion are frequent in the Stomach; either upwards, in Vomitings, and Spawlings; or downwards, in the *Lienteria*, *Diarrhæa*, and *Coeliaca Affectio*. *Symptomes in excretion are.*

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. *Vomiting.*

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 carryed into the Stomach; as *Galen* observes and proves by examples. *Of Choler.*

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 [h] *Vas Breve*. Sometime the Patients life is Vomited up this waies, according to that expression of a Poet. *Of Blood.*

Out of his Mouth, he spewes his Purple Soul.

[h] Tab. 4. Fig. 8. let. h.

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 Choler up and down. But there is a Malignant Symptome, called *Cholera humida*, which is a violent, and plentyful voiding of Choler upwards and downwards, which kills within four daies; becauses very much Evacuation suddenly caused, is dangerous. *Hip.* 1. Book of Aphorismes; and al excess is an Enemy to Nature, according to the same *Hippocrates*. It proceeds from an Inflamation 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 Pouders of an hot Nature, because they vex and fret the Stomach. The Physitians of *Paris* do let Blood, in a smal Quantity, though the pulse be very weak, least the Stomach Heat being suffocated, a Gangræne should arise.

2. Spawling. Spawling, or Salivation, unless it be caused by anointing the Body with Quicksilver (which they cal *Fluxing*) comes either from the Brain, or else (and that oftentimes) from the Spleen, 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 Varjis Lectionibus*. Twas knowingly said of *Seneca* in his 15 Epistle; *Bibere et sudare Vita 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 al 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, joyned 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 *Horstius* saies in his Epistles.

Vomits warily 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 Hulwife 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 dissolue 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 premited as the Antients were wont to use.

Vomits not to be given to persons very weak. Wherefore they deal unskilfully, not to say wickedly, who after many other Medicines tried, do give vomits to such as are at Deaths door, as the last help, which suffocate that little life which remaines, and bring a speedy death. But some wil say that Empericks and Mountebancks, 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 robust ions 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 Choler works and ferments in places neer the Stomach, than when the Pangs of Death have seized upon the Patient. 'Tis Man slaughter, 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 Physitians have acted, and to declare the Patient dangerously sick, and there upon, warily to give their *Aurum Potabile* or som such other Medicine as a cordial and restorer of strength, until Nature being freed from al disturbance of Physick, begins to gather strength: and then they take opportunity to give a gentle Vomit which Purges

serous

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

Sluggishness of the Belly, and impurity of the Vessels, brings al 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 color it imprints upon the blood; howbeit the Liver of some Fishes, is of another Color, viz. green, black, yellow as Saffron; in which Creatures, the blood receives its red color by passing through the substance of the Heart. *Substance of the Liver.* *Its Color.*

But in Men, and other living Creatures, which have the two Veins distinct, called *Porta*, and *Cava*, the whol 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 conveighed by the *Vena Cava*, is perfected in the Heart, of which is made the Arterial blood, which is distributed to al the parts, and afterwards is tranimitted into the Veins, that so in a Circular motion, it may pass again into the Heart, that by its flux, it may maintain the perpetual motion of the Heart; as the Wheels of a Mil, are continually turned about by force of the Wind, or Water-fal. *Blood, where, and how made.*

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

The Liver is [a] scituate in the right Hypochondrium, under the bastard, or short Ribs, and fils with its bulk, al that Cavity to the Sword-like Cartilage. Sometimes it is so enlarged, as to exceed those Natural Bounds, and then it rests upon the Stomach, reaching as far as the Spleen, and 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 Midrif, and short Ribs, partly through swelling of the Liver it self, over loaded with Nutriment. *Scituation of the Liver.* *Bigness.*

In Man-kind, there is one single Liver, which is not divided into Lobes, or Fingers, as in bruit Beasts; yet there is a certain [b] Cleft to be seen, where the Umbilical [c] Vein creeps into the Liver; and many times two little Lobes, or Laps, are [d] seated under the greater ones: sometimes there is only [e] one, which being hollowed, receives the Trunk of *Vena* [f] *Porta*, which is included in a Duplication of the *Omentum*, or Call, that the Excrements of the Liver might be derived thither. *Number.* *Lobes, or laps.*

Although the Liver be one continued Substance, yet Anatomists divide the same into two Regions; the one superior, and exterior; the other inferior, and internal. The superior, or upper, is called the [g] Gibbous, or bunching part of the Liver: the inferior is called the [h] hollow part of the Liver. Into the upper Region, the *Vena* [i] *Cava* sprinkles its Roots: into the nether Region, the *Vena* [k] *Porta* sows abroad its Suckers. *Two Regions of the Liver.* *Its Vessels.*

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

[a] T. 2. f. 10. 1. D. T. 4. f. 1. AB. [b] T. 4. f. 5. C. [c] f. 1. a. f. 5. E. T. 2. f. 10. G. [d] T. 4. f. 4. AA. [e] f. 5. B. [f] f. 5. I. [g] f. 1. B. f. 4. AA. [h] f. 1. A. f. AA. [i] f. 4. DD. [k] f. 5. I. &c. [l] f. 15. H. [m] T. 9. f. 1. aaaa.

Diversity of the Regions, to be observed in practice.

It is the mind of Physitians, 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, conveighing blood, and the evil humors of the Liver. I have seen Impostumes in the bunching part, when the hollow part has not been at al 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 beleeve that one part can be sick, and the other sound, unless the morbifick humor be contained within the Pipes of the little Veins.

Whether the Roots 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 Anastomoses: others deny that there is any such Conjunction; among which, I willingly acknowledg my self for one, and give my voyce on their side: my Reasons I have elsewhere laid down, and Nature would have it so, that natural, and vicious Humors might not be confusedly jumbled together in the Liver.

How blood is distributed from the Liver

You shal 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*, neer the midrif, that the *Cava* may forthwith powr 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 Arterial, *by a double Circulation, Particular, and General.*

A double Circulation of the blood.

I cal 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 *Aorta*, after that manner which is described in my Treatise of the 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 Cholerick, Flegmatick, or Melancholick. It is altered, and corrupted in its substance, whiles it loses its Tone, and becomes flaggy, and faint.

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

Magnitude.

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

Shape.

It's Figure, or Shape, is also changed, if we feel it to be round. Oftentimes its passages are stopt, namely, the Roots of the *Cava*, and *Porta*; or the Roots of the Gall-Bladder are stopt, 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 an 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 Goate which it imparts, and the Midrif, by reason of the firm Connexion they have with the Liver, are drawn to sympathize in its Diseases.

Action.

The Action of the Liver, which is 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 al 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 waſht, or Excrementitious Humors of bad and diverſe Colors. *Its Similar Diſeaſes.*

Its Organick Diſeaſe is obſtruction. Its Diſeaſe common to the Similar and Organick Parts, is an Ulcer and a wound. Its Componnd Diſeaſe is al ſort of Tumors, whence comes the Term of Inflamation of the Liver. alſo a ſcirrhus and a purulent Impoſtum, which is frequent enough. *Its Organick, Common and Compound Diſeaſes.*

Its Symptomes are, Action hurt, and that manyfold: 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 *Diarrhæa Hepatica*. But the Principal 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 in ſtead of blood or natural 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-bellyed Dropſie; or elſe they are conveighed into the Habit of the body, whence comes the Dropſie *Anaſarca* and *Empneumatoſis*, *viz.* The Bloat-fac'd, Puf-Cheek'd Dropſie. Somtimes 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 Color in the Skin, either blewiſh white, or Yellow, by reaſon of Seroſity or Choler ſhed into the Habit of the whol Body, even as far as the face, by which we diſcerne the evil diſpoſitions of the Liver. *Cachexy.*

Chap. 25. *Of the Bladder of Gall.*

NOw follows the *Folliculus Fellis*, or *Cyſtis Billiaria*, the Bladder which is ordained to containe that Excrementitious Choler which flowes from the Liver. *Its Name.*

Its ſubſtance is Membranous, being diſtinguiſhed into two Coates. *Subſtance.*

It is placed under [a] the Liver, & affixed to the greater Lobe or lap thereof, and as it were, overwhelmed therein. *Scituation.*

The bottom of the Gal Bladder reſpects the inferior Parts, Its Neck, the ſuperior parts, and a pipe derived from the Gall-Bladder called *Canalis Cyſticus*, is carried obliquely til it meet the *Canalis Hepaticus*. There is a *Sinus*, or bending neer the Orifice of the Bladder, *Bottom. Neck. Sinus.*

Its Magnitude varies according to the plenty or Scarſity of Choler, It is only one. It has been found ſomtime 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. *Bigneſt. Number.*

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

It is hollow that it may receivve Choler, and retaine it til a convenient time of emptying the ſame: is has certaine pipes or Channels to carry Choler: the one [b] broader and longer, drawn out from the Liver to the beginning of the [c] *Inteſtinum Jejunum*, that is the Hungry Gut, or Gut termed *Jejunum*, by which the thicker Choler paſſes directly away; the other Pipe is [d] ſmaller and ſhorter, which is drawn Croſs-waies, from the Neck of the bladder, to the foreſaid paſſage. The former I cal *Meatum Hepaticum*, the Liver Channel; the latter I cal *Cyſticum* *Paſſages Choler.* *Meatus Hepaticus.*

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

Meatus Cysticus.

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.

Communion.

The Gall Bladder communicates with the Stomach by touching the same, which it heates so, as somtimes to burn the same, when the Gall Is inflamed in its Bladder. Somtimes it sticks to the Gut Colon which passes along hard by, which it often Colers Yellow, and provokes it to expell the Excrements.

This expurgation of Choler, being liable to be stopt, does vex the body with many Inconveniences.

There is seldom observed a third channel of Choler, which goes into the Stomach, unless some Part creep from the *Meatus Hepaticus* unto the *Pylorus*.

Its Vessels.

It has manifest Veins from the *Porta* called *Venæ Cysticæ*. 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. [a] T. 4. f. 8. b.

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 ful 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 somtime it is so distended with Choler, when the passages are stopped that should Evacuate the same, that it has been seen as big as both a Mans Fists.

Somtimes, when it is empty of choler, it dries up, so that nothing therefore remaines 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 venemous Quality of the suppressed Choler was so great, as to infect the heart, or to weaken and corrupt some noble part.

Its Symptomes.

The Symptomes 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 undue proportions or quantity of the Choler is, when either too little or too much is voided forth.

Their Signs.

Which Symptomes cheifly appear in those Parts which Sympathise with the Gall-bladder, as in the Stomach, when Choler is vomited up; in the whol body, when Choler is shed abroad through the Veins into the habit of the Body, and deformes the Skin; or when it takes its Course into the Guts and causes a dysentery, or a Cholerick looseness.

Their Original.

But the original of these Symptomes is to be charged upon the Liver, being il disposed.

And *Democritus* had good Reason 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.

Diversity of Choler proved.

When I see in an extream Yellow Jaundice, the whol Skin infected with Choler, & that the Urins die cloaths Yellow, the stooles being in the mean time whitish; And when I see in another sort of Jaundice, both the Urins and stooles Yellow; This confirmes to me, that there are two sorts of Choler, and several waies for the expurgation of each of them. In the Yelloweſt sort of Jaundice, in which the stooles are whiteish, 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 Urins and Guts, and the obstruction

By the different sorts of Jaundice.

ſtruction is not ſo great nor ſo ſtubborn, as in the Yellowiſt 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 Diſeaſed, it may aſſiſt the ſame in Sanguification or blood making. *The Spleen deſcribed.*

It is of a [a] Subſtance ſpongy, ſoft, ſprinkled al over with very many Veſſels like *Fibres* or threds; 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 Color is Black and Blew and obſcurely Reddiſh. *Color.*

Its greatneſs is uncertaine and not determinable, becauſe it grows greater or leſs, according to the abundance or defect of Humors which flow thither, & 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; Somtimes it has been obſerved to be double and threefold. *Number.*

Conſider in the Spleen its upper Part, which is termed the Head, and its nether Part which is called the Taile. *Parts.*

Tis [a] placed in the left *Hypochondrium*, under the ſhort Ribbs, oppoſed as it were to weigh againſt the Liver, that the Body might remaine equally ballanced. *Scituation.*

When it keeps its Natural 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] ſplenical Veins and Arteries, on the back part towards the Ribbs, its [d] bunching. *Shape.*

Its knit into the Stomach by two or three Veines 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 Splenical, it Purges it ſelf into the Guts and Kidnies. *Connexion.*

Is faſtened to the baſtard Ribs by Membranous *Fibres* ſufficiently ſtrong: ſomtimes it's faſtened to the Stomach, and is knit at its point to the Midrif 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 il Juyces thereof.

The Action of the Spleen is much doubled and controverted among Phyſitians and Anatomiſts: ſo Many Men, ſo Many Minds: *Hippocrates* did beleeve that it drew ſuperfluous ſerolity out of the Stomach: which Opinion *Ariſtotle* followed, though others draw it to an attraction of Chyle, either out of the Pancreas and Meſentery, or out of the Stomach. *Action controverted, divers Opinions thereof.*

Galen will have it emploied 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 Arterial, 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 aſſigne 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 shal 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. Shal 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 Opinion of the Spleens Sanguification examined.

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 containe Arterial 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 *Asellius*, which he allowes of; seeing none of them reach unto the Spleen.

Furthermore, that same bastard and impure Blood, bred of muddy Blood by a bastard Liver, wil 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 Cholerick, Melancholick and Wheyish Excrements of the said Blood, cannot be Purged away but by Veins and Arteries; the Arteries are allready 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 Kidnies, 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, Color divers, Situation variable, because sometimes it sinkes 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 stifly affirmed, that 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 allwaies, one and the same and uniform.

Furthermore you may know that the substance of the Liver & 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 blue in Color: The substance of the Liver of Animals boiled, 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 Bruts as wel as in Men, they should have both alike substance, and breed the same blood.

Where

Where will you find a place to clenſe away Choler in the Spleen, as their 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 ſmal, like unto threds. Wherefore *Hofman* does fooliſhly to enquire the *Dioti* 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 natural Action of Parts is ſought after, becauſe the natural Conſtitution is Compounded and accommodated thereunto. What cannot an ingenious Wit imagine? But al 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 wil 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 drawes 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.* [c] *T. 4. f. 6. b.*

The Medicinal Conſideration.

The Subſtance of the Spleen is liable to al kinds of Diſtemper, 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 ful. It ſeldom impoſtumates. Its Coat does oftentimes grow thick and becomes Cartilaginous. *Diſeaſes of the Spleen in Subſtance.*

It often grows great by abundance of Humors, and grows ſmal again, ſomtime of it ſelf, and ſomtime by uſe of Medicines. It is better that the Spleen be ſmal, than great. *Magnitude.*

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

The Scituation of the Spleen is ſomtimes changed, when its Ligaments being ſlackened, its weight bears it downwards, or they being broke, it fals into the *Hypogaſtrium* or Parts beneath the Navel; and then it deceiveth unskilful and heedleſs Phyſitians, 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. *Scituation.*

Somtimes one or other of the Kidnies is ſeen to fal 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 Natural place: otherwiſe, after the ſpace of ſix months, 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 wil the ſooner do, if either you give the patient Emollient 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. *Difference of the Spleen and Kidney when fallen.* *The Cure of both.*

What if the Spleen fal from its natural place, ſhal we ſear and burn it with a red hot Iron? when it ſlips into the Belly ſhal we take that Courſe with it? It is a tickliſh and dangerous peice 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 diſolved by beating the ſame.

same. I should by such a practise fear a contusion, after which an incurable suppuration of the whol substance would undoubtedly follow.

Figure. There is none of the Bowels which in Diseases does more change its shape. Somtime its long, somtime fourquare, somtimes round, according as it finds room to dilate it self in.

Communion. when it rests upon the Stomach, it does much hurt and disturbe the action thereof; and if it be fastened to the Midrif, is oppresses the same, or if it reach thither in its Bulk, it hinders the free *Motions* thereof.

Obstructed, what Diseases it Causes. Upon the Spleen obstructed depend the Black Jaundice, Hypochondriacal Melancholy, the ill Colors of Virgins and other Women, The Scurvy, or *Hippocrates* his great Spleens, out of which flowes a Malignant Whey ish Humor, which being spread into divers Parts of the Body, does in the Mouth cause *Stomacace* or *Oscedo* a soreness with loosness of the Teeth &c. In the Thighs *Scelotyrbe* a soreness with spots, and wandring pains through the whol body, which are either fixed and abiding in certain Parts, which we cal 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 universal 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 [a] *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 separated, as it is in the stock of the [b] *Aorta* springing out of the Heart: but Ocular Inspection does demonstrate, that the Trunk of *Vena Cava* is separated from the Liver, which creepes beneath, and that near the top of the Liver by the Midrif it receives 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 al 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 [g] Trunk. The inferior produces the *Vena* [h] *Adeposa*, which is disperled 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] Lumbares into the Loins, which are spred 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 Channels or Pipes, which from their Scituation are termed [m] *Canales Iliaci*, the Iliack Pipes. From these on either hand are produced other Veins, especially the [a] *Sacra*, [b] *Hypogastrica*, *Amplissima* [c] *Epigastrica*, and [d] *Pudenda*. In Women, the *Hypogastrica*, is longer than in Men, and Nourishes more Parts, and holds the Menstrual blood, till the time come that it must be voided. Wherefore blood is conteined in greater plenty about the Genitals of Women, than of Men.

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

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

seminary

seminary of intermittent Feavers or Agues, is in the *Vena Porta*, or in the Bowells, 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. *Why Cava has a thick Coat.*

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. *whether Veins have Fibres.*

Hippocrates in his Book *de Morbo 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. *why the Veins are called the Bodies Wind-Doors.*

In Antient times, and the daies of Yore, 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 joyful success; if bad and corrupted, it was an ill sign, according to *Lucan.*

Nec Cruor emicuit solitus, sed Vulnere Largo
Effluxit nigrum rutilo pro sanguine Virus.
That is,
No usual Blood did spring from the large Wound,
But black and Venemous, for Red and sound.

The Medicinal 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 judg of that which is corrupt. Now in bodies that are healthy the blood is Red, *Fibrous*, and has a smal quantity of Wheyish Water mingled with it. *The conditions of good Blood.*

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 conteined 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 Alimentary 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 al the Parts of the Region of the belly, notwithstanding *Hippocrates* acknowledged two fountains of Flegm, the Head and the Stomach. *How the Fibres in the Blood are bred.*

Now the Quality or temper of blood is hot and moist. Its Quantity cannot be deemed. The Arabian Physitians, especially *Avicenna*, do write, that in a Sanguine body wel 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 Sickness and Death it self. *The natural Temper of the Blood.* *Quantity of the Blood.*

When blood offends in quality, it is termed *Cacochymia*, when in quantity, it's called *Plethora*. Sometime the blood is corrupted and not the Serum or Wheyish Water, Sometime the serum is corrupt and the blood remaines sound. Now the serum or Wheyish Water being corrupted, is the worst Humor in the body, *Cacochymia & Plethora, what they are.*

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

Corruption of the Serum.

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 several degrees of its Corruption and Tincture, appears sometimes yellow and Cholerick, 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 whol Mass is turned into a rotten putrefied *Serum*.

Worms breed in the blood.

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.

Heart eaten by worms bred in the blood.

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.

Retentive faculty of the Veins being lost, what follows.

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 al 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.

Blood congealed.

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*.

Vena Cava inflamed.

Aretæus 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 only in the Veins of the Thighs and Legs.

Cure of the diseases of Vena Cava, and the blood, twofold.

Of the Diseases of this Vein, and of the Blood contained therein, there is a twofold 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 extreamly corrupted blood may be taken away.

Purgation.

Blood-letting.

Blood-letting takes away such Obstructions as are caused by blood, but not those that are caused by Humors congested 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 may be lessened by other waies beside blood-letting.

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 Feaver, 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.

A Valve in Vena Cava.

Forasmuch as *Sylvius*, and *Carolus Stephanus*, 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 favors that Opinion of the bloods being carried from the Liver unto the Heart.

Its use.

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.

[a] T. 12 f. 1. *A B C.* [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. *z z.* [l] f. 1. *a a a.* [m] f. 1. *D D.*

Of

Of the Aorta *descending.*

Distribution of the Aorta descendent.

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.

Arteria Lienalis.

Its Use.

That same Artery, as large, and wide as a Goose Quil, 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 it's neighboring bowels, and that it might afford a fermenting juyce to the Stomach, to help its Chylifaction, by that same permixion of both sorts of blood. Peradventure likewise, when the Liver is vitiated, and extreamly obstructed, Arterial blood may be brought unto it, by the Splenick Vein, as it were a Natural *Tartarum Vitriolatum*, to open its Obstructions.

Then it produces the [b] Cæliacal 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 disburden the parts of superfluous blood; which returning back into the *Aorta*, may conveniently be evacuated, by opening a Vein in the Foot.

Thickness of the Membrane of the Aorta.

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.

The Circulatory Vessels.

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.

[a] T. 12. *f.* 4. G. [b] T. 12. *f.* 4. *p.*

Of the Nerves of the Lower Belly.

Contexture of the mesenterie Nerves.

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

what diseases arise therefrom

When this Contexture of Nerves is ful of evil Humors, Convulsions happen with the Colick pains, both in men and women, though the brain be no waies misaffected.

Chap. 28. *Of the Kidneys.*

substance 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 whol body.

They have a very thin [c] 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* [f] *adiposa*, wraps, and infolds the Kidneys, and is produced from the *Peritoneum*.

Their temper.

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

scituation.

They are [a] scituate in the Loyns, between a duplication of the *Peritonæum*, 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.

Greatness. 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 cal Kidney-beans.

Color. Their Color is reddish.

Vessels. You shal 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 til they are a yeer old, because the external face of the *Uva* 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, til 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 wil 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 runs down drop after drop, through nine little fleshy Teats, called *Caruncul[a]* [b] *Papillares*, which are acuminated without, and are encluded, 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 Renum*, or Kidney-sieve.

The Basin.

The Teats.

The sieve.

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.

[a] T. 3. f. 8. △. [b] f. 8. *iii*. [c] f. 8. *BB*. *Q. r*. [d] T. 3. f. 8. *Imn*. [e] T. 5. f. 2. *E*. [f] f. 2. *AA*.

[a] T. 5. f. 1. *BC*. [b] f. 1. *FG*. f. 2. *KK*. [c] f. 2. *HII*. f. 5. *B*. [d] f. 2. *aa bb*. f. 5. *C*. [e] f. 2. *F*. [f] f. 2. *G*. [g] T. 9. f. 2. *BD*. [h] f. 2. *A* & *C*. T. 5. f. 1. *AA*. f. 2. *BB*. f. 3. & 4. *AA*.

[a] T. 5. f. 5. *AA*. [b] T. 5. f. 6. *EE*. [c] T. 5. f. 6. *DD*.

The Medicinal Consideration.

Infirmities of the Kidneys are Distempers. 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 wel in the internal, as external parts: for oftentimes a morbifick matter, is collected within the *Membrana adiposa*, which breeds Impostumes which compress the Kidneys.

Imposthume, Ulcer.

Laxity, how caused. *Laxity* proceeds from a cold and moist distemper, or from an exceeding hot one, which corrupts the Natural 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 only 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 Stomachs sympathizing with the Kidneys. Observe diligently

Diabetes.

Ischuria.

when

when the Stomach is ill, if there be no Diſeaſe in the Kidney; for if there be, that's the cauſe of the Stomachs 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 perform as much as two: and therefore thoſe that have but one Kidney, enjoy not their health ſo wel as they that have both.

Falling down of the Kidneys.

Although the Kidneys ſeem faſt fixed unto the Loyns by the fat, as it were with glue; yet do they ſomtimes fal out of their place, and lean forward, ſomtime they 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 ſtaies as were wont to hold them. Being fallen into the belly, they ſtay there a while, and at laſt they putrifie, and impoſtumate.

Their ſwelling

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

ſtoppage.

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 ſuppreſt.

Ulcer.

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

Vein opened, or broke.

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 enclined to vomiting.

Action Hurt.

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

ſtones bred in the Kidneys.

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.

when curable by Inciſion.

Conſumption of the kidneys.

The Kidneys do ſomtimes conſume away, and cauſe an univerſal Conſumption of the whol body; which comes either from putrefaction of the Kidneys, or through overmuch ejection of Seed or Sperm.

who moſt ſubject thereunto.

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.

Dropſie from the kidneys weakneſs.

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 Diuretricks open thoſe paſſages. And therefore our chief Care muſt be to purge thoſe, and the neighboring parts, and by Fomentations, to reſtore the loſt Faculty of the Kidneys.

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 dammed up within the greater Veins, in caſe we cannot purge the ſame away with Hydragogues, or Water-Purgers?

CHAP.

Chap. 29. *Of the Ureters.*

Their Description. THe Ureters are Channels or Conduit Pipes ordained to conveigh the Urine to the bladder.

Substance. They consist of a single Membranous substance, which being enclosed in a duplication of the *Peritoneum*, therefore Anatomists have said, that they borrow another Coate of the *Peritoneum*.

Length. Scituation. They are as long as the Space between the Kidnies and the bladder. Resting upon the [a] Muscle [b] *Psoa*, they are obliquely carryed towards the *Ossa Ilium*, and rising up unto the bladder in the bottom thereof, they slip in between the two [c] Coates almost as far as the [d] Orifice, where they peirce the [e] 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.

Wideness. Naturally they are as thick as Goos-quils, but in such as have the Stone and use to void little ones from the Kidney, the hollowness of the Ureters is so widened, that they have been seen as thick as a Mans Finger in the dissection of dead bodies.

Original. The Original of the Ureters is rather from the bladder than from the Kidnies, because they are of a Membranous substance. Within the Cavity of the kidnies they are divided into nine Pipes, which are fitted to the little fleshy Teates called *Caruncul æ Papillares*, that they may distil the *Serum* into the *Basin* or large Cavity of the Ureters, within the Kidnies.

Nerves. They are thought to have Nerves whereby they feel; but being of a Membranous Nature, their extream pain in the passage of a Stone, proceeds from the stretching of the Membrane.

Obstruction. 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 Disease of the Ureters is Obstruction.

Stone. And if within the duplicature of the Bladder either of them be obstructed, there is bred a Stone, which grows by little and little, which is not movable, but remains fastned to the Bladder, which when those that Cut out the Stone endeavour to pul 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.

[a] *T. 5. f. 1. F F. G G.* [b] *T. 10. f. 1 00.* [c] *f. 7. F F.* [d] *T. 10. f. 7. D.* [e] *T. 6 f. 6. c c.*

Chap. 30. *Of the Piss-Bladder.*

Its Substance. Coates. 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 Bottel with its bottom upwards, and with this Partition it is severed from the Guts and other Parts, only in mankind, least with the weight of the Guts bearing thereupon, it should be forced out of its place.

Magnitude. Its natural size is smal 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 Aquita Pendente* took to be Musculous, and after him *Spigelius*, who cals it *Musculum Detrusorem Vesicæ*. He might better have called it Expulsorem, the Expulsive Muscle of the Bladder.

Its

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 *Pubis*. *Shape.*

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

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. *Holes.*

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

The Piss-bladder has Veins and Arteries from the [b] Hypogastrical Vessels; it has Nerves in its Neck, from the *Os* [c] *Sacrum*, and in its body from a Nerve of the [d] 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 Loins or *Os Sacrum*. *Vessels.*

The Medicinal Consideration.

THe Piss-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 whol Body thereof. Of which we shall Discourse particularly. *Diseases of the Bladder.*

Its temper is perverted, when the bladder naturally cold and dry, comes to wax hot, and fals into an inflammation. *In its Temper.*

Its Scituation is changed, when that Part of the *Peritoneum* 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. *Scituation.*

Its greatness or widness cannot certainly be defined unless it were empty; however 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 Coates being broken or too much slacned, 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 Month or two, must be done twice a day, until the Membrane have recovered its antient tone or contractive Vigour. *Wideness.*

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 conveighed thereunto. *Diseases of the Neck of the Bladder.*

It is frequently obstructed by the Stone lying hid in the bladder, or by a fungous *How Obstructed.*

fungous body which grows therein. Yea and somtimes beyond the Neck, within the bladder, fungous or Spungy carnolities do arise, which do much trouble the bladder and fil 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 *Hypersarcoses*, which are easily Eaten away with Medicinal Wax Candles, made and fitted for that purpose.

Oftentimes they happen in the Passage of the Urine after a Venemous *Gonorrhea* not wel Cured

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

The Key of the Bladder, an Instrument so called.

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 cal 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.

Bladder perforated.

Perineum opened.

Urine let out with a Knife.

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 *Perinæum* is opened. But when a Catheter with grates in it, upon which the Section is wont to be made, cannot be thrust in, to depress the Neck of the bladder which lies hid under th *Os Pubis*, a smal Knife is thrust deep in as far as the bladder sidewaies, until the Urine comes away: for so I have often freed many from imminent Peril.

Ease for old Men that have the Stone.

In persons far in years, who are greivously troubled to make Water by reason of a great Stone, which cannot be taken out without manifest danger of Death, to give them some releise in their Misery, the *Perinæum* 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 Spunge is applied to receive the droppings of the Urine, if any be, until 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.

Ulcers of the Bladder clensed.

Also by this means Ulcers of the bladder may be clensed and dried, if there be no Stone, to fret upon the Ulcer.

Zecchius his Vain Brag.

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

The Stone Sucked out.

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 strong and continual sucking of the yard, or it may be drawn out by an incision made in the Ureter.

Cut out of the Bladder.

If the Stone be great it cannot be taken out but by Cutting of the bladder, the Inisection being made upon the *Perinæum*, 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.

The Ægyptian Operation naught.

And I beleive 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 Pare 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 painful by reason of the extream stretching of the bladder, which cannot indure distention, neither in its Neck, nor in the Ureter.

And that of Hildanus is naught.

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

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 & Italian way the beſt to take out the Stone.*

[a] T. 5. *f.* 1. *F F. G G.* [b] T. 10. *f.* 1. *O O.* [c] *f.* 7. *F F.* [d] T. 10. *f.* 7. *D.* [e] T. 6. *f.* 6. *c c.*

[a] T. 5. *f.* 7. *B. and C.* [b] *f.* 7. *A A.* [c] *f.* 7. *B B.* [d] *f.* 7. *B.* [e] *f.* 7. *E E.* [f] *f.* 7. *D* [g] T. 6. *f.* 6. *c c.*

[a] T. 6. *f.* 5. *F F.* [b] T. 12. *f.* 1. *and* 4. *ζ ζ.* [c] T. 3. *f.* 8. *o.* T. 18. *f.* 5 *o.* [d] T. 8. *f.* 8. *A B.*

Chap. 31. *Of the Genitals of a Man; and firſt of the Yard.*

I Proceed to the Genitals of a Man, among which, the Yard, which is aſſociated 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 only of Skin for thinnes 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-ſtal, that it may infold 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. *Skin* *Fore-Skin*

The Fore-Skin is tied to the Nut by a little band which is termed *Frænulum*, the Bridle: it is extended in the nether 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 *Panniculus Carnoſus*. *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 ſidelong faſtened to the Ligaments of the Yard; the *Ejaculators* ſpringing out of the Tranſverſe Ligament placed between 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 Blader. *The Muſcles.*

Theſe Muſcles being taken away, three Bodies come to view which form the Yard, *Viz.* The two Ligaments and the *Urethra*.

The [a] hollow Ligaments being disjoined beneath in the *Perineum*, do ariſe from the Protuberancies of the Huckle-bone, and have in their progreſs, the [b] *Urethra* interjected. Neer the *Os Pubis*, being joyned together they make a Pendulous Body terminated with the Nut, which is called [c] *Penis*, 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 erection of the Yard depends upon theſe Ligamentss. *Their internal Subſtance.*

The *Urethra* or Piſs-Pipe, is a Channel of Spongy ſubſtance, that it may ſwel and fal with the foreſaid 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 Perineum. Observe diligently, the Obliquation, or Reflection of the *Urethra* in the *Perinæum*, and how the scituation of the Orifice of the bladder lies hid under the bones of the *Pubes*.

Impostumated hard to cure. In the *Perinæum*, divers Tumors are raised: but such as adhere to the *Urethra*, and impostumate, are dangerous, often degenerating into Fistulaes, because the *Urethra* will very hardly heal, and grow together. If it be eaten by a venemous 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*, [f] 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 o. T. 18. f. 5. o. = [h] T. 12. f. 1. nn. f. 4. θθ. = [i] T. 6. f. 1. a a. f. 5. H H. = [k] f. 5. K K. = [l] f. 1. b b. f. 5. l l.

[a] T. 6. f. 5. K K. = [b] f. 5. G G. = [c] f. 1. c. = [d] f. 7. B. = [e] f. 5. G G. = [f] f. 5 M. f. 7. C. = [g] f. 5. *infra*. M. =

The Medicinal Consideration.

Diseases of the whol Yard are, Priapismus, The Action of the whol Yard, viz. voluntary erection, and stifness, 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 whol Yard without pain: It arises from a weakness, or a paralytick disposition of the Muscles, or Nerves of the Yard.

Crookedness Somtimes the whol 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. Somtimes the Tumor called *Ganglion*, in the hollow Ligaments, is a cause of this Contersion, or crookedness of the Yard: of which Infirmity, *Hollerius* in his Comment upon the 63. Aphorism, of Book 5. and *Cæsar Arantius* in Chap. 50. of his Book of Tumors, have treated.

Inflamation, Tumors, and ulcers Furthermore, The whol Yard is subject to Inflamations, Tumors, and Ulcers.

The Yard is but one in Number, for two had been needless: if we find two, it is Monstrous, and they are both useless; or one is but the rudiment of a Yard, or some fleshy Excrescence.

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 shortened 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 unfruitful. *Fallopius* in his Book *de Decoratione*, teaches us how to make the Yard longer. *Martial* mentions one that had so large a Yard, that when it stood erected, he could smel to it with his Nose.

Of the Foreskin. The Fore-skin has its Diseases; somtimes it is too short, and somtimes too long, and is incommodious. The Jews have it cut off, for which cause they are termed *Apellæ*, 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*.

Phymosis 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 wil abate, and then the Fore-skin may freely be drawn up or down. An admirable Secret.

Exulcerated. 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.

Thickness of the Frænulum. The band of the Fore-skin termed *Frænulum*, if it be more thick than ordinary, and goes unto the hole of the Nut, and makes the same crooked, it makes men such as *Galen* cals *Hypospadicos*; so that they cannot ingender, because they do not cast their Seed directly into the Womb, unless it be cut.

Ulcers of the Nut. 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 ful of Warts, and deformed; which warts may be eaten off, and eradicated with pouder of Savin; but they grow again, if the internal Cause be not removed, by Medicines accommodated to cure the Pox.

Deformation with warts.

The urethra obstructed. 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.

Inflamed. It is inflamed, by reason of its Spungy, 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 sharpnels of a putrid Humor, which passes through the same, as in the virulent *Gonorrhæa*, and then it swels, and makes the Yard crooked, and stretches it with the *Tentigo* like a Rope; which disease they term *Gonorrhæa Chordata*, the Corded, or Rope-stretched running of the Reins.

Ulcerated. It is ulcerated by the Acrimony of Quittor, and purulent Matter; and somtimes the Ulcer being not well cured, there grows up a spungy superfluous flesh, which is termed *Carnositæ*; which must be diminished, or eaten away, with Corrosive Candles; otherwise it swels so as to shut up that passage, and stop the Urine, not without pain to the Patient.

Hermaphrodites. 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 smal. These things have deceived unskilful Midwives, and made them judg Children so born to be Females.

Somtime the *Urethra* is perforated above the Cod, or neer the Nut of the Yard, which 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 yeers, 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 Groins, do fal 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.

A woman is never changed into a man. 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 stifness of a Mans Yard, but is no way compounded as a true Yard. And therfore 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.

Chap. 32. *Of the Groyns.*

Things to be observed.

BEfore we proceed unto the Stones, we are to take notice of the Groyns; in which are to be seen, the Crural [a] Vein, and [b] Artery, with 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.

Crural vessels.

Process of Peritonæum.

Muscle Cremaster.

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] *Erythroïs*, and the other [g] *Eschthroïs*.

Kernels.

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, neer the Vessels, you may see other Glandules, or Kernels, bordering upon the Vessels.

Spermatick Vessels.

Within the Process are contained, *Vas* [h] *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-[k] bladders. In the Groyn, within the Process of the *Peritoneum*, descends the Gut [l] *Ileon*, the inward Coat of the *Peritoneum* being relaxed.

Descent of the Gut Ileum.

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 interchangably 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 under, that the Gut may be reduced into the Cavity of the Belly; in which work, many of the very skilfullest Chyrurgeons have erred, to the loss of their Patients Lives.

Buboes.

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 shal consider whether it be safe to use that prick, or Thread of Gold or Lead about the Production of the *Peritoneum*, that the process which in the Rupture called *Oschcocele*, 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.

Insensible gelding.

The Seminal Vessels may be feared, 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. *A A.* [b] *f.* 5. *A A.* [c] *T.* 18. *f.* 5. *K L M N.* [d] *T.* 2. *f.* 9. *E E* [e] *T.* 6. *f.* 2. *D D.* [f] *T.* 6. *f.* 2. [g] *f.* 2. *C C E E.* [h] *T.* 6 *f.* 1. *A. f.* 3. *and* 4. *A A.* [i] *f.* 1. *V V. f.* 3. *C C E f.* 3. *C C D. f.* 5. *C C.* [k] *f.* 5. *and* 6. *E E.* [l] *T.* 3. *f.* 4. *H H.*

Chap. 33. *Of the Fundament.*

Order of Section.

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

Its Name.

The Fundament therefore, called *Anus*, and *Podex*, is the outermost end of the [a] *Intestinum rectum*, or streight Gut, which is shut, and purled 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

tuberances of the Huckle-bone, and the extremity of the *Coccyx*, or Crupper-bone.

The Fundament has four Muſcles, called *Levatores*; 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. *Muſcles.*

Theſe four Muſcles do relieve, and raiſe up the Fundament when it pouches forwards, and is ready to fal out in the expelling of Excrements which are more hard and ſollid than ordinary. The Circular Muſcles do ſhut, and contract the Fundament, leſt our Excrements ſhould come away againſt our wils: for by means of theſe Muſcles, we may take our own time, and regulate this kind of Evacution according to our own pleaſures. *Their uſe.*

[a] T. 3. f. 7. M. [b] T. 3. f. 7. O. [c] T. 3. f. 7. NN.

The Medicinal Conſideration.

The Fundament is liable to very many Diſeaſes. It is ſometimes poſſeſſed with an hot diſtemper, with a troubleſom, and almoſt intollerable itching, which cauſes a continual deſire of going to ſtool, which is called *Teneſmus*. *Its diſeaſes.* *Teneſmus.*

In the Expulſion of the Dung, ſometimes the Fundament fals out, which is reduced into its place with extream trouble and difficulty. *Falling out.*

Sometimes it is palſied, and the Excrements come away whether the Patient wil or no: and ſometimes it is ſo ſtraitened, that a man can hardly void his Excrements. *Palſie.*

Within, and without it ſwels, the mouths of the Veins being ſwollen and knobbed, which are called *Hæmorrhoides*, both internal, and external. *Hemorhoids.*

Sometime 'tis inflamed, but it is more often impoſtumated; from whence proceeds an hollow Ulcer, termed *Fiſtula Ani*. *Inflamation.*

It is made rough with Warts, which are called, *Condylomata*, or *Mariſcæ*. It is exulcerated with ſmal Clifts, which are called *Rhagades*. It may ſafely be cut, according to *Hippocrates*, after any faſhion, without hurting the Sphincter. Finally, 'tis troubled with al kinds of Diſeaſes. *Warts.* *Clifts.*

Sometime it has a Scirrhous 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. *Scirrhous tumor.*

It is ſometimes found cloſed up in new-born Infants, and it is cut open: but if the Gut be found ſollid, having no Cavity, there is no way but death. *Cloſed up.*

Chap. 34. *Of the Cod, and Stones.*

WE 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 yeers; it has the *Epidermis*, or Scarf-skin upon it. Under the hairy Skin, there is a fleſhy Membrane which 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 Cods, their Coats.* *Cavities.*

The Cod has Veins and Arteries from the Privy Parts, and Nerves from the *Os Sacrum*. *Veſſels.*

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 Original from *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 *Peritonæum*, which infolds the Testicle.

The Third immediately infolds the substance of the Testicle, and is called [g] *Nervea*, the Nervous Membrane.

Substance. The Membranes being taken away, the Substance of the Testicle comes in sight, which is [h] glandulous, white, pretty firm; and upon the same, overthwart, is placed a final body like a Silk-worm, which is called [a] *Epididymis*; to the one end whereof, there cleaves *Vas Spermaticum* [b] *deferens*, the carrying Spermatick 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] ful of turnings and windings, as is the Body of the *Epididymis*, and firmly cleaves unto the Testicle by its ends, being loose, and separate in its middle.

Epididymis. *Sperm Carrier.* *Ejaculator.*

Situation. *Figure.* *Action.* The Testicles are excluded from the Cavity of the Belly, being placed in the Cods. They are about the bigness of a Pigeons, or yong Pullets Egg. They are of an Oval shape, and their work, is to elaborate the Seed.

The Medicinal Consideration.

Diseases of the Cods. 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.

Oscheocele. If the Gut fal into the Cod, or into the Cal, it makes that kind of Rupture which is called *Oscheocele*.

If water or wind flow from the Cavity of the belly, into the Cod, they make those Ruptures which are termed *Hydrocele*, and *Pneumatocele*.

Hydrocele.

Circocele. If in the Spermatick Vessels, both Deferent, and Jaculatory, where they are ful of turnings and windings neer the Stones, thick blood be intercepted, it breeds a tumor, which is called *Circocele*.

Sarcocele. If Spongy flesh breed, and grow to the Membrane called *Dartos*, it is termed *Sarcocele*.

If the Testicle adhere to the said spongy flesh, it has the same name.

If the Stone swel, and exceed its natural bulk, it causes a swelling in the Cod.

Pneumatocele. If wind or water insinuate themselves into the Membranes of the Testicles, they produce those Tumors which are called *Hydrocele*, and *Pneumatocele Testiculorum*, which are familiar to Children.

Inflamation. Moreover, The Cod is inflamed, overmuch widened, or contracted; both which dispositions, are inconvenient, and hinderfom to life and Generation.

Rhegosis. 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.

Diseases of the Stones in Situation. The Stones are faulty in point of Situation, while they lie out of sight in the belly, or when they are in the Groyns. By reason of the former Situation, in questions of Divorce, men are pronounced impotent, though strong otherwise, because the Stones are not in their Natural place.

Number. By reason of il Conformation 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 *Triorches*, 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.

Figure. They are faulty in shape, when they are uneven, by reason of the swelling, relaxation, or divulsion of the *Epididymis*.

Color. If there be a fault in the Color, there is a fault in the Substance, which ought to be pretty sollid; when it is over-flaggy, and soft, it is faulty.

Greatness 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 perform

and opening Herbs, the ſteam whereof, the Patient muſt receive into her Womb. Alſo Fomentations muſt be applied to the *Os 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 il ſhape thereof, or the hardneſs of the inner Orifice, or the diſtortion thereof, or from fault of the Stones, and Spermatick Veſſels, in which ſomwhat 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) ſhal be amended. *Symptoms in the Actions hurt.* *Sterilitie*

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 Menſtruat 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 Humoral, when only Humors come away: which laſt, if it be malignant, and the Humor be ſharp, exulcerating, and of evil color, it is dangerous, and comes ſomtimes from an outward, venemous, and contagious cauſe; and therfore women ought diſcreetly to be queſtioned touching that matter, that they may be brought to acknowledg 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 cal 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 wel, and upon her Legs again.

Touching other Diſeaſes, whereunto ſhe is ſubject, I wil 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. *Moles, 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: VVhereupon, 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 Egs that a Hen ſits upon. Afterward, certain Skins are formed, within which, the foundations, or firſt threds of the Veſſels, and al 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] VVomb-Liver, which being glued to the ſides of the VVomb, 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, does 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 VVomen, 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, al the while they are big, in others *Why ſome childing women are ſickly, others not*

thers, to the middle of the time of their Belly-bearing.

If a Woman, during the whol time of her Conception, can make the Child partake of her passions, it wil 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. A B C D G. [f] T. 9. f. 4. D

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 smal, 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 VVoman 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 defrauds the Child of its nutriment, and impoverishes the mother; so to go about to Cure a VVoman with Child, is a dangerous, and unheard of Practice. For if al Practitioners dis-allow the same in Men, and VVomen 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 smal quantity, it is to no purpose: what can the taking away of one little Porrenger of blood do, to resist the furious agitation of Humors, and to extinguish a Feaver, 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 shal be more accurately discussed in another place. He that desires to be acquainted with the Cure of VVomens Diseases, let him read *Hippocrates* his fift 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 VVomb, the more does the VVomb, and the *Placenta*, or VVomb-Cake, or VVomb-Liver encrease; so that neer 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 VVomb be less, either those VVomen 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 Purgations.

The posture, & accömodation of the child in the womb.

Now the Child in the VVomb, 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 VVomb-Liver fastened to the sides of the VVomb, as a Mattress, or Bed to rest upon, in which the Mothers womb is purified, and in which the Unbilical, or Navel-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,

The Cavity of the [e] Womb in Virgins and in those which have never conceived, is so smal 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 Dugs in the form of Milk. *Actions.*

[a] T. 7. f. 2. 22 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 out knowledg 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 hurtful to women. *Spermatick Vessels.*

They swel 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 Trumpet or Horn of the Womb is widened and moved by Seed, which being there corrupted, seekes 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. *Trumpet.*

'Tis very strang 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 Glass of a Mans Seed and menstrual blood, placed in Horses Dung, unless both of them, the one being an Athiest the other a Jew, were known to be Impostors.

The womb is the Root, Seed plot and foundation of very near al womens Diseases, being either bred in the womb, or occasioned thereby. *Womb it self.*

It it be troubled with an hot distemper and inflamed, it causes intollerable burnings, the Feaver *Synochos* and the burning Feaver, very troubleiome itchings? and finally it brings exulcerations, the Cancer and Gangræna. *Distemper.*

If it be stung with fervent Lust, it becomes enraged, causes Uterine fury and Madness; wil 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.

Somtime 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 wil give leave; and it wil rise directly to the Liver, Stomach and Midrif, 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, punnishing Poor women with many Sorrows.

Although *Hippocrates* hath written and *Fernelius* confirmd the same, that the womb like a Globe does 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 putrified, which being swelled do move themselves this way & that way, til they have shed their Seed into the Cavity of the Belly: which Seed being dispersed, brings very cruel pains and stretches the Belly, until the force of the Spirits be Evaporated: hence comes that same swelling of the Belly and stifling about the Midrif.

Somtimes

Suffocation Somtimes 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 al parts of the Body, from the VVomb, as from a Beast that spits poyson.

Cancerous Scirrhus. The VVomb is but little when empty; but when it is filled with evil Humors, it swels 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. VVXX.*

Dropsie Somtimes 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. Somtimes 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 I said before.

Whether seed suppressed hurteth women? The Womb is watered with a two-fold Humor, Seed, and Menstrual Blood; the suppression of both which, does many waies 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 hurtful unto Women: he writes indeed, that the Womb being dry, 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 saies 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 her 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.

What must be observed in letting blood to move the courses?

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 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.

1 *The sufficiency of matter.*

2 *Fitnest 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, until 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 shal 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

3 *Strength of the faculty* 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.

Medicaments, & other means to accomplish the Cure 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. Pils of Steel, Mirrh, and Aloes, must somtimes be given, and Baths made to sit in: or a Vaporary must be used somtimes of blood-warm Water alone, and somtimes boyled with Hysterical

and

out, makes its own way, with the Head [i] foremoſt; and ſuch an Egreſs is termed a Natural, and right faſhion'd Birth.

what precedes the ſame.

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 whol Sheath, which in the laſt months, do by little and little grow thick, are moiſtened with the ſame clammy, glutinous Humor, that they may eaſily be enlarged to ſuch a widneſs as ſhal be neceſſary for the going out of the Infant.

[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.* 11. *f.* 4. [i] *T.* 8. *f.* 1. *D.*

what follows

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 Secondine, or After-birth, muſt come forth, *viz.* the *Placenta Carnea*, or Womb-Liver, whol, and untorn. VVhen the Child is come forth, the Navel is tied [a] a Thumbs breadth from the Skin, and after it is tied, it is cut of, leaving only another Thumbs breadth.

[a] *T.* 9. *f.* 2. *P.*

Helps to further hard labor

The Infant being wiped and clenſed, with its Head gently preſſed together, and cloſed, is delivered unto the Nurſe. The Midwife takes care of the Mother, who is careful of her privy parts, being pained, and to recover her languiſhing ſtrength.

If the Birth prove hard and painful, a Feaver is raiſed, and the privy Parts are ſwelled, by laboring, and endeavoring in vain to bring forth the Child. Sometimes her ſtrength fails her, and other whiles 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.

Drawing the Infant out by an Hook.

Finally: when all wil 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.

'Twas elegantly ſaid by *Tertullian* in his Book *de Anima*, *cap.* 25. *Neceſſaria crudelitate trucidatur Infans matricida ni morturus*; that is, It is a neceſſary kind of Cruelty, to kill that Child, which otherwiſe would kill its own Mother.

VVhen 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 pul 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 ſhal obſerve the Caruncles obliterated and defaced, the Nymphes much diminiſhed, ſo that only ſome Rudiments of them, are to be ſeen, and the inmoſt Orifice ſo wide, that it wil receive a mans four fingers bended together.

Admirable power of Nature.

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.

Child-bed Purgations what they are

The widneſs 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 pu-

also the Hæmorrhoid [t] Veins, which pass down along the Loins into the Fundiment; as also the [u] Spermatick Vessels which swel with Spermatick Humor, which in their progress do send branches unto the Loines. In Women, the [x] Womb with its [y] Ligaments and [z] Testicles may hurt the Loins, but especialy in a Woman with Child, by, reason of the weight of the Womb and Child. The Veins and Arteries of the *Iliac* [a] branches, which are spread abroad through the *Os Sacrum*, may vex the Loines.

[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. α α α.* [t] *T. 4 f 6. I I.* [u] *T. 6. f. 1. 2. &c.* [x] *T. 7. f 1. d f. 2. R &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 Loines, are, the [a] Liver by the *Vena* [b] *Portæ*, and [c] Meisentery, and the Head whils it disburthens it self of its Superfluities into the [d] Marrow 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 [f] Million of Threds.

[a] *T. 4 f. 1. A B.* [b] *f. 1. F F f. 6. the whol* [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 Loines, as internal *Rheumatismes* or Fluxes of Humors, and external by the Veins, or an Humor between the Skin, which flowes from the Head betwixt the Muscles and Fleshy Membane,

Oftentimes the branches of the *Vena Cava* and *Aorta* do carry a Part of boyling and Superfluous Blood, out of the greater Channels into the Loines, which they Diseate 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 Arthritis 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 Loines. within and without in the Loines 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.

External Causes.

Many times pains of the Loines are stirred up by external Causes, as a fall on the Back, or a blow with a thick Stick, or some other massie thing.

Certain places in Hippocrates expounded.

These things being premised and wel understood, it is easie to explain very obscure places in *Hippocrates*, touching pains of the Loines, which you shal find in the Commentaries of *Duretus* upon the Coick Prognosticks of *Hippocrates*, and others collected together in the Commentaries of *Marinellus* upon *Hippocrates*, in the word *Lumbi*.

There are two kinds of Loine Symptomes: for some are in the Loines, and others spring from the Loines: both of them are by *Hippocrates* judged to be very stubborn and hard to deal with,

In his Coicks he hath pronounced absolutly and without exception, Such as have pains in their Loines 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, unles by a clear knowledg of the the Parts sending and Parts receiving, as I declared before.

Certain it is, if in the beginning of Diseases their be pain in the Loines, with heavyness and a Feaver, 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 I should recite those places, I should fil twenty Leaves and upwards, wherefore I wil take in my Sailes and dispatch al in a word. Pains of the Loines in acute Malignant Feavers or other Feavers in the beginning are dangerous: for they signifie 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 plentyful 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 Symptomes. *Danger of these pains in Feavers.*

We ought therefore to be very fearful of pains in the Loines which persevere in Feavers, although Blood have been often let, because in the Region of the Belly, Humors lie extreme 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 Feaver. *Their Cure.*

Purging must not be omitted that the Vault of the lower Belly being loaded with Excrements may be emptied and clensed; 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 Kidneis 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 discussed with Fomentations, after purging & 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 conteined 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 Hæmorrhoid 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. 1. *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] Midriff; above by the [c] *Claviculæ*, and the whol Circumference, and bulk thereof is made up of al 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 the Head, though it be the prop and Pillar thereof.

[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.*

Shape.

That the Cheſt may be wel ſhaped, it ought to be of an Oval Figure, and not flat before, which is termed *Pectus Tabellarium*, a Table-ſhap'd Breaſt, and is a token that the Party ſo Breaſted, wil fal into a Conſumption.

The

The Cheſt is Compounded of divers Parts, which are divided into external and internal, that is to ſay into Parts conteining, and Parts contained. The conteining 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. *Parts.*

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 middeſt of which there lies one Kernel greater than the reſt, under the Teat. *Their Subſtance*

The Dugs are placed upon the Breſt, 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 provoks 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 lacivious conſtitution of Body: for the luſtful heat of the Womb does puff up and ſwel 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 bounty ful Mother, has given a Woman two Dugs, that ſhe may nurſe two Children; or if one breſt be ſore, the other may ſerve the turn for a time. And for this Cauſe they communicate Veſſels one with another. *Number.*

The ſhape of the Dugs is not flat but bunching out, that they might contein 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 boared 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 Colors 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 Girle, it is of a whiteiſh Color. *The Circle about the Teats.*

The Medicinal Conſideration.

The largneſs 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 ſhal ſpeak in our Doctrin of bones. *Miſ-ſhapen Cheſt.*

Terence blames the affected Care of Mothers who ſtraitned the Cheſts of their yong Daughters, that they might become Slender and ſmal in the waſt. [Such are rightly termed Waſp-waſted Wenches, becauſe they ſeem divided in the middle, like a Waſpe or Bee.]

A miſshapen

By Crookedness of the Back-bone.

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.

Some are born thus Mis-shapen, and they are incurable, let the Rectifiers of Crookedness do what they can.

Many times Rhewmes fal upon the Muscles of the Back-bone, which draw the Vertebraes awry, whence proceeds a mis-shapen Brest-bone and consequently a Crooked Chest, because their shape depends upon the shape of the Back-bone.

By falling of the Brest.

To the evil shaping of the Chest appertains the falling down of the Brest, or the bowing in of the Sword-like Gristle, which hurts the Stomach and provokes vomiting, and also shortness of Breath by hurting the Midrif; 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.

Dropsie.

The Diseases of the Cavity of the Chest are *Empyema*, or a collection of quittor within the said Cavity, and the Dropsie of the Brest: all which Diseases require a perforation to be made between the fourth and fift 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 Choaking, unless the Chest be opened by the Perforation afore said, 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 *Pneumatiai*.

Condition of the Dugs.

In a marriagable Virgin.

The Dugs are to be considered at divers seasons, in a Virgin Marriagable, 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 Marrigable, the Dugs are firm and solid. They become more soft and swelling, when they are transported with a burning desire of carnal Embracements: and by how much the higher they swel without pain, and the fuller Orbe that they make, strowting 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 Maryed woman which were raised with the Ardency of fleshly lust, do sink and fal by little and little. Women that have large strouting Dugs are termed in Latine *Mammosæ 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 Spunges. So saies *Hippocrates*.

Inflamation of the Dugs.

Impostum.

Scirrhus.

Cancer.

Large and ponderous Dugs, do hinder Breathing, by burthening the Chest. So the swelled Breaths of Ancient Virgins and married women, are liable to the same Diseases. For either by reason of a Flux of Humors or of some bruise, they are inflamed and impostumate: somtime they become Scirrhous 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 ful of Kernels and spungy, and therefore ordained by Natnre to receive superfluous Humors. So that such Women as have them dried and shrunken up, are unhealthy and much troubled with spitting.

The

The Dugs of a Woman with Child, ſome time after her Conception, do ſwel 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 Feaver, 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 *Inflamation*, *Tumors*, and *Ulcers*; 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 bruiſed Hemlock, which Experience ſhews to be true. Howbeit, *Dodonæus* approves not of this Medicine, by reaſon of the malignant, and venemous Nature of this Herb, which being applied unto the Dugs, may wrong the Heart. *In a woman that lies in.*

Hippocrates in his Epidemicks, 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 [b] *Epigaſtrica*: and alſo by the *Venæ* [c] *Thoracicæ*, or Breaſt-Veins, which are Branches of the *Vena* [d] *Cava*, which in the bottom of the Belly, affords the Hypogaſtrick [e] Vein unto the Womb. *Conſent of the womb & dugs, how cauſed?*

The Ancient Chyrurgeons were wont to cut off Cancerous Dugs with the Inciſion Knife; but becauſe it lucks not well, women are not willing to undergo ſo cruel a Remedy, neither do our Chyrurgeons practice it.

[a] T. 2. *f.* 9. *d.* T. 12. *f.* 1. *C C.* [b] T. 2. *f.* 9. *e.* T. 12. *f.* 1. *E E.* [c] *f.* 1. *ll oo.* [d] *f.* 1. *A B. &c.* [e] *f.* 1. *ξ ξ.*

Chap. 3. *Of the External Parts of the Cheſt.*

THe *proper Containing Parts* are boney, muſculous, or membranous. The boney Parts are of four ſorts, *viz.* Twelve [f] Ribs, two *Claviculæ*, or [g] Channel-bones, the *Sternum*, or [h] Breaſt-bone, and the twelve *Vertebræ*, or [i] turning Joynts of the Back-bone, of which we have ſpoken in our *Oſteologia*, or Hiſtory of the Bones. *Proper containing parts.*

[f] T. 10. *f.* 2. 1, 2, 3, *&c.* [g] *f.* 1. *f.* T. 21. *f.* 1. *B B.* [h] T. 10. *f.* 2. *A A.* [i] 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 ſhal 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 al the internal parts of the Cheſt, and beſtows Membranes upon every one of them, like the *Peritoneum*, is *The* Pleura, *what it is.*

is termed [f] *Pleura*; which being every where stretched out under al 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 swels, 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] *Mediastinum*, and leaves within it self a certain void space, ful of threds, which also comprehends the *Heart*, and the *Pericardium*: it is nothing else, save a Production, or a doubling and folding of the *Mediastinum*.

The Mediastinum, what it is?

This Cavity of the *Mediastinum*, 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.

Its Cavity.

[f] *f.* 5. *A A.* [g] *f.* 5. *C C.* [h] *f.* 4. *B B.* [i] *f.* 4. *A A.*

The *Mediastinum* is fastened unto the *Claves*, and the *Midrif*, by reason of the *Pericardium*, which is circularly knit unto the [a] *Circulus Nerveus*, and the Breast-bone; and by this Artifice, the *Mediastinum*, 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 *Mediastinum*, 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 *Mediastinum* in other places.

The Pericardium, what it is?

[a] T. 10. *f.* 6. *F F. f.* 7. *G G.* [b] T. 11. *f.* 1. *A. f.* 2. *A.*

The Medicinal Consideration.

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.

Diseases of the Costal muscles, in

The Muscles, as wel those that are spred 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.

They undergo divers Tumors, Inflamations, Impostumes, Rheumatick pains, springing from a serous, or wheyish Humor; al which do produce sharp pains in the sides, with a Feaver, and somtimes with a dry Cough, which imitate the Pleurisie; wherefore the difference must diligently be marked, lest we apply the same Remedies to these pains of the sides, which are proper to a Pleurisie.

Pains of the sides.

How known from the Pleurisie.

Hippocrates has observed this Difference; and after him *Duretus*, the *Ghost* of *Hippocrates*, and his *Faithful Interpreter*: For every Pleurisie is a pain of the side; but every pain of the side, is not a Pleurisie, or at most, but a bastard Pleurisie.

But some wil 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 Pleurisie is thereby enraged the more, in which there is a continual Feaver, an Inflamation, a Cough, and a pricking pain of the side.

How they differ in

Scituation,

And therefore the pains of the side differ in Scituation, and in matter; because one is seated in the Membrane [a] *Pleura*, and the Intercostal Muscles; another in the greater Muscles, which are spred upon the Ribs, such as are the [c] Pectoral Mus-

cle

cle, the [d] *Serratus major*, and [e] *minor*, the [f] *Latiſſimus*, and the Muſcles of the [g] Back.

Matter.

They differ alſo in Matter, becauſe wind, or wheyiſh Humors, or blood does inſinuate it ſelf into the greater external Muſcles, and is carried likewiſe, or ſlips down from the Brain, by the Veins termed [h] *Thoracicæ*, or Cheſt-Veins: But the Humor which does poſſeſs the Intercoſtal Muſcles, is brought by the ſmal Branches of the *Vena* [i] *Azygos*, or Vein without a Fellow, and does produce the true Pleuriſie.

[a] *T. 10 f. 5. AA.* [b] *f. 1. GG. HH.* [c] *T. 10. f. 1. AB.* [d] *f. 1. CD.* [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. oo.* [i] *T. 12. f. 1. aaa &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 ſharp 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 Palſey 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.

whether there may be a Peripneumonia, *or no?*

The Membrane *Pleura* being inflamed with a continual Feaver, a pricking pain in the ſide, and a Cough, makes a Pleuriſie, which ſome late Phyſitians 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 Inflamation of the Lungs.

Zecchius 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 *Vincentius 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.

How it is cauſed, according to our Author.

Oft-times the Lungs in one, or both the ſides, do cleave unto the Membrane which covers the Ribs: or it 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 whol Cheſt, do at length ſtick unto the ſaid membrane *Pleura*, and the cleaving is made the faſter by the heat of the Feaver. Neither does the motion of the Lungs hinder that ſame cleaving too aforeſaid, becauſe when the pain is encreaſed, 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 Inflamation 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 Cholerick and Flegmatick Humor 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; which Operation ſomtimes lucks wel.

The difference of a Pleurisie, and Peripneumonia.

So that according to the Doctrine of *Hippocrates*, whom *Herophilus* (as *Cælius Aurelianus* relates) and *Cornelius Celsus* do follow, there is a true Pleurisie, if there be joyned thereunto, an Inflamation of one side of the Lungs; if both sides be pained, it is a true *Peripneumonia*, or Universal Inflamation of the Lungs, because the whol 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 Pleurisy, and the Inflamation 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 Pleurisy, be transferred, or propagated by any other waies into the Lungs by any *Metastasis*, or *Epigenesis*. Howbeit, we see in dead bodies, the diseased *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 Pleurisie may degenerate into a *Peripneumonia*, or Inflamation of the Lungs, after the manner aforesaid.

On which side the blood is to be taken away in a Pleurisie?

Touching blood-letting, there has been for an hundred and fifty yeers, an eager contention between the Modern Physitians of *France*, *Italy*, and *Germany*, from what part blood is to be drawn in a true Pleurisie, 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 Physitians. The Physitians of *Paris*, and al 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 Vena*, 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 joyned to the Extremities of the Solitary Vein called *Azygos*. This was formerly declared by *Gordonius*, a Physitian of *Montpelier*. *Ludovicus Duretus* has confirmed the same with Histories, in his Commentaries upon the Practice of *Hollerius*.

Diseases of the Mediastinum.

The *Mediastinum* is subject to divers Diseases. Its Membranes are inflamed as in the Pleurisie, because of the neer Neighbor-hood of the Heart, and the communion of substance with the *Pericardium*. The Quittor therein collected, makes an

Inflamation,

Impostume,

Impostume, which is drawn out by perforation of the Breast-bone, or by an instrument fitted for that purpose.

Wind,

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 neer the Heart; which therefore is subject to frequent Swounings; and then the pulse is quicker, the Feaver stronger, the thirst more vehement than in the Pleurisie, or in the Inflamation of the Lungs.

Full 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 wheyish Humors; what if you should boar an hole in the breast-bone, a Thumbs breadth distant from the Sword-like Gristle? because the *Pericardium* is 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.

If there be no water at al in the *Pericardium*, the Heart pines away by little and little, as it has been observed in many Patients.

Worms.

Certain it is, that Worms are bred in the *Pericardium*, which feed upon the Heart, and are destroyed by the use of Scordium. *Petrus Salius Diversus* has

treated

treated of this Diſeaſe. Neither is it any abſurdity, that worms ſhould be found within the Ventricles of the Heart; howbeit they are bred in the *Vena Cava*, and come from thence into the Heart.

Seeing the Heart hangs upon the Breaſt-bone, it wil 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, ſhal require.

[a] *T.* 24. *f.* 1. C C. [b] T. 12. *f.* 1. *B B.* [c] *f.* 1. *ll. o o.* [d] *f.* 1. *a a a.*

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 al the baſtard Ribs, to two of the true Ribs, and to the Sword-like Griſtle; and being on this manner oblickly ſtretched round about, it ſends forth two [b] fleſhy Productions ſomewhat longiſh, even to the utmoſt *Vertebra's* of the Loyns. *Midrifs Situation.*

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*. *Subſtance.*

The Sinewy Circle is placed in the midſt, to ſtrengthen that part, that it may bear the point of the Heart beating thereupon, 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 *Mediaſtinum*: for the Figure of the *Diaphragma*, or midrif, towards the belly, is hollow, within the Cheſt, it is bunching out. *Shape.*

It receives [a] *Veins*, and [b] *Arteries*, termed *Phrenicæ*, from the *Cava*, and *Aorta*. It has two notable [c] *Nerves*, which taking their Riſe between the fourth and fift *Vertebra's* of the Neck, are inſerted into the Sinewy Centre of the *Diaphragma*. *Veſſels*

Seeing the midrif is a muſcle of a peculiar Nature by it ſelf, ſo that there is not ſuch another in the whol Body, it has a perpetual motion like the Heart, if not ſo faſt an one: for it is dilated and contracted; ſomtimes ſlowly, and ſoftly; other whiles ſwiftly, and violently. Somtimes 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. *Motion.*

Hippocrates cals the midrif, the *Fan* of the *Belly*, becauſe by its motion of dilatation and contraction, deſcending and aſcending, it fans both thoſe 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. *How it moves in Reſpiration.*

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 whol 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 haled, 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.*

The

The Medicinal Consideration.

Its Diseases are. The Midrife is somtimes Diseased of it self, somtimes by accident as Sympathising 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 Root of the Midrif, which wasted away the Patients by a slow Consumption, without any Phrenzy or other Dotage.

Inflamation. When the Midrife is *Inflamed*, an acute Feaver 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, somtimes swift, somtimes slow, somtimes great and somtimes little, and at length Convulsions happen.

Wounds. The Midrif being wounded causes the Patient to die laughing, if we beleive *Hippocrates*, *Pliny* and other later Physitians.

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 *Ulisses* (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 whol Body the Midrif is affected, which is known by dificulty of breathing,

Chap. 6. *Of the Lungs or Lights.*

Their Substance. THe 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 spred through the whol substance thereof; such as are the *Bronchia* or [a] 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 [d] Lungs are *Situate* within the Chest, and do with the Heart fil up Both the Cavities thereof, while they are dilated to fetch in breath; but they leave the Chest Empty, while they are contracted to expel the sooty or superfluous breath.

Motion.

Division. These interchangable motions of the Lungs are perpetual and never cease from the beginning of our Life until we Breath our last.

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 whol and sound.

Shape. If you take a diligent view of the Lungs after they are taken out of the Chest, you shal 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 in that Part on which it touches the Back.

Membrane. It is girt about with a very thin [e] *Membrane*, which is manifestly porous and ful 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 shal there at any time abound.

This

This Bowel alone is nourished after another fashion than the rest of the Body, for it borrows its blood from the Heart, from whence it has Vessels and not from the *Vena Cava*. And therefore those Physitians are shamefully over 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. *Peculiar manner of nourishment.*

They cannot receive Humors from the Head unless with coughing, so that where there is no cough, the Lungs are affected only by that blood which comes from the Heart.

The Medicinal Consideration.

The Lungs are extreamly necessary for the maintenance of Life, *For we live so long as we Breath, and no longer*: Nor is it enough meerly to breath we must breath easily, or it wil go ill with our Heart and our whol body. For in Diseases, difficult breathing is of great moment, and was more regarded by *Hippocrates* than the pulse: And *Galen* composed three admirable Bookes of *Difficult Breathing*, according to the Doctrin of *Hippocrates*, howbeit they are obscure and not to be understood save by skilful Physitians and Anatomists. *Excellency of the Lungs.*

I wil give you a little tast of them, after that I have laid open the Diseases of the Lungs.

Because the substance of the Lungs is soft and Spungy 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 Midrif, not only between the Hammer and the Anvil, as the Proverb is, but between two Hammers, wherewith they are beat upon and hurt on both sides: whil 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 viciousnes the Heart is not able to correct, save after many Circulations.

In the mean whil the Lungs are greivously 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 Emunctory Emissary 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 Impostumes and Ulcers, which bring the Consumption: for from spitting of Blood comes spitting of quitter, and from thence the Consumption. *Distemper. Inflamation. Consumtion.*

Also they are subject to a certain kind of Push or rising which in the end turnes into a secret mischievous Impostum termed *Vomica*, of which few escape. *Push. Vomica.*

If the Quitter be derived from the Lungs into the Heart, unless it pass readily into the *Aorta*, it suddainly choakes 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 Patien cannot breath save standing or sitting upright, is termed *Orthopnæa*. *Asthma Its Kinds.*

Often

Cough

Oftentimes 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 feirce *Catarrh* or sudden and plentyful Defluxion. Whereupon by reason of the extreme troublesomness of the Cough which shakes the Lungs, there arises that disposition termed *Spadon Vasorum*, 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 final 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.

If it be true that Blood naturally does pass from the right Ventricle of the Heart unto 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 flowes 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 al Parts of the Body, from the Head, Nose, Tongue, Armes, Feet; that the quantity thereof might be diminished, and the Course thereof drawn from the Lungs.

Affirmed.

He himself in Diseases of the Lungs, bids us draw blood, til the Body were Blood-less, 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* [a] *Arteriosa* into the [b] right Ventricle, the [c] Sigma shaped Valves do hinder it, and the [d] 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 Arm than the left; because the blood cannot return into the *Vena Cava*, save by breaking two doors and Bolts, placed in the Heart.

[a] T. 11. f. 2. EEG. [b] T. 11. f. 3. DD. [c] T. 11. f. 4. BBB. [d] 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 sharpe Serosities, or by spitting of Blood: which if it come from an opening of the mouthes of the Veines by reason of Aboundance 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.

Nature

Nature in this case, out of Pitty, that our life might be preserved, has distinguished the Lungs into divers pipes and sundry Lobes, Laps or Scollups that the infection might not spread over the whol Body of the Lungs, which is usual in al 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, & not through the *Septum Medium* or *Partition-Wal* of the Heart, we must maintain a two fold Circulation of the blood: the one is performed by the Heart and Lungs, whiles 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 returnes 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 fastned to the claves 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 Weiand or Wind-pipe and Parts fastened thereunto would be torn in peices. Howbeit the Lungs and Heart being inflamed (according to *Hippocrates*) if the Lungs fal to one side, the Patient faints away, lies Cold and senceless 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, their is no Disease or Symptom so usual as difficulty in breathing. It is wel for the Patient, if in al Diseases, especially acute ones, he breath easily, because life is inseparable from Respiration, according to *Galen* in his 6. Book of the Parts Diseased. And if with al the Patient Sleeps kindly and sweetly, and feels no pain in the noble Parts of his body, it is to be hoped the Disease wil end wel, because *Hippocrates* never knew any one die, in whom these three 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 Ribbs and whol Chest never moving: unless hapily the lower bastard Ribs are gently stirred; and this kind of breathing is truly natural. *Its twofold. Free,*

The second sort of breathing, which is forced and violent: is partly natural, partly against Nature. Natural, when it depends upon our own power, so that we can make it quicker or slower, as when we puf out our wind with a long blast, and when we hold our breath. It is against Nature, when it depends not upon our wil, but upon the violence of the Disease. In this kind of Respiration the whol Chest is moved by al 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. *and Forced.*

There are two parts of Natural Respiration; *Inspiration*, and *Expiration*.

Parts of Natural respiration

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 sooty 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 *Perisystole*.

Inspiration

Expi ation

Its three Organs.

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.

wherein Natural Respiration consists.

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 Expiration, 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 wil therefore be moderate, wherein we shal observe a Mediocrity of motion and Rest, and of the distention of the Chest, and of the matter it felt, which is drawn in, and breathed out, and wherein Persons in Health appear no waies changed from what they were wont to be.

Differences of unnatural Respiration.

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 in moderate. Now Respiration is hurt as many waies as there are parts which make up Natural Respiration, *viz.* Motion, Rest, Swiftness, or Slowness. So that the hurts of Respiration, are these following, namely, Defections from Natural Motion; Rarity, and Frequency of the Rest; Greatness, and Smalness of Inspiration and Expiration; Plenty, and penury of the matter drawn in, or breathed out, with cold, or heat.

Wherefore al difficulty of breathing, consists in Magnitude, or Paucity; Frequence, or Rarity; Swiftness, 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 wel 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, seldom, and slow; and some are doubled, both in drawing, and rendring back the breath. These are the Compound Differences of Respiration hurt.

whether Perspiration may supply the use of Respiration?

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 whol 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 smal Arteries, unless they did gape very wide, seeing it would meet with the Arterial blood, to stop its course. The Arteries may indeed expel the sooty 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

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 expel smoaky vapors by forcible blowing out of the breath; or to expel the Excrements of the Belly, or to force out a Child by holding the breath. Exsufflation, 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 *Arytbenois*, and the *Glottis*.

Unnatural Respiration sometimes needful in healthy persons.

Chap. 8. *Of the Heart.*

THe Heart is the *Principal, and most Noble Bowel* of the whol Body, the Fountain of Life-giving Nectar; by the Influx whereof, the vitality, or lively force of al the parts, is recreated, and cherished; *It is the first that lives, and the last that dies*: by the benefit whereof, al the parts of the body do live, and subsist.

Nobility of the Heart.

And therefore it is, that Nature has framed this principal Part with admirable Workmanship, both without and within, of a [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 mollified it with fat placed round about, and watered the same by circumfusion of a wheyish Liquor.

Its Substance

[a] T. 11. f. 4 B.

It is scituate in the middle of the Chest, hanging by the [a] *Mediastinum*, and [b] *Pericardium*. For those two parts do joyn in this Office, as hath been said in our Chapter of the *Mediastinum*.

Its Scituation.

The Heart is always of the same greatness; in some strong men it is more small and solid, than ordinary: in feebler Persons it is greater, and of a looser substance, as in some men, and frequently in women.

Bigness

It is *shaped* 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* [c] *Cava*, running through the Breast, and opened neer the Heart, and fastened thereunto; the *Vena* [d] *Arteriosa*; the [e] *Aorta*; and the *Arteria* [f] *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 *Auriculæ Cordis*, the [g] *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 al 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 [h] 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 expels the same, it is contracted, or drawn together: between both which motions, there intercedes a pause, or resting time, which is termed *Peri-Systole*. How these motions are caused, is a doubtful Question.

Systole. Diastole.

[a] T. 11. f. 4. A A. [b] T. 11. f. 1. A. T. 11. f. 1 C. [d] f. 2. E E. G. [e] f. 1. M. f. 2. C. [f] f. 2. H H. [g] f. 4. C C. [h] f. 2. by B.

Rejecting the various Opinions of others, I wil tel 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 *Cone*, 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 Midrif, with its *Cone*, or pointed end, it smites the Nervy Centre of the Midrif, and 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 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 al 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 whol 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 Physitian*, the Author and Inventor of this motion of the blood; and *Joannes Walæus*, a Professor of *Leyden*, and most eager *Defender*, and Protector thereof, wil 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 wal between the Ventricles of the Heart; and that the whol mass of Blood, in an hour, or two hours space, is circulated through the Heart, and the whol Body: which I do not allow of, and I have elsewhere laid down my reasons of the impossibility, and inconveniency of such a motion.

The Heart is the Original 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 smal 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 these sorts of blood being sent into the *Porta*, the other by a branch rooted in the Liver, twice as smal 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 circulated?

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 Cœliacal Arteries, which are joyned 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 al 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 revelled 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 con-

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 into 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 continual 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, ſhal 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 cleerly demonſtrated againſt *Harvey*, and *Walæus*.

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 dayly 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 Ancient 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 Mils, the Water muſt perpetually fal 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 perpetual Dew, leſt by little and little, it ſhould parch, and wither away, for want of that 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 perpetual flowing in of the circulated 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 interchangably; 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 ſhal ſee divided into two Ventricles by the *Septum Medianum*, or [a] 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 wal, reaching as far as the *Cone*, or Point of the Heart, which the Right does not. *The right Ventricle of the Heart.*

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. *Its Veſſels.*

To the Orifices of the *Cava*, are adjoyned certain three-pointed [f] Valves, or Shutters, which hinder the going back of the blood. The Orifice of the *Vena Arterioſa*, *Their Valves.*

terioſa, is compaſſed with three *Valves*, or *Shutters*, ſhaped like an old-faſhioned Greek *Sigma*, which hinder the reflux of the blood.

[a] *T.* 11. *f.* ☉. *D D.* = [b] *f.* ☉. *C C. f.* 3. *D D. f.* 4. *C C.* = [c] *f.* ☉. *B. f.* 5. *C C. f.* 6. *D D.* = [d] *f.* 1. *C. f.* ♀. *E.* = [e] *f.* 2. *E E G. f.* 4. *A. T.* 12. *f.* 3 *all* = [f] *T.* 11. *f.* 3. *C C C.* = [g] *f.* 4. *B B B.* =

The left Ventricle of the Heart. Its Veſſels.

The *Left Ventricle* receives two Arterial Veſſels, the [a] *Aorta*, and the *Arteria* [b] *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.

Their Valves

The *Arteria Venoſa* hath in its Orifice, only *two* [c] *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* [d] *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 neer 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 unmovable, ſaving towards the Baſis, where it is ſofter, and gives way 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* [c] *medium*, or *Partition-wall* of the Heart is porous, ful of little holes, which are ſomtimes 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.

[a] *T.* 11. *f.* 1. *M. f.* 2. *C. f.* 5. *A.* = [b] *f.* 2. *H H. f.* 6. *A. T.* 1. *e. f.* 6. *all* = [c] *T.* 11. *f.* 6. *C C.* = [d] *f.* 5. *B B B.* = [e] *f. O D D.*

The Medicinal Conſideration.

Uſual Diſeaſes of the Heart, are,

Having finiſhed theſe Obſervations, I proceed unto the Diſeaſes of the Heart. The Heart (as *Pliny* tales) cannot endure long Diſeaſes, nor ſuffer lingring torments. And *Galen* tels us, That Phyſitians 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.

Swooning

Wherefore, if the Heart be ſupplied with pure, and good blood, and be not infected by contagion of the neighboring parts, the Lungs, and the Liver, it flouriſhes moſt cheerfully, and cauſes a very long life. But by our Intemperance we ſuffer it not to continue in Health for the good of the whol 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 *Leipothumia*.

Fainting.

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 fulneſs 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 ſomtime 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 dayly Feaſtings, and liberal drinking, eſpecially at dinner, which laſts til within

within Night, they in the mean time taking no care to abate their Plethorick habit by liberal blood-letting. Nor is it any wonder, if from so great plenty of blood, they fal into an Apoplexy, or the Heart-swoonings aforesaid. Hence depends the Explication of the 42. Aphorism of the Second book.

Palpitation

The motion of the Heart is depraved in the Palpitation, or Panting thereof, and it is interrupted in *Syncope*, and *Lipothymia*.

The Circulation intercepted by obstruction of the Ventricles, Or of

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.

Worms are also bred in the Heart, of which *Salius* 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*.

The Veins.

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 *Fernelius*.

A Feaver.

The most frequent Diseases of the Heart are Feavers, wherewith it is inflamed, and roasted as it were; so that the Original moisture thereof, becomes exhaust, and dried up: for as *Ludovicus Duretus* tales in his Commentary upon *Hippocrates* his Coick Discourses: *We lose more of our strength by a feaver of seven daies continuance, than by the deprædation of our Natural Heat, in seventy yeers time: a yong man dies in seven daies, consumed by a Feaver, who might have lived seventy yeers under the sole Regiment of his Natural Heat.*

Differences of Feavers.

The History of Feavers belongs to this place, which I shal 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.

In respect of the Cause, a Feaver is, Spirital,

From the Spirits, a Feaver is termed *Spirituosa*, or Spirital; from the Humors in the Vessels, it is termed *Humoralis*; and from the Humors fixed in the solid parts, it is termed *Hectica*.

Humoral

Though there be three sorts of Spirits, Natural, Vital, Animal; yet is it the Vital Spirit alone, which being inflamed, causes the Spirital Feaver. There are four Humors contained in the Vessels, whence comes four sorts of Humoral Feavers; the Sanguine, the Cholerick, 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 waste; and the *Hectica Marasmodes*, when it is quite exhaust, and consumed.

Hectick,

In respect of the manner, Continual, Intermittent.

The *Modi* of Feavers, or their manner of afflicting, is two-fold: for either the Feaver is continual, or it intermits; it is putrid, or not putrid; malignant, or wel-affected. A continual Feaver never ceases burning, til it go wholly away. An intermitting Feaver, leaves the Patient some space of time free from burning.

Putrid, Imputrid

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 Intermission. 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 al these. A great Feaver is the same with a Malignant, and a little Feaver differs not from a Well-affected. Hence are al the differences of Feavers taken; a spirital Feaver is continual indeed, yet lasts but a Day, and is therefore termed *Ephemera*: a Sanguin Feaver is also continual and three-fold, 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. Cholerick, Melancholick and Flegmatick Feavers, are continual,

Malignant, Non-malignant.

tinual, when the Humors from whence they arise do Putrifie in the great Veins: when they Putrifie in the little Veins, or out of the Veins, they make Intermitting Feavers. An Hectick Feaver is also continual, but slow and lingering.

The fit of a Feaver. The Return of intermitting Feavers is termed their fit; the more than ordinary violence of continual Feavers it 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.

Its Exacerbation.

Circuit

Now the Accessions or exacerbations of Feavers are various according to the various motion of the Humor. They come every third day, by reaton of the proper motion of Choler, whence al bilious intermitting Feavers are called *Tertians* or third day Agues; as the Quartans come every fourth day, becaule the Melancholick Humor is moved upon that day; as Flegm is moved every day, whence quotidian Agues are Flegmatick.

Tertian Feaver.

Quartans

Quotidians

Quintan, *Septan*, *Nonan*, or fift, 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 shewes 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 mere simple coldness, is the token of a Quotidian.

A double tertian comes every day, as the Quotidian does, but with extream shaking; whereas the Quotidian comes only with a coldness.

Confused. Confused and implicated Feavers, are made of those Feavers, which we have now explained. Confused or mixed Feavers, are made by mixiture of the Humors, as a Bastard Tertian is made by a mixture of Choler and Flegm. But Implicated Feavers are stirred up by Vicissitude of Humors put into Putrefaction or Commotion, where upon there is observed in them, distunct fits one following another, as in a double Tertian, and in a double and triple Quartan, and in a Semitertian, which is nothing else but a complication of a continual Quotidian and an Intermittent Tertian: and in the Feaver called *Triteophyæa*, which lasts thirty hours and longer.

Implicated

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 inordinat keeeping no certain Course, and returning upon several daies, they make such Agues as are termed *Erraticæ*, wandring 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 al 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, becaule the Feaverish Heat is drawn inwards.

Typhodes. *Typhodis* and *Eleodis* 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 extream and remarkable putrefaction, and so deadly, that more die than recover.

Burning Feaver. *Causus* is a name signifying extream Heat and burning, such as is in a continual Feaver arising from Choler, so that a Cholerick continual Feaver by way of Eminency is so termed.

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.

Chap. 9. *Of the Vessels* viz. *Veins, Arteries and Nerves conteined within the Chest.*

I Have a few things to speak of one Part of the Trunk of *Vena Cava*, for the whol Trunk has been sufficiently explained in our Chapter of the lower Belly. *In the Chest are Veins.*

You shal observe that the Trunk piercing through the Midrif, does receive that same [a] Hepatick branch which arises from the top of the Liver, and carries Blood 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. *Hepatica*

[a] *T. 12. f. 1. r r. &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 Limbes, with that blood which descends from the Head by the Veins.

You shal 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 revelled 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 shal 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 shal 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 Kidneys. 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 shal 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-Pits. 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. t. 12. f. 1. a a a.*

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 *Mammaria*

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 along unto the Right or streight Muscle, that it may Joyn it self to the *Epigastrica*. *Hippocrates* was wont to open the external, in Inflamation 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 Horse-leeches may be applied, or Cupping-Glasses with Scarrification.

[a] *T.* 12. *f.* 2. *bb.* [b] *T.* 12. *f.* 1. *cc.*

Thymus a Kernel so called.

In the parting of the *Vena Cava* you shal 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 yong 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.

By the swelling of this Kernel, Strangulations or a sence of Choaking may happen even to Men, but in Women subject to the Mother it is more frequently swelled, and Choaks them if they be not releived by Blood-letting. Some do recken up three smal Veins which are termed *Thymica*, *Capsularis* and [a] *Mediastina*: whereas notwithstanding the *Capsularis* and *Mediastina*, are one and the same Vein.

Mediastina

Cervicalis.

From the [b] Ramus Subclavius, four notable branches do arise. The first is cal- *Anterior* [c] *Cervicalis* the foremost Neck-Vein, which being drawn out upon the *Musculi Mastoides*, ascends unto the Chin and Waters the fore Parts of the Neck.

Internal Jugular.

After this follows the [d] *Internal Jugular*, being larger than the external, which ascends unto the Neck under the *Musculus Mastoides*, and about the middle thereof, it is divided into three Branches, one of which being greatest and thickest, creeping along the *Vertebra's* goes under the Scul, making its entrance at the hole which is near the *Apophysis Styloidea*, so as being applied 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 *Ranulæ* or Veins under the Tongue, the opening of which does wonderfully help in Diseases of the Brain.

External Jugular.

A Finger-breadth distant from this Vein you have the *Externa* [e] *Jugularis*, which creeping aslant or sloaping under the *Clavicula*, it sends forth two twigs, whereof *the one* passes Obliquely unto the *Delta*-shaped Muscle under 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 al 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 likwise that an Issue made, or a caustick applied to the Cavity behind the Eare, 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 sleepy Diseases, is very good, as many Histories do testifie: but many wil 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 safely be opened. And therefore that same opening of the Jugulars which is so much spoken of, is to be understood of the external Jugular, and not of the internal.

Arteries.

And because the Arteries and Veins are alwaies contiguous and coupled together, in the same Line you shal look for the *Trunk of the* [a] *Aorta ascending*. Springing out of the left Ventricle of the Heart, it does presently even in its Rise produce the two [b] *Coronary or Crown* Arteries, which do compass the Heart like a Crown.

Coronarie

These you wil 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 shal 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 [c] *Ascendent*, the other [d] *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.*

Subclavia

The ascendent is triparted, three Arteries being brought from the same place; that on the right side ascending to the Claves, makes the [a] *Subclavia dextra*; the other two ascend unto the left side; the first whereof, is called *Carotis* [b] *Sinistra* going upwards; the second is named [c] *Subclavia sinistra*; and a while after [d] *Axillaris*, when it is come as far as the Arm-pits, and sends forth the [e] *Arteria Cervicalis*, neer the Shoulder-point.

Axillaris.

The *Right Subclavian* Artery having over-past the Claves, does produce that Artery which is termed *Carotis* [f] *Dextra*, which neer the corner of the lower Jaw-bone, is like the internal Jugular Vein, divided into *two notable Branches*, the [g] Internal, and [h] External. They are termed *Arteriæ Carotides*, Sleepy Arteries; because they being compressed, do make a man fal 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 sixt Conjugation.

Carotides.

Galen, in his Book, of the Utility of Respiration, does conceive, and proves by making experiment in Live Creatures, that Animalls are no way offended by tying or straitning the Jugular Arteries; and therefore he refers the Sleepy-Evil to the Jugular Veins. I shal rather think, that in Apoplexies and Dead-sleeps the Arteries are stopped, than the Veins.

whether the obstruction of the Carotides do cause deep Sleep?

Valverda does certifie 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 Skul may be plainly perceived, you shal put in a very small brass Wire that wil 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 shal 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. δ δ.* [f] *f. 4. a.* [g] *f. 4. c.* [h] *f. 4 b.*

The Intercostals.

The Trunk of the *Aorta* being writhen towards the left side, and bent downwards again, is born up by the *Vertebraes* of the Back, and in its progress as far as the *Os Sacrum*, out of each side produces as many Arteries as there are *Vertebraes*, neither is here 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 Inflamation of the Lungs, fel 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 translation 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 Feaver, by translation 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 serous Humor may be derived into either side.

By the same Reason, the serous matter may through the Celiack 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 revelled by the *Aorta* into the Mesentery.

Nerves. In the Chest we are to take notice of eight remarkable Nerves or Sinnews. Two of which are called *Diaphragmatici*, two are termed *Recurrentes*, two *Stomachici*, and two *Costales*.

Diaphragmatic *Diaphragmatici*, the Midrif Nerves, taking their rise between the [a] fourth and fift *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 sixt Conjugation or pair, whose Trunk you shal seek for in the Neck near the internal *Jugular*, by the *Apophysis Mastoides*; where it is cleft into two branches, the one of which is dissemmiated 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 shal 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 voyce, and being united the voyce 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 *Os Hyoides*, which arise from the Inferior Parts.

Stomachic. You shal 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 shal perceive ten or twelve twigs drawn into the [a] Lungs; and of the final branches of the two Stomachick 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. AB. [b] T. 3. f. 1. ζζ. [c] T. 3. f. 8. III. & 16.

Afterwards

Afterwards the Stomachick Nerves creeping along the hinder Parts of the Stomach, are near the Back-bone between the two Kidneys Joyned to the [e] 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 [c] Anatomists derive the Costal Nerve from the sixt pair, when as in the mean while, it arises from the same point of the Brain from which the sixt pair arises. *Costal*

The costal Nerve, being come without the Scul, 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 smal 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 smal Nerves proceeding from the Marrow of the Back.

Having pierced the Midrife, 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:

THE

THE FOURTH BOOK OF THE ANATOMY AND PATHOLOGY OF John Riolanus, THE KINGS PROFESSOR OF PHYSICK.

Chap. 1. *Of the Head.*

Why the Head is placed in the highest place?

THE Head being the Seat of the Soul, the Mansion-House of the Brain, is placed aloft in the highest part of the Body, as it were the prime Castle, which commands, and bears Rule over the whol 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 wel framed, ought to be of an indifferent Size; for a great, and a little Head, are disallowed, and dispraised.

Shape,

The Natural Figure of the Head is round, or spherical, somwhat longish, bunching out before and behind, with two Eminences, and a little flat, or compressed towards the Temples.

Division.

The Head is divided into the hairy Part, and the smooth Part, so long as it is whol, and unparted: The smooth part is termed the *Face*, and thereunto is the Forehead

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] Skul, and the two Jaws, the [b] upper, and the [c] lower; and the Forehead appertains unto the Scull.

Again, The whol 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 Hairs turn, is termed [e] *Vertex*: the hinder part is called [f] *Occiput*; the lateral parts are called *Tempora*, [g] the Temples, or Times; because they discover the Times of a mans Age by their hollowness, hoarines, or baldnes.

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 Particles as are included in their Cavities.

The first containing part we meet with, is the [h] hairy Skin, which has also its *Epidermis*, or Scarf-skin. Under the Skin, lies the Fleshy [i] Membrane, which is the Foundation, & 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 *Pericraneum* follows, which does immediately compass the bony Skul. It is produced from the thick *Meninx*, which in Children, goes through the Sutures, at what time they are not firmly closed, nor joyned Tooth within Tooth. *Pericranium*

[a] *T.* 15. *f.* 3. *A B C.* [b] *f.* 5, *and* 6. [c] *f.* 3. *L M N.* [d] *f.* 3. *A.* [e] *f.* 3. *B C.* [f] *f.* 4. *C. f.* 6. *A A.* [g] *f.* 3. *D. f.* 6. *B.* [h] *f.* 1. *A A.* [i] *f.* 1. *B B.* [k] *f.* 1. *C C.*

Besides the *Pericranium*, there is scraped from the Skul, as from other bones, the *Periostium* being a thin Skin, which immediately covers them. Wherefore the *Pericranium* is not the Periosteon of the Skul, but is spread out upon the Skul by a great Providence of Nature, that it might hold fast the Muscles which arise from the Skul, such as are the temporal Muscle, the strongest in the whol Body, which with its companion, contracts, and lifts up the Jaw, and bears greater burdens in some bodies, than the other Muscles acting al together. *Periostium* *Its use,*

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.

These Membranes being separated, and plucked off, and the [a] Skul having its Cap taken off, it presents it self to our sight, being framed together of many bones, which are joyned one to another, by looser, or faster Sutures, or Seams. *The Skull,*

Somtimes there are no Sutures, or Seams to be seen, when the Skul is one continued bone. But the History of the Skul appertains to that double *Osteology*, or Bone-story; the one of which has been premised unto this Work, and the other shal be demonstrated at the end hereof.

[a] *T.* 15. *f.* 1. *D D.*

The Medicinal Consideration.

The Head being the Fountain, and Original of almost al Diseases, according to *Hipyocrates*, by reason of Fluxes of Rhewm, 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 fal 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 weakened. 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 applied, 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 wil 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 more exposed to the Injuries of the ambient Air.

These Inconveniencies 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 final Pores, gains the form of a thred. The hurting of this Action, is a Symptome of the hairy Skin. The hurt thereof is three-fold, it is diminished in the Disease termed *Ophiasis*, in which the Hairs fal 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-fal of the hairs. *Ophiasis.*

The Cause of the 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 color 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 Hectical 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 Symptome 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 wel 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 allaied 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.

Daddruf 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 *Porrigo*: 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* cal 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* cals 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.

Hydrocephalos, 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 al ſides. *Head-droyſie.*

In Infants 'tis cauſed by ſqueezing of the Childs Head at the time of Birth. In thoſe that are grown up, the cauſe hereof is a cold and moiſt diſtemper of the Head and whol Body, or a tranſlation 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.

Phthiriaſis, 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. *Louzie 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 Flegmatick 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 Skul 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 pliable, 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 [e] *Meninges*. The *firſt Coat, or Covering*, is called [e] *Craſſa Meninx*; the ſecond [f] *Tenuis Meninx*. The Arabians termed theſe Membranes, *Matres*, 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* [g] hard and thick, being united to the Sutures of the Head, ſuſpends the whol buſk of the brain; theſe Connexions muſt be viewed when the Skul is taken off. In the thick *Meninx* are obſerved innumerable [h] Veſſels, wherewith it is ſprinkled and ſtrewed: they are rather Arterial than Venal, being produced from the *Rete 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. A A.* [c] *f. 6. A A.* [d] *f. 6. D D.* [e] *f. 1. A C. f. 2. B. f. 3. H. &c.* [f] *f. 1. B B.* [g] *f. 1. A A. &c.* [h] *f. 1. a a.*

Now the Pipes belonging to this Coat, are four; whereof two are lateral, which run along the ſides of the *Sutura Lambdoides*, that they may receive the blood *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] *Choroides*, which is dispersed through al the Ventricles, unto the Basis of the Brain.

Plexus Choroides.

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.

These lateral Channels, 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, subtile, 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. & b. = [b] f. 2. aa. f. 5. cc. = [c] f. 5. ee. = [d] f. 3. DE = [e] T. 17. f. 1. OO RR. T. 16. f 3. FF. f. 5. ff. = [f] T. 17. f. 5. F. =

Now this Menbrane, 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

Tenuis Meninx

The *Tenuis* [b] *Meninx* follows, which immediately incloses the brain, being closely conveighed into the windings and turnings thereof; for the substance of the brain, is [c] without, after a wonderful manner, ful 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 beleeve that there was the beginning of the Veins.

Why the Brain is full of windings and turnings?

The *Tenuis Meninx* is three times so long as the *Crassa Meninx*, because it passes into the inner Parts of the Brain, and as a Veil it covers and separates, and divides the whol 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 mal quantity of the [c] *Corpus Callosum* being cut of, the *Two* [c] *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.

They are separated by a *Thin Membranous Partition*, which is framed of the *Septum lucidū.* *Tenuis 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. EE. = [b] f. 1. BB. = [c] f. 1. bb. = [d] f. 2. BB. f. 3. BB. = [e] f. 3. DD. EE. f. 4. CC. DD. =

[a] T. 16. f. 3. G. =

The

The former Ventricles are perforated in the forepart towards *Os Ethmoides*, that the serosities may flow down from the superior Parts to that place.

Above the foremost Ventricles there is spred out a [b] Tripartite body, which is termed *Corpus Psalloides*, 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:* *Fornix.*

The other foreward [e] Colomne, is placed between the two Ventricles. If you shal follow those two lateral *Columnes*, you wil 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 knowledg, is principally contained, in the former Part of the Brain, and that from thence the Animal spirit is drawn, which is administred 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* [f] *Ventricle.* In the Basis of which Channel there is seen an [g] hole, which penetrates into the *Choana*, to purge out Wheyish Flegm into the throat, near the Palate. *The third Ventricle.*

In the sides of this Channel, the *Circumjacent Eminences* do form, some the [h] *Nates* or *Buttocks*, others the *Testes* or [i] *Stones.* For so those *Eminencies* or *bunchings out* are termed, being interchangably disposed, and from that Channel, the *Hole* which goes into the fourth Ventricle, is termed *Anus* or the [a] Arse-hole. *Nates. Testes. Anus.*

[b] T. 16. f. 3. b b. f. 4. B. [c] T. 17. f. 1. G G. [d] T. 16. f. 4. b b. c c. &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. b b. [i] T. 16. f. 4. c c. T. 17. f. 1. M M.
[a] 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 shaped like a Pine-Apple. And over this Channel and the fourth [c] Ventricle, is a thin Membrane stretched out, derived from the *Tenuis Meninx*, upon which runs the [d] *Plexus Choroides*, diffused through the foremost Ventricles. *Conarium.*

In the entrance of the fourth Ventricle, there is placed a certain portion of the Brain more firm than ordinary which represents the taile of a River-Crab when the shel is peeled off. It is called *Scolicoides* and *Vermiformis* [e] *Processus*, the *Worm-fashioned Production*: is opens and shuts the passage into the fourth Ventricle. This is placed in the *Cerebellum* or Petty Brain; which contained within it selt the two hinder most 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.* *Processus Vermiformis.*

In that same [f] fourth Ventricle, there appeares a certain [g] Chink like a Writing-Pen, which is the Separation of the Marrow of the Back. *The fourth Ventricle.*

The Petty-Brain being pulled asunder, you shal see how it conteins 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 ful 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. F F. T. 17. f. 1. O O. R R. [e] T. 16. f. 6. E. T. 17. f. 2. C C. [f] f. 1. N N. f. 2. D D. G G. 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.

Pelvis. *Glandula Pituitaria.* *Tubuli.* *Seven pair of Nerves.*

If you shal gently draw upwards the formost Part of the brain, as far as its basis, you shal observe the [k] *Optick Nerves*, and the Nerves, serving for [a] *Motion*, and then the [b] *Choana* or tunnel dropping Wheyish moisture upon the [c] *Glandula Pituitaria* or *Flegm-Kernel*, which fils up and possesses the *Sella Equina* or *Horse-Saddle*. In the *Choana* or *Funnel* you shal see *Four Pipes* distilling Wheyish moisture into the Palate and throat. Then you shal 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*;
[f] Third *and* Fourth *tast*, [h] Fift *hears and makes us Wise.*
The [i] Sixth *is large and wanders all about*:
[k] Seventh *Larynx moves a prating Tongue so stout.*

Rete Mirabile.

Then you shal 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 sleep Arteries.

You shal 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 Eare, and by a little Channel slides down into the Palate, and is distributed into the inner Part of the *Larynx*: from whence comes that same Concent 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. *B B.* — [a] *T.* 18. *f.* 1. *C C. f.* 3. *G G.* — [b] *T.* 18. *f.* 3. *D.* — [c] *T.* 18. *f.* 1. *B B. f.* 3. *B B.* — [d] *f.* 1. *C C. f.* 3. *G G* — *f.* 1. *D D. f.* 3. *H H.* — [e] *f.* 1. *E E. f.* 3. *I I.* — [f] *f.* 1. *F F. f.* 3. *K K.* — [h] *f.* 1. *G G. f.* 3. *L L. T.* 3 *f.* 8 *all* — [i] *f.* 3. *M M.* — [k] *f.* 3. *P P.* — [l] *f.* 3. *C C.* — [m] *T.* 18. *f.* 1. *F F. f.* 3. *K K.* —

Observe Whether or no they be intersected Crose-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 smal threds? Whether the other Nerves differ from the Optick Nerve.

I wil 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 contein 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 *Diastole* and *Sistole*, after the manner of the Arteries, but only the *Crassa Meninx*, which is sprinkled al over with Arteries, arising from the wonderful Contexture 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, in asmuch as by Circulation, it sends back the 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 fals down into the lower Ventricles, that from thence it may flow through *Os Ethmoides* into the Noſtrils: if the *Os Ethmoides* or Colander-bone be obſtructed, it diſtils by the *Choana* or Funnel, or by the little holes over the Funnel, into the Palate and Jaws or Throat.

whether or no and how the blood is circulated in the Brain.

The Circulation of the blood is performed in the brain, with a ſlow pace. The blood rites out of the Netlike-Contexture, by the Arteries of *Dura Meninx*, unto the foure Channels; afterwards it deſcends by the Veins unto the Heart, having been plundred of its ſpirits, which the brain drank up. And ſo the blood being cooled, is ſaid to coole the Heart. Of al which I ſhall treat more fully in my *Anthropographia*, or large Deſcription of the body of Man.

What Blood the Brain is nouriſht with?

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 looſe none of their ſubtility, 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 diſtils 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 interior Parts.

What Blood comes away in the Noſe bleeding.

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 coole the body and extinguiſh the Feaver. And therefore refrigerating and aſtringent Medicaments are to be applied, not only to the hinder Part of the Neck, but alſo before upon th Carotick or ſleepy Arteries.

Whether the Air goes which is drawn in at the Noſtrils?

Whether it is mingled with the Spirits?

You ſhal obſerve that the Air drawn in by the Noſtrils, 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 ſubtile, otherwiſe by permiſtion or mingling of the Air, they would become more thick and would not run ſo ſwiftly by the Nerves al 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

The Manner of Diſſecting the brain and the Hiſtory of its Parts.

Now that the brain may be demonſtrated after that manner, which *Varolius* deſcribes *in a particular Book*: You ſhal ſaw in ſunder the Scul 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 Pinſers you ſhal take of 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*[a] *Meninx* from the Scul round about with help of a Spatula, leave it at the Baſis of the Scul, where it ſticks exceeding faſt to the Bones. Then you ſhal take out the Brain and as much of the Spinal Marrow as you can both at once, and let ſome body hold the Brain turned upſide down in both his hands whiles you ſhal diſſect it.

But you ſhal firſt ſearch within the *Dura Mater* for thoſe four bendings or Hollowneſſes, for the place of the[d] *Preſs*, the *great Vein deſcribed by Galen* which makes the *Plexus*[e] *Choroides*, and that diviſion of the brain which reſembles a[f] Sickle: Afterwards returning to the Baſis of the Brain, you ſhal 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 ful 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[g] Net, made of Multitudes of

ſmal

ſmal Arteries, ſpringing from the [h] Carotick Arteries and two other [i] aſcending through the holes of the Vertebraes of the Neck; but it will be torn, which cannot be prevented. Now each of the Carotick or Sleepy-Arteries enters within the Scul divided into two, to Weave that ſame wonderful Net, 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 Scul, and within its Cavity, containes certain very *ſmal 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. *A A. f.* 2. *D D. &c. T.* 17. *f.* 1. *A A.* — [b] *T.* 17. *f.* 2. *I I.* — [c] *T.* 16. *f.* 5. *a b c e.* — [d] *f.* 5. *F.* — [e] *f.* 5. *f f.* — [f] *f.* 2. *A A. f.* 5. *E E.* — [g] *T.* 18. *f.* 3. *P P P P.* — [h] *f.* 3. *C C.* — [i] *f.* 3. *O O.* —

Then you ſhal obſerve that the *Proceſſus* [a] *Mammillares* or Teat-like Productions do not run out ſo far as *Varolius* has deſcribed them.

Then you ſhal 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 ſhal obſerve that the Veins of the *Plexus* [d] *Choroides* deſcending to the Baſis of the [e] Brain, are interwoven with exceeding ſmal Kernels.

In that place the *Plexus Choroides* is more eaſily diſcerned, than upon the foremoſt Ventricles.

Afterward, you ſhal contemplate four *tuberous Eminencies*: two [f] before, ſcituate 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 Eminences of the Brain. The other two ſhort ones, are carried within the petty brain; which a thickened Portion of the Marrow of the ſaid petry-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. *a a.* — [b] *T.* 17. *f.* 1. *T.* — [c] *f.* 1. *S S. V V.* — [d] *f.* 1. *O O R R.* — [e] *f.* 1. *P P.* — [f] *T.* 16. *f.* 4. *c c.* — [g] *f.* 4. *b b.* — [h] *T.* 18. *f.* 4. *by C C C.* — [i] *f.* 3. *E.* —

When you have viewed al theſe things, you ſhal paſs over unto the [a] Petty-brain, where you ſhal ſeparate from the Spinal Marrow the *Proceſſus* [b] *Vermiformis* which lies between the two *Tuberous 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 ſhal cut a ſunder [d] the little Bridg, 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 ſhal 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 Roofe of the Ventricles, but beneath it is looſe, and free from al ties, that the paſſage of the Spirits might be free.

But you ſhal 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

of the Ventricles; the fore most bifurcation cleaves unto a little transverse cord, which resembles the Optick Nerve in thickness and in Color.

The same partition which is termed *Septum* [i] *Lucidum*, being pulled back, you shal manifestly descern the Vault of the Ventricles, which is called *Corpus Psalloides* or Harpe fashioned body; also you shal see that the foremost Ventricles make but one continued Cavity.

[a] T. 16. f. 6. D D. T. 17. f. 2. A A. T. 18. f. 4. A A. [b] T. 16. f. 6. E. T. 17. f. 2. C C. [c] T. 17. f. 2. D D. &c. T. 18. f. 4. F. [d] T. 18. f. 4. by C C C. [e] T. 18. f. 4. D D. [f] T. 16. f. 3. D D. E E. f. 4 C C. D D. &c. [g] T. 16. f. 3 G. [h] T. 16. f. 3. b b. f. 4. B. T. 17. f. 1. F. G G. [i] T. 16. f. 3. G. [k] T. 16. f. 3. bb. f. 4. B. T. 17. f. 1. G G. F.

Mean while you shal 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 interior 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 shal observe that al the [b] Nerves even the Optick ones, do arise out of those same Roots of the Spinal Marrow: and therefore al 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 shal 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 shal likwise 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 [d] *buttocks* are portions of those Roots which are derived from the Petty-brain.

And if you shal 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 *Varolius*, you wil find it larger and different from his. And he that wil take pains to do as much, after he has once or twice seen me demonstrate these things, he wil acknowledg the truth of them with admiration.

[a] T. 17. f. 2. D D. T. 18. f. 4. F. [b] T. 18. f. 13. &c. [c] T. 16. f. 4. c c. [d] T. 16. f. 4. b b.

Now that in the brain the Diseases & Symptomes thereof, may be distinguished as much as may be by their proper places, the whol bulk of the brain must be divided into three Parts, *viz.* The [c] brain properly so called, the Petty-[a]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 shal observe the Turnings and Windings of the brain, the [d] Sickle, and the *Corpus* [e] *Calloſum*. *The Parts of the Supreme Region*

In the Middlemost which is beneath the [f] Vault, you shal observe the Arched seeling of the said Vault, being the Root which is placed over the Ventricles; the Partition-Wal, born up by 3 three Pillars; three [h] Ventricles with certain [i] Eminencies, which make up a Channel to the fourth Ventricle. *Of the Middle Region.*

And then you shal observe the *Plexus* [k] *Choroides*, the [l] *Conarium*, and the [m] Petty-brain, and the [n] fourth Ventricle therein concealed.

In

Of the lowest Region. In the lowest Region, you shal mark the [o] *Choana*, or Funnel, the *Glandula*, or [p] Kernel; the Mammillary, or Teat-like [q] Productions; the seven [r] Pair of Nerves; the [s] *Rete Mirable*, or wonderful Net; and the Roots of the Spinal [r] Marrow.

[a] T. 16. f. 6. D D. &c. T. 17. f. 2. A A. &c. = f. 2. ll. T. 18. f. 4. D D. = [c] T. 16. f. 1. bb. = [d] f. 2 A A. f. 5. E E. = [e] f. 2. B B. f. 3. B B = [f] f. 3. b b. f. 4. B. T. 17. f. 1. F G G. = [g] T. 16. f. 3. G. = [h] f. 3. D E. f. 4. C D. &c. f. 4. E. = [i] f. 4. b b c c &c. = [k] f. 5. & 6. ff. T. 17. f. 1. O O R R. = [l] T. 16. f. 4. a. T. 17. f. 1. L. = [m] T. 16. f. 6. D D. T. 17. f. 2. A A. &c. = [n] f. 2. D D. G G. T. 18. f. 4 F. = [o] T. 18. f. 3. E. = [p] T. 18. f. 3. D. &c. = [q] f. 3. a a. = [r] f. 3. B G H I K L M. f. 1. B C D E F G. = [s] f. 3. P P P P. = [t] f. 4. D D. &c. =

And forasmuch as *Casparus Hofmannus*, in his Book against *Montanus*, and in his *Institutions*, cals 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 shal briefly examine his, by him supposed invincible Arguments, because no man has yet had the Courage to contradict them: only I shal 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 *Rete 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 Skul, that when that Membrane is broken, the brain remains immovable.

Seeing therefore the foremost Ventricles are opened in the Basis of Brain, and equal in their widness to the upper Cavities of the said Ventricles, and are close unto the *Rete 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 streight 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 Root, and fore, and after parts, are made up by the double *Apophysis Scolicoides*.

Those four Eminencies are Spongy, and receive Spirits, which run 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 whol 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, al 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.

2d 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 entered 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 whol 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 slides into the inferior parts, and by the Press, or that great Vein which Constitutes the *Plexus Choroides*, it flows into the Ventricles.

More probable it were to assign the Seat, and Shop of the Animal Spirits in the *Plexus Choroides*, which is diffused through al 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.

3d 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 *Meninx*, the passage is thereby the safer into the fotemost 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 Meninx*, distilling into the brain, does on al sides afford Spirits to the whol 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 Surety, 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 same hole is exceeding smal, and so deep, even to the *Os Sphenoides*, that it can equal the length of a mans Finger.

You who beleeve 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 whol 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 your 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 Funnel, can purge away any wheyish Excrements which shal be in the Ventricles; but the greatest part, flowing down by the external windings of the brain unto the basis, fals partly into the *Os Ethmoides*, or Colander-bone, partly it descends to the basis of the brain; and if not by the *Choana*, yet by other holes neer 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 shal 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-weather*. 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 whol Doctrine of Diseases of the Brain: and that I may declare so much, I wil chuse out only two Diseases, which have their Seat in the Ventricles, *viz.* The *Epilepsie*, and *Apoplexy*.

The Apoplexy he makes to be in the whol Substance of the brain, not in the Ventricles: The Epilepsie, he wil have to be caused only by vapors ascending into the Head, and diffused through the whol 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 whol 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 Press introduced by *Nymmanus*. But if the Torcular, or Press is obstructed, which is the fourth Channel carrying blood into the *Plexus Choroides*, 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 discussed, 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 to 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, Cholerick, 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 distil 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 al Diseases that are caused by content, or sympathy, without matter, only by evaporation, are not so dangerous, as if they were bred within the brain, so as that the morbifick 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 encreased

creased, 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 Press: which being obstructed, is thought to cause the Apoplexy, the passage of the Spirits to and fro being intercepted. Which I do not beleeve, 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 Choroides*, 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 Choanæ, or Funnel.*

If the anterior, or foremost ventricles, are perforated into the Nostrils, the obstructions of those passages, wil be very hurtful 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 *Siriasis*, or Dog-day madness; but not any *Paraphrenitis*. *Siriasis.*

Siriasis is termed from the Dog-Star; for in the Dog-Daies chiefly, it afflicts both Boys, and elder persons; and therfore 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 Feaver. *Frenzy.*

The brain may likewise swel, by reason of a Commotion thereof from some internal Cause, it is called *Ecplexis*. 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 al the Disorders of the Head, which have been observed by Experience, are Symptomes, and not Diseases.

But he elegantly, according to his wonted fashion, does *divide the Symptomes 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.*

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 Symptomes of Fancy and Reason depraved, such as are, Dotage, Melancholly, Ecstasies, Lycanthropy, Madness. Also the Symptomes of Memory abolished, such as are Forgetfulness, Foolishness, Doltishness, and blockishness. Symptomes consisting in the Cavities, and passages, are very many, appertaining to Sence and Motion; and to sleeping and waking, as dead sleep, sleeping Trance. Symptomes of Motion are, Walking in ones sleep; to be taken stiff, as it were blasted, or Planet-struck; the Night-Mare, Convulsion, Falling-sickness, Unquietness, and tumbling, Shivering, Shaking, Trembling, Palsies, Feebleness of the Limbs, and Apoplexy. *Or Membranes.* *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, *Rheumatismus*, Bleeding at Nose. All these Symptomes aforesaid, I wil 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 Cholerick Distemper of the Head: a heavy pressing pain, shews a Flegmatick Distemper: a panting, or pulsing pain, argues somwhat of an Inflamation: 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 whol Head, or in the half, or in some one particle thereof. If it infest the whol Head, it is called *Cephalalgia*: if half the Head, *Hemicrania*, because the brain is divided into two parts: If the pain possets 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 *Cephalæa*; which together with the *Hemicrania*, is periodical; but the *Cephalalgia* is a continual univerial Head-ach.

A continual Pain of the Head joyned with a continual Feaver, 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 *Secundary*, and by *Sympathy* from other parts: These are not so dangerous as the former.

Symptomes 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 Chymerical.

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 Fansie, 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.

Ecstasie.

The Melancholy *Ecstasie*, is an excess of Melancholy, which is three-fold: An Ecstasie simply so called; an Ecstasie with silence; an Ecstasie with a Frenzy: they are caused by black Choler, according to the divers degrees of its Adustion.

Foolishness with laughter is better and safer, than with seriousness and fierceness. Raving without a Feaver, is so much the better by how much the Parts under the short Ribs, or the Brain, are less heated.

The Resting, and binding up of the Sences, 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 idlely, the Disease is called *Typhomania*.

Coma, or Dead sleep.

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 Theif that has laid hold upon them to Rob and Murther them.

The abolition of all sence and motion saving Respiration, is called *Catalepsis* or *Catoche*: whereby a Man is Frozen as it were in that posture he was in when the fit seazed upon him. It springs from a Cold distemper of the Brain with Flegm. *Catalepsis.*

Carus is a deep Sleep, which comes upon Feavers and wounds of the temporal Muscles, or from an hot and moist distemper, or from much evaporation with serosities, moistening the substance of the brain. *Carus.*

A Lethargy is an Imminution of sence and Motion and also of the Memory of necessary things. It Springs from a Primary hot and moist distemper of the brain, joyned with a putrid Humor which provoks a Feaver and cherishes and keepes it up a long time. There is also Dotage adjoyned. Touching this Disease there is a saying of *Hippocrates* in his Coicks Page 75. Which explaines all the Symptomes thereof. The existence or particular Nature of the Lethargy and *Coma*, consists in a lootness, 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 followes some other Sleepy Disease. It is an Abolition of sence 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 Weasand. *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 smal 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 discussed, 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 discussed into the spinal Marrow Death fallows 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. There ore they are termed *Carotides*, because being obstructed they cause *Carum* or the Sleepy-Evil.

In the Apoplexy and Sleepy Diseases, besides general Medicines, as blood-letting liberally twice or thrice repeted 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 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 applied 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 Nostrils *Cure of the Apoplexy, Carus and such like Diseases.*

Nostrils by a syring, and within the furrows placed between the spaces of *Os Vomeris*: 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 administred, and without Precipitation.

You shal observe also, that a great Part of these Humors is gathered together in the turnings & windings which are outmost in the upper substance of the brain, which do either putrifie 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 sence and motion, not in the whol 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 sence is taken away, the motion remaining unhurt: and somtimes motion is taken away and the sence 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.

Somtimes 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 sence are only dulled, the Disease is termed *Stupor* or *Nothrotis*, which arises from a moist distemper of the brain. A Stupidity or dulness of sence and motion in a Feaver, is wont to foretel a sleepy Disease to follow. When it comes alone without a Feaver, it foretels a Palsie or an Apoplexy.

Vertigo. *Vertigo*, is a depravation of sence and motion, which makes the Patient think that al 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 darkness before the Patients Eyes, it is called *Vertigo Tenebricosa* or *Scotodinos*. It arises from the Brain or from vapours 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, *Emprosthotonos*, when the body is bent foreward; *Opisthotonos*, when the body is drawn backward: and *Tetanos* when both sides remain stif, 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 stif as a dried Lutstring; this is incurable. In one word, all Convulsions are said to arise either from too much emptyness, or over fulness.

Falling-Sickness. An Epilepsie or Falling-sickness, is a Convulsion of the whol body, coming by fits, and hurting the Mind and sences. It is caused by an obstruction of the foremost Ventricles of the brain, caused by an Abundance of sharp Humors, either, Cholerick 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 venemously 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 venemous Air or vapour, which is exceeding hurtful to the brain; and therefore he conceives, it must be cured with specifick and appropriate Remedies, as wel as those vulgar ones.

Trembling is a depravation of Motion through weakness. It is caused by the weakness of the motive faculty and the bodies heavyness. So that look how much the motive faculty endeavours to lift up the Member, so much does the heavyness 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-Tromos*. *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 Impostumes, when the Impostum 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 Greekes *Asse*; is a depravation of motion, which proceeds from a misaffection of the Stomach, by reason of a sharp Humor Nettling 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 depraved: because it is not preformed by Judgment 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 immoderatly flow from the Nose, or by drops. Both which Symptomes are Malignant. The former decaies 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 Vaporous Feaver, both as a Cause, and as a Sign. *Nose bleeding.*

The disproportion in Excretion of a serous and Phlegmatick Humor, is manyfold. 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 fal into the Nostrils, it is called *Coryza* or *Gravedo*; if into the Throat *Branchos*, Hoarsness; if into the Mouth and Palate *Ptyelismos*, 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 fal 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

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 *Glauco*: *in his Book of Blood-letting, against Erasistratus &c.* This Disease he cured by liberal Bloodletting. It is described by *Hippocrates*, in *his Book of the internal Diseases*, under the Name of a Joynt-pain, which is wont to trouble young People more than Aged.

The other differences of Catarhs with Reference to the diversity of Parts on which they fal, are Vain. It suffices to know, that al Fluxions upon internal Parts, are called likewise Rheums.

The *Cause* of a Catarrh 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 Physitians, following the Doctrin of the Arabians wil have the Humor which Causes the Catarrh, to be bred in the Head, only without the Vessels, by reason of Vapours ascending.

Fernelius contends that the Conjunct Cause of a Catarrh, is a serous 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 wil give you abundant satisfaction.

Chap. 3. *Of the Eyes.*

The Eyes. BEcause the Eye and the Ear may be demonstrated without meddling to dissect the Face; I wil 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 al actions are directed forwards, by reason of the Situation of the Hands. Seeing it is an Organical Part, made up of many Similar Parts; some of those Parts are external and some internal. The external are the [a] 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 shal treat in our fifth Book containing the History of Muscles. From whence the Reader may fetch what does appertain to the present occasion.

Parts.

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 underwose for the Eye-brows, withal 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 al the Eye-lids, are terminated with a Cartilaginous or Gristle edging, which is called [b] *Tarsus*, whereupon one by one in a row are fastened the [c] 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 whol life.

Cilia. They seldom fal of by reason of Sickness, unless in a Malignant Whores-Pocks, which mows down and makes wast of al 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 [d] greater, towards the Nose; the other is [e] lesser, towards the Temples.

Tear-Spouts. In the Eye-lids by the greater Corners are observed two little [f] 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

Humidites

Humidites to receive, the *Glandula Lachrymalis* or [a] Tear-Kernel is ordained, being thruſt into the little perforated bone, that the Humor might rather diſtil through this Hole into the Noſtrils, than fal out upon the external Parts.

Muſcles.

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 ſpred 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 Eyelid may therewith be raiſed.

The *Muſculus latus*, or broad Muſcle is common to the two Eye-lids, which being Circularly derived from the bony brim of the of the Socket, is ſpred 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. Unles any man wil contend, that there is a diſtinct Muſcle for that uſe.

Eye-brow.

Now the Eye-brow is a Fleſhy 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.

Parts of the Eye.

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 bal 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.

Fat

Kernels.

Before the Fat be removed, the two Glandules or Kernels are to be conſidered in their Scituation, of which one is of the greateſt moment, *Viz.* The Lachrymal or [e] Tear-Kernel; whoſe ſubſtance you ſhal obſerve to be Fleſhy, ſoft and ſmal; and its Scituation 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. *dd.*

[a] T. 19. f. 1. *D.* [b] f. 1. *AA.* [c] f. 1. *B* [d] f. 2. *AA.* [e] f. 1. *D.*

Then you ſhal look out the other Kernel which is wholly unlik 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, Obliquus [f] *Minor*, muſt be ſought for in the inferior Part of the Socket, being rould back under the Eye, it is terminated by the leſſer [g] Corner. The other four, are right Muſcles, whereof one [h] lifts up, and its oppoſite [i] draws down; the remaining two draw towards the [k] Sides. They al take their original from the Cavity of the Socket, by the hole of the Optick Nerve, and each one is produced right forewards to the Conjunctiva.

True Coats.

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 ſhal obſerve two true Coates of the Eyes, which are orbicular as the Eye it ſelf: the reſt are imperfect coates: and before you cut aſunder the *Cornea* or Horny-Coat, you ſhal take away the Nervous productions of the Muſcles of the Eye, which ſome would have to be a [m] Coat, which is abſurd.

1 Cornea.

You ſhal obſerve that the *Cornea* or [n] Horny Coat is tranſparent before, to ſerve the ſight, but behind and on the ſides, it is dark.

Its thick [o] 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 Circumfused about the *Uvea Tunica*, or Grape-Skin [q] 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.* *Pupilla.* *Iris.*

Afterwards you shal see the [a] *Uvea* or Grape-Skin Coat, and its open hole, which makes the [b] *Pupilla* or sight of the Eye; the external Face or Circle of the *Pupilla* is termed [c] *Iris*, or the Rain-bow. The Circumference of the *Pupilla* is adorned with smal threds or little Fibres extended upon the Chrystalline Humor, which they retain in its Scituation.

The *Pupilla*, in Catts, is manifestly moved, in Men it is unmovable, unless it be somwhat slackened and straitned, by the Access and Recess of some extraodinary light.

These things being observed, pour out the Humors, and you shal find the [c] Christallin Humor overwhelmed in the Vitreous [f] Humor, and then the interior [g] Superficies of the *Uvea Tunica* wil appear black, and cleane; in Brute Beasts it is varigated, being tainted with Green Black and Sky-Color. Wherefore, when you are to demonstrate the Eye, you shal have an Ox and a Sheeps-Eye in readyness, that you may compare them with the Eyes of Man-kind.

In the hinder Part of the *Uvea* you shal see the Optick [h] Nerve fastened, and the Marrow thereof piercing within that Coate.

The three Humors of the Eyes. *The Watry. Chystallin.*

There are three Humors conteined in the Eye; the first is the [i] watry Humor, already run out, there remain two fastened together, the Chrystallin and the Vitreous. The Christal 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* saies that in living Creatures it Runs like Water, or is more liquid at least.

The Glassie.

The Christallin Humor being pulled out, there remaines the [m] Vitreous Humor, being compacted and not running about, by means of the *Reticularis Tunica*, or [n] Net-like Coat Interwoven: which being [o] 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.

[m] [a] *T.* 19. *f.* 7. *A. C C. 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* [n] *f.* 8. *AA.* [o] *T.* 19. *f.* 8. *aa.*

The Medicinal Consideration.

There are divers Diseases of the Eyes.

Although the Eye be but a smal 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 wil retain and use them as Latin Names.

Of which some are general of the whol Eye.

An Arabian Physition, *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 Guillemeau* 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.

Diseases of Magnitude.

The Eye therefore is afflicted either by being encreased, or diminished in its Quantity.

The Eye is diminished, when it consumes for want of nourishment: its Magnitude is augmented when it swels without the Eye-hole or Socket.

Of Situation.

Its Scituation is changed, when it fals without the Eye-hole, which Disease is termed *Ecpiesmos*: 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*.

Number.

There ought to be two Eyes: and therefore he that wants one, is diseased in Number, and is called *Monoculus*.

Distemper &c.

Furthermore the Eye is troubled by an hot and a cold Distemper and by inflamation of the whol 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.

And in case an Inflamation of the whol 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 quittor being let out, by pricking the *Cornea*: which is happily practised at *Paris*; and so with the Quittor a watery Humor is let our, as in the couching of a Cataract.

Special Diseases of other Parts.

Besides these general Diseases, al the Parts whereof the Eye is made up, have their Diseases and Symptomes, which I will particularly and breifly explain, beginning at the Eye-Lids.

Eye-Lids Diseases.

Emphysema. Hydatis.

A moist distemper of the Eye-Lids with wind, or a flatulent Spirit, is called *Emphysema*. With much Wheyish Humors, its termed *Hydatis*, and by *Celsus Vesica*, and *Aquula*, which does so load and depress the upper Eye-Lid, that it cannot be lifted up.

Sclerophthalmia.

An hot distemper of the Eye-Lid, Joyned with a thick Humor, is cald *Sclerophthalmia*, Hard-eyedness.

Xerophthalmia. Psorophthalima

A dry distemper without Humors, is *Xerophthalmia*: if it cause Itching, *Psorophthalmia*. Unto which may be referred the *Phthiriasis*, or Lowse-Evil of the Eye lid.

Ptilosis

If the said 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 *Madarrhosis*.

Tracoma Sycosis.

If it make the Inside of the Eye-Lid rough its called, *Tracoma*: which if it be great, so as to resemble the final Seeds that are in Figs, its cald *Sycosis*; if it be hard and of long Continuance, its Name is *Tulosis*.

Tulosis.

Crithe Chalasion.

A little Tumor upon the upper Eye-Lid springing from a thick Homor, is called *Crithe*, the Barly-Corn. If it be greater and movable, because of its likeness to hail, it called *Chalasion*, the Hail-Stone.

Anchiloblepharon. 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 *Anchiloblepharon*: 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. *Lagophthalmia* is a Convulsion of the upper Eye-Lid, or a drawing back thereof by reason of a Cicatrice or some seam. *Ippos.* *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 inwards.

Trichiasis. *Dystichiasis.* The generation of the Hairs of the Eye-Lids being depraved, is called *Trichiasis*, & it is twofold: when more are bred than ordinary, its called *Dystichiasis*, when there is a row of Hairs more than usual. But when the natural Hairs are only longer and inverted, tis caled *Phalangosis*: in both these, the Hairs prick the Eyes: tis caused by a moist distemper of the EyeLids, with much Humor which is not sharp.

Phalangosis.

Tear-Kernels Diseases.

Euchantis. The Caruncle or little bit of Flesh in the greater corner of the Eye, makes a Tumor against Nature, which is called *Euchantis*: the Diminution of the said Caruncle is termed *Rhyas*, which causes a dropping of moisture from the Eye.

Rhyas.

Anchylops Ægylops. Near the said Caruncle and the Nose, there breeds an Imposthum through Inflamation, which is called *Anchylops*: which being broken and turned into a Fistula is termed *Ægylops*. 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 Choler, 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 Inflamation and fluxion.

Chemosis. And if the Inflamation 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*.

Hypospbagma *Hypospbagma* 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.

Pterygium 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 inal Tumor of the *Adnata* or the neighboring *Cornea*, proceeding from a thick and sharp Tumor, so that it terminates in an Ulcer.

Botrion. Epicauma. And if it be hollow, it is called *Botrion*, or *Fossula*; if it be become crusty tis named *Epicauma*. After the Ulcer follows a *Scar*, which is the Hardness and thickness of a Spermatick Part springing from a wound or Ulcer.

Diseases

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 neighborhood: 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 *Cheloma*, which is a broad Ulcer of the *Cornea*, about the *Iris*. *Cheloma.*

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 smal it is termed *Nephelion* or *Nebula*, the Cloud: if the Scar be thin, its called *Achlys*, *Caligo*, a Mist or Darkness. *Albugo.* *Nebula.* *Caligo.*

Diseases of the Uvea Tunica.

The rupture and Exulceration of the *Cornea*, is attended by a Disease of the *Uvea* in Scituation, which is called *Proptosis*, *Procidentia*, when the *Uvea* sticks out above the *Cornea*. *Proptosis.*

If the Extuberance of the *Uvea* be smal, 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 Grap-Stone, or *Melon* as being like an Apple. If their be an inveterate Ulcer of the *Cornea* through which the *Uvea* fals out, its called *Elos*, Clavus, the Nail. *Myocephalon* *Staphyloma* *Melon* *Clavus.*

The Ulcers of the *Cornea* and *Adnata*, if they be Malignant are termed *Carcinomata*.

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, ful of Spirit and Watry Humor.

There is a double Disease of that space: *Zinisisis*, 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. *Zinisisis.*

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 caused by Flegm, its termed *Hypochyma Suffusio*. But *Hypopium* followes an Inflamation, and *Hypochyma* 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 Stomath, 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 first formation in the Womb; or from a dry distemper, and then it is called *Phthisis* or *Corrugatio*. *Corrugatio.*

Galen writes that a smal *Pupilla* from from ones Birth is occasion of a very sharp sight: but when it happnes a whil after, tis bad. In his first Book of the Causes of Symptomes. Chap. 2.

The Dilatation of the *Pupilla* is called *Mydriasis* or *Platu-Corie*. 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 conjoyned; 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 læsa*, the action hurt.

Thinness of the Spirits. 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 fomenter of which distemper may be a Cholerick 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 color 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 somwhat 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.

Thickness of the Visive spirit. 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.

Obstruction 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 cal this Disease *Gutta Serena*, and sometimes *Amaurosis*.

Amaurosis

Diseases and Symptomes of the Sight.

Cæcitas
Amblyopia
Myopsis
Nyctalops Sight abolished is called *Cæcitas* 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 fain 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 al by night, or very obscurly: 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 *Pararasis* 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*, *Leucoma*, Hypopion, *Hypochyma*, *Proptosis*, the larger *Mydriasis*, a *Pterygium* or Film covering the whol sight of the Eye,

of Anchylo-Blepharon. *Anchylo-Blepharon* or Gluing together of the Eye-Lids.

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 *Nephelion* and *Achlys*; and by a

Leucoma

Leucoma and a ſmal *Mydriaſis*, which touches but Part of the Sight.

Dry diſtemper of the Humors of the Eyes cauſe *Myopſis*: the over Humidity and thickneſs of the ſaid Humors, makes a Man that he cannot ſee in the Night. *Myopſis* *Nyctalopſis*

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 falſ Appearance, the ſight is depraved, and termed *Amalops*: ſo al things appear Yellow, to ſuch as have the Jaundice. *Hallucination* *Amalops*

But that kind of Symptome happens, when the *Cornea* which is ſpred out before the ſight of the Eye, is infected with Blood or Cholet.

The Animal action of the Eye is hurt ſomtimes, as Feeling and Motion: the Feeling of the Eye is hurt by extream Pain thereof, which notwithſtanding, according to the Judgment of *Celſus*, remains within the Eyes, and draws not the Brain into conſent, as Pain of the Eares is wont to do. The Cauſes of al Pains in the Eyes, is a diſtemper, or Solution of Unity. *Eyes pain*

The hurting of the Eyes Motion, is either a Palſie, Convulſion, or Trembling. In the Palſie and Convulſion, the Eyes become ſtif and fixed: in that ſort of Convulſion called *Tetanus*, they are unſtable, as in the Trembling. *Palſie* *Convulſion* *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. *Flowing out of tears.*

Hereunto likewiſe belongs the filth of the Eyes, which is by the Greeks called *Lemai*: they are cauſed by an extream diſtemper of the Eye, which makes a diſſolution or melting down of matter. *Laimai*

The ſimple infirmities of the Eyes, are the ſpotts and Scars of the Conjunctive and Horny Coates, which are both Diſeaſes and Symptomes. *Spots*

The Duskynes and obſcurity of the Eyes, is when the Bal 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. *Obſcurity*

Chap. 4. *Of the Ear.*

THe Ear, being the Inſtrument of hearing, is divided, into the [a] External Part, broad and griſtly, and the [b] Internal, which lies hid in the *Os petroſum*. *The Ears Parts*

The external Part is termed [c] *Auricula*, made up of a [d] Griſtle, which is covered with a Skin ful 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*. *windings*

It is more beautyful, when ſmal: for a great pair of Aſſes Ears are uncomly.

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 had 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 ſhal obſerve two Parts; one is called [i] *Tragus*, and the other [k] *Antitragus* the Names of the other Particles of the Ear, are uſeleſs. *Tragus* *Antitragus*

In

Hole of the Ear In the Auricula is conteined 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

Ear-Wax dust and crawling Bugs, that might otherwise enter in. There is collected, the Cholerick 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*.

Concha The internal Ear Concluded in the *Os 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 streched out, which terminates upon

The Drum the [d] *Drum*: it has a string that runs cross it, as we see the Military Drums have.

[a] T. 20. f. 1. and 2. [b] f. 3 4. &c. [c] f. 1. and 2. [d] f. 2. BB. [e] f. 2. A A. [f] f. 1. A A. B B. [g] f. 1. G G. [h] f. 3. A. [i] f. 1. G. [k] f. 1. D. [l] f. 3. B. f. 4. A. &c. [m] f. 4. B B.

[a] T. 20. f. 3. C. [b] f. 6. B. C. f. 7. within A. B. [c] f. 4. B B. f. 5. B. [d] f. 3 B. f. 4. A A. &c.

Four little Bones. Furthermore, we observe three littel Bones, the [e] Mallet, the [f] Anvil, and the [g] Stirrup: others ad a [h] fourth, which is a little Scal of a bone, such as is found in the *Carotick* Artery near the *Os 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 windores, whereof the one is the entrance of the labyrinth and the other of the *Cochlea*, or elsewhere? It is a most hard peice 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-Knifes Edge that same portion of [k] *Os Petrosum*, which within the Scul reaches unto the Basis of the Brain.

In the *Concha* you shal observe on the left side an Hole, which passes into the winding Cavity of the *Apophysis Mastoides*, 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 *Fallopius*, after *Carpus*, who discovered those little bones the 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*.

[e] f. 4. G. f. 5. E. f. 7. A. [f] f. 7. B. [g] f. 7. C. [h] f. 7. D. [i] T. 8. f. 5. 6, 7, 8. [k] T. 20. f. 10. B B. [l] T. 8. f. 1. F F. f. 3. K K. T. 20. f. 12. A A. B B. [m] f. 10. A A. [n] f. 7. D D. f. 9. A. f. 11. B D. [o] f. 8. A. B B.

The Medicinal Consideration.

Diseases of the Ear. The Gristle of the external Ear if troubled with Pustles or Pushes, is contused, Swels, is inflamed and exulcerated. By cold it contracts Sphacelation, is contracted and dies do what a Man can: and its somtimes cut of both in sick and in sound Persons. Whence the Greek phrazes *Coloboma* and *Acrotiriasmenoi*, for persons that are Crop-Eard.

Parotis what is it. The greatness of the external Eare, though it be ill favourd, cannot be helped. The Swelling and Inflamation of the Kernels which are beside the Ears, is termed *Parotis*, which in regard or the narrowness of the place and nearness to the brain, is not

not very safe, happening upon an acute feaver, though it have the name of *Dioscouros* 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 lightsomness of the Patient following the same. In Children and young People a *Parotis* 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 applied, in Diseases of the Ears and of the Eyes.

Of the Auditory passage.

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 our, or by Filth, or somwhat 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 Cholerick Humor: wherefore *Hippocrates* saies that when Deaf persons fal into Cholerick Lootnesses, their deafness is lessened, or taken away: and when their lootness is stopped, their deafness returnes.

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 Inflamation, which draws the brain into Sympathy.

Of the inner Cavities.

The internal Cavities, because they have no *Periostium*, are not pained, unless the Auditory Nerve be affected, whose ofspring makes the Drum: from its inflamation proceeds an Impostum and from that an Ulcer: which tears asunder the Drum.

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 dwel by the Fals of the River *Nilus*, are al deafe, by reason of Lovd roaring and Headlong fal of the flowing Water.

Also the loosness and over great moisture of the Drum is to be considered, because it may Cause Deafness.

Symptoms of the Action hurt.

The proper Symptomes of the Ear, are those which belong to the hurts of hearing, and the Irregularity of Excrements.

Deafness.

The hearing is hurt in a threefold Manner. When 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.

Thickness of Hearing.

Hearing diminished is called *Barucoia*, thickness of hearing.

Noise in the Ears.

Hearing depraved consists in a noise and ringings or buzzings in the Ear; tis called *Paracousis*.

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 conteined in so close a Room; or some Spirit may stir it self within the Dug-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 Eare, 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*.

Their Cure

In natural Deafness, springing from mis-formation in the Womb, and not from any of the Causes aforesaid: whether may we experiment that which fel out unexpectedly

pectedly wel to a certain Deafe man: who thrusting an Ear-Picker very far into his Ear, rent the Drum and Break asunder the smal bones and afterwards, attained hearing?

Whether in a ringing of the Ear may the teat like Proces 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 flatulent Spirits cannot break out? whether or no wil 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.

The Irregulary of Excrements in the Ear, is not only of Cholerick and Wheyish Humors, but also of quitter and blood, proceeding from the brain: neither is so great a quantity of quittor as is avoided, bred in the Cavities, but in the Brain.

Excretion of blood (bolar serum, quittor &c.

If an intollerable inflamatory and pulsatory pain does occupy the hinder parts of the head, and the matter flows thither and there stops, the pain abiding: it wil be safe to boar an hole in the hinder part of the Head, that Egress may be given to the quittor; 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 Eares, Mouth, Lungs and Wesand: 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 Wesand 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 described.

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 [c] 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 whol 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] Temperal Muscle, the Muscle called [b] *Masseter*, possessing the sides of the Face, shal 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 extremities of this Slit art termed [c] *Lips* which are moved by Muscles in their opening and shutting.

The Chin.

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 [a] Fore-Head.

The

The sides of the Face are the [f] *Cheeks*. The internal Parts of the Mouth, as the [g] Teeth, Gums, [h] *Palate*, [i] Throat, [k] Tongue, shal 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 carryed 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 whol Face, by the Nose, as far as the Lips. *The Vessels.*

[a] *T.* 15 *f.* 3. *A.* [b] *f.* 1. *between F F. T.* 19. *al.* [c] *T.* 15. *f.* 1. *G I.* [d] *f.* 1. *N N.* [e] *f.* 1. *G H I. &c.* [f] *f.* 1. *K L M N.* [g] *f.* 1. *R S T. &c. f.* 2. *A B C. &c.* [h] *T.* 10 *f.* 1. *g g.*
[a] *T.* 15. *f.* 1. *P P.* [b] *f.* 1. *S.* [c] *f.* 1. *N N.* [d] *f.* 1. *n.* [e] *f.* 3. *A.* [f] *f.* 1. *O.* [g] *f.* 6. *m n o.* [h] *f.* 6. *L L.* [i] *T.* 13. *f.* 15. *A.* [k] *f* 14. *A &c.* [l] *f.* 9. 10. *&c.* [m] *f.* 11, 12, 23. [n] *T.* 3. *f.* 2. 3. [o] *f.* 16, 17. *&c.* [p] *T.* 18. *f.* 2. *A.* [q] *f.* 2. *c c. &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 Ruddyness in the Cheeks, it is a Sign of an hot Liver: if the Redness be seated upon 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 Color proceed from being in the Sun, it is termed *Ephelis*. If Redness remain setled on a great Part of the Face, it is named *Gutta Rosacea*, and those who are spotted on that manner are termed *Antirhoei*. *Diseases of the Face.* *Sunburning.* *The Rose.*

Palenes 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 Color of the Face is without blood because the whol Mass of blood is Wheyish, and therefore the blood of the Face being such, must needs be of an Wheyish Color. Those that are so affected, are called *Liphæmoi*, blood-les. A bad Color of the Face, both in Sick and found persons, is termed *Cacochroia*.

Furthermore, the Face is made rough and deformed by burning *Pustles*, *Ionthi*, *Vari*, *Fici*, *Nævi*, and *Spilloi*.

An hard Push is called *Ionthos*, because it represents a branch of the flowring Violet. *Ionthos.*

Varus is an harder knob, and not so red and fiery as the *Ionthos*, *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 be moust, it Exulcerates and runs. *Lichen.*

Nævi, Warts, are smooth knobs white or blewish: which if they be of a bad Color, 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 Septalius* has composed a most Elegant Book.

Black and blew Color 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 squeesing the Skin, or by some emollient Medicament or Pomatum, if they be hard and thick.

Pani *Pani*, are scarrs in the Face.

Mentagra. *Mentagra*, an *Impetigo* or Dry-Scab of the Chin, which troubled the Gentlemen of Rome in Plinnes time, where it was a Popular Disease: is a Malignant Scab, which remaines many years and is hardly curable, and so alters the Skin of the Chin and Lips, that a Man continues Beard-less al 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 Palsie or Convulsion.

It 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 Symptome, 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 *Latissimus*.

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 a sunder, 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 *Commotice* painting and plastering with *Fucuses* &c. The other *Cosmetice* beautyfing and adorning without any thing laid on: the latter *Galen* allowes to take away the ill favouredness of Women: but the former, he disallows in a Physitian, and leaves it to panders, bawds and Whores

The Use of those *Fucuses*, unless skilfully mannaged does quickly wrinkle the Skin, such as are the Spanish-White, and *Purpurissus* or Lovly-Red.

The use of the Lips. The Diseases of the Lips are very many, distempers, Inflamation, Swelling, Ulcers, and others consisting in evil conformation, al which pervert the use and action of the Lips which serve to shut the Mouth, form the speech and for the easie reception of meat and drink, to contein 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 Lips were cut of, 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 hanging, it proceeds from a Palsie. 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 *Memones*, whose Chins stick out.

Chops *Tumors* The Chops of the Lips are called *Rhagades*. Somtimes 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 wil quickly cease: and experience does many times confirm the same. Yet somtimes Tumors and Ulcers in the Lips are in Diseases signes of Death, as in the two Brothers *Hermoptolemus* and *Andreas* in *Hippocrates*.

Ulcers

Bad Color Bad Color of the Lips in Diseases is no good sign: in such as are wel, it argues a fault in the Lungs or in the blood.

Moles and Warts. *Moles* and *Warts* black and blew and Scirrhous sticking upon the Lips, are things to be warily handled, and not to be tampered with by way of Incision.

&c. Somtimes the Lips do naturally Swel, 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. *Symptomes*

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.* *Trembling*

The opening of the Mouth is hurt, when the Jaw is become stif 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. *Shutting*

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 undecent. Touching the Cure of Lips cut of, *Taliacotius* has written. *Frequent spitting.*

Chap. 6. *Of the Nose.*

THe Nose, the Instrument of Smelling and of clensing the brain, is placed in the middest of the Face; dividing the Eyes and Face into two even Parts. *The Noses Scituation.*

The length and breadth thereof is uncomly, if it exceed a Mans Thumb in length and thickness. *Magnitude*

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. *Shape*

It is divided into two [a] Cavities, which are called Nostrils severed by a partition, and reaching as high as the Colander-bone. *Cavities*

The Depth and Widness 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. *Spungy Bones* *Spungy Caruncles.*

These bones and Caruncles or Spungy 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. *Bones*

It consists of [b] *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 *Pinnæ* and *Alæ Nasi* the Wings and Pinnacles of the Nose. There is a Gristle placed between them, which is called *Septum*, the partition, and depends upon that same boney [a] partition, placed between the bones of the Nose, being a continuation of *Os Vomeris*. *Gristles*

The Nose is cloathed externally with the *Cuticula* and *Cutis* under which lie the [b] 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 shal find in my History of the Muscles. Book the 5. *Membrane* *Muscles*

To the Nose do belong, the *Seive like plate* of the Colander bone, and *the Mamillary or Teat-like Productions* ending at these bones, and given out to be the Organs or Instruments of Smelling.

Some would doubt whither 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. 15 f. 2. [b] T. 15. f. 3. K.
[a] T. 15. f 6. I. [b] T. 15. f. 1. G H. &c. [c] T. 15. f. 5. C C. [d] T. 18 f. 3. a a.

The Medicinal Consideration.

Diseases of the whol Nose.

The Gristly Parts of the Nose, are *Inflamed*, *Bruised*, and *Ulcerated*; the bony Parts are *broken*; al of them are troubled with *distempers*, but especially with organick 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*, if 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 shape, by widening the bones and Gristles, whiles 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 Swel, and is infested with Inflamatory bunches, which come to suppuration: but far within in the Spungy bones and their Caruncles, there is bred a filthy stinking Ulcer called *Ozæna*, which is offensive both to the Patients and al that come near them, and is very hard to cure. Somtimes the little bones are corrupted and come out at the Nostrils. The Caruncles being swelled with or without an Ulcer, cause the *Polypus*, which fals into the Nostrils, or it fils the hollow places above the Palate, reaching as far as the Throat.

Polypus

The *Polipus* is neatly discribed by *Celsus in his sixt 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 wil grow again, if any Part be left remaining after section.

A Malignant Cancerous *Polypus* must not be medled withal either by cutting, burning, or caustick Medicaments, for if it be exasperated it eates and devours the whol Face.

Symptomes of the Nostrils.

Symptomes of the Nose are either its action hurt, or simple affections thereof, or the Irregulary of what is voided forth. The action of the Nose is Smelling,

Smelling lost

which is abolished, diminished or depraved. The Causes of the smel diminished or abolished, are the same, to wit, the obstruction of the inward passages of the

Diminished.

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 Spungy bones with the Mammillary Productions, are free.

depraved.

The Smelling is depraved, when al 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 Scul, 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 deforme 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 *Grauedo*, or a continual Nose-dropping. *Hippocrates* in his sixt Book of Aphorismes saies, Such as have running Noses, are unhealthy.

In

In bleeding at the Nose, the blood either comes from the Nostrils opened by picking, 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 al 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 Signe: 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 Inflamation or some Sleepy Disease. *Its Cause.*

If bleeding at the Nose be stopped in young people accustomed thereunto, and their brains Ake through fullness, 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 Wormes were thought to have been cast out of the brain, where as 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 Emissaries of superfluovs blood; Even as the Hæmorrhoid 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 beleive it flowes out of the brain. And *Galen* and *Areteus* 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 Epilepsie or Falling-Sickness, because it is a momentany Concussion or Convulsion of the brain. So saies *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 Necks use*

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 *Vertebraes*, by reason of the shortness of those Vessels which are carryed into the Head, is liable to the Apoplexy or Sleepy Diseases; and a Neck too long containing eight *Vertebraes*, 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 *Conteining* and *Conteined*. The Conteining are common or proper, the contained are manyfold. *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 Latus*, which seems to be a Propagation of the Membrana *Carnosa*.

The Parts contained are manyfold *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 *Pharynx*, the [i] Tongue, the [k] Kernels, The 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 forepart of the Neck: in the hinder Part thereof are the [q] *Vertebraes*, and the hinder [r] Muscles ordained to move the Head and Neck.

I wil 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*. [k] f. 16 17. &c. [l] T. 12. f. 1. *ee. ff*. [m] f. 2. *aa*. [n] T. 3. f. 8. [o] T. 12. f. 1. *gg*. [p] f. 2. *ββ*. [q] T. 13. f. 19. [r] T. 14. f. 2. 3, 4. &c.

But you must diligently observe the Kernels placed upon the [a] *Cartilago Thyroides* or Door fashiond Gristle, which are larger in Women than in Men. In this order therefore you shal search for the Parts of the Neck, and separate them if you can one from another, or take them out.

Its Vessels. And first of al, the *Musculus Latissimus* being taken away, you shal 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 values or shutters near the Claves, but the [d] external Jugular has none.

The *Carotick Artery* at its entrance into the Skul, has two very smal 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 one only be tied, he barks but faintly and by halves: which is diligently to be observed.

Os Hyoides. Then you shal consider the *Os* [f] *Hyoides*, how it is suspended with strong bands and firmly fastened to the *Apophyses* [g] *Styloides*; how it sustaines the *Larynx*, the *Epiglottis* and the Tongue. For the *Cartilago* [h] *Thyroides*, is by its Hornes annexeded 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 Speechles 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.

Kernels. Besides those Kernels resting upon the *Cartilago Thyroides*, there are other little ones, placed al along the internal jugular and orderly disposed, into which the brain disburthens it self.

Under the lower Jaw, in the upper and foremer Part of the Neck, are seen two other Kernels, which do often swel, and in them the Kings-Evil is bred.

At the Root of the Tongue are the [a] *Tonsillæ*, termed *Antiades*; certain Kernels so called. Whose pain and swelling are by *Ulpian* termed *Antiagri*.

Al these Kernels are diligently to be considered in Fluxions which happen in the Neck, whether they be the *Scrophulæ* Kings Evil or *Bronchocele*.

[a] T. 13. f. 1, 2. 8. [b] T. 3. f. 8. *AB*. &c. [c] T. 12. f. 1. *ee*. [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*. [a] T. 15. f. 16. *and* 11.

The

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 Hoarsness.

The Wind-pipe being wounded is curable and may securely be cut, under the *Larynx*, between two Gristles, in a very choaking Squinsie.

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 Coughing, hinder not?

[a] T. 13. *f.* 9. *and* 10. E E.

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 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 joyned to the Stomach, and is in Latin termed [d] *Stomachus*, is obstructed by a Tumor either proceeding from Flegm or Melancholy, which turnes 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 staies, and many times is vomited up again.

[a] T. 3. *f.* 2. E E. *f.* 3. E F. *&c.* [b] T. 3. *f.* 2. *and* 3. A B C. *&c.* [c] T. 3. *f.* 3. D. [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. 1. *Of the Limbs.*

The Method of handling.

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 wil do very wel to contemplate the exteral Conformation of the Limbs, and and withal to shew you what Veins are wont to be opened, and in what places Issues may be made.

Parts of which the Limbs are compounded.

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 Parts I shal 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. Al the other Parts are contained, being comprehended by these. Touching the Scarf-Skin and the Skin, I shall repeat nothing, because

becauſe they are the ſame and al a like in al Parts. The *Membrana Adipoſa* or fatty Membrane, is ſpred 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 Scituation. In the Thigh the *Faſcia Lata* ſupplies its place.

The Medicinal Conſideration.

Diſeaſes of the Skin.

The Univerſal Diſeaſes of the *Skin* are divers diſtempers, ſimple, or with Humors conjoyned. If the diſtemper be with Humor, it makes the Skin rough or ſwollen, whence ſprings the Scab, the Mange, the Morphew, Scurfe, Leproſie, Tetters, Itch, Puſtles, Blains, Water-bladders, Yellow-Bliſters, Warts, Scalds, Moles, Biles, Night-Blains, Ring-worms, Lowſie-Evil, Chops, Black and Blewneſs, Smal-Pocks, Meazles, Whores-Pox and *Elephantiaſis* or a Cancerous Tumor, over the whol body.

Of the Fleſh.

The Fleſh is infeſted with al kinds of Tumors, Inflamations, Carbuncles, Cholerick Tumors, Phlegmatick Tumors, Melancholick Tumors, Cancers, Watry Tumors, Windy Tumors, Impoſtums of al ſorts, *Steatoma* the Fat impoſtum, *Atheroma* the Pap impoſtum, *Meliceris* the Hony impoſtume, an Ulcer, a wound and a Gangrene.

An Athletick or Champion-like conſtitution of body, high fed, and as we ſay, luſty and ful of Beefe, 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.

Of the Veſſels.

Of the Bones.

Veins and Arteries have Diſeaſes proper to themſelves, the Nervs have their peculiar Diſeaſes, and the Joints have theirs. And the bones are ſubject to fractures, Dryneſs, Disjoynting, Rottenneſs, &c. Which ſhal be explained when we come to treat of the bones,

Chap. 2. *Of the Superior Limbs.*

The general diviſion of the 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.

Special diviſion.

And foraſmuch as the whol Arm hangs upon the [g] Shoulder bone, as the whol 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-blad, and of the Leg from the Huckle-bone.

Of the Shoulder-blade and the Arm from the Shoulder to the Elbow.

The Axillary Kernels.

The Shoulder-blade [i] Joyned to the [k] Arm, makes a Joynt: in the bending of which Joynt beneath, Kernels are placed, which are counted to be the Cloſe ſtooles 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.

Diſeaſes of the Kernels.

Theſe Kernels do frequently Swel, Impoſtumate, are infected with the Kings-Evil, and ſubject to Buboes, yea ſuch as accompany the Whores-Pox, as in the Groin.

Of the whol Joynt.

This Joynt is liable to be disjointed, but it is more often vexed with the Gout, *Rheumatiſme*, and other Fluxions. The ſtrong ſmel of the Arm-Holes proceeeds from theſe Kernels. Upon which Martial has wittily and neatly played in one of his Epigrams.

Lædit te quædam mala fabula, qua tibi fertur
Valle sub alarum trux habitare caper:
Hunc metuunt omnes, neque mirum, nam mala valde est
Bestia.

That is,

An ill Report your Credit (Sir.) does wound,
How that a stinking Goat has dwelling found
Within your hollow Arm-Pits shady Grove,
A beast which al 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 Articulation of the *Brachium* with the Cubit, is more hardly disjoynted; 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 *Galliagones*.

The Diseases of the Joynts of these Parts.

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.

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 Sixt Finger growing to the Thumb or little Finger. It is easily taken away, by the Incision Knife.

Diseases of the Hand.

Of the Nailes

The Fingers are terminated and closed up by the Nailes, which are liable to divers Diseases, in Figure, in Magnitude, whil they grow thick, wrinkled, unequal, rough, hooked as in leprous persons; they are also Cleft; and fal off in the time of Sickness and afterwards breed again. The Color of the Nailes is changed in time of Sickness. Also there is a sore Disease of the Nailes termed a White-Loase or Felon.

Diseases of the Nails.

A Wheyish very sharp Humor is bred under the Naile near the bone, which causes most bitter and intollerable pains, and brings an Inflamation 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 putrifie, and sometimes the last Joynt 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 Græcorum, *viz.* Opening of the Skin at the corners of the Nailes and Issuing of blood thereat, is a sleight 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 Ancient Phylosophers, and Physitians, were wont to Divine, and tel 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. D E. [c] f. 1. F G H I. [d] f. 1. K. [e] f. 1. M N. [f] f. 1. O P Q. [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. D E [c] f. 1. F. [d] f. 1. G H. [e] f. 1. I.

Chap. 3. *Of the Inferior Limbs.*

Diseases of the Inferior Limbs.

The Inferior Limbs are commonly divided into three Parts; The Thighs, the Shank, and the Foot. The *Os Ilium* is joyned to the Thigh, and from thence we are to take measure of the length of the Leg. In the bending of the *Os Ilii*, and the Thigh, are placed many Kernels, above and beneath; in which divers Buboes arise, both Pestilential, Venereal, and springing from common Causes: of which we have spoken in our Chapter of the *Peritoneum*.

These inferior Limbs are liable to the same Diseases with the superior, which I wil 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 Nutriment 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 whol, 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.

The Sciatica.

In the Joynt of the Thigh, about the Cavity of the Huckle 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 hault.

The Hip-Consumption.

If a very sharp putrid Humor does corrode, and bring corruption into the Joynt, it produces a Disease called *Phthisis Coxaria*, the *Hip-Consumption*, which makes an end of the Patient by degrees.

The Bastard Sciatica.

If an Humor flow into that part where the great Nerve arises, which creeps up and down the hind parts of the Leg, *Notha Ischias*, or a *Bastard Sciatica* is produced.

Swellings of the Knee.

Swellings of the Knee, either springing from a Flegmatick Humor, or from Inflamation, are oftentimes very dangerous, or long-lasting; and at last do hasten the Patients Death.

The Foot is divided into the [a] *Tarsus*, [b] *Metatarsus*, and the [c] Toes. The first Bone of the *Tarsus* called [d] *Pterna*, 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.

Corns.

The Toes of the Feet, by compression, and straitness of Shoos or Boots, have painful *Corns* breeding upon them, the unwary extirpation whereof has somtimes brought a Gangrene into the Part.

[a] T. 21. f. 1. O. [b] f. 1. P. [c] f. 1. Q. [d] f. 5. B.

The Legs.

Elephantiasis of the Arabians.

The whol Leg from the bending of the Groyn unto the Toes, is somtimes exceedingly swollen with an hard, and il-favored Tumor, which is called *Elephantiasis Arabum*: The Arabian Physitians, Elephants Leg, because it makes the Leg of the Patient resemble that of an Elephant.

Swellings.

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.

The

The principal matter of these Tumors, is Wind or Water, or a clammy Flegmatick Humor, which produces the swelling called *Oedema*.

Somtimes the Toes of the Feet, as wel as the Fingers of the Hand, are deficient or superfluous in their Number. There is a little knob grows somtimes under the little Toe called *Gemursa*, 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; *Compernis*, one narrow betwen the Knees; *Scauripeda*, one that has hunching Ankles, that interfer and hinder his going; *Pansus*, one that has a broad or Splay foot; *Atta*, he that treads only on the fore part of his Feet, as it were on Tip Toes; *Plautus*, he that is Splay-footed or Broad-footed, al which Infirmities are seen in grown Persons and in Children.

Some are borne with their Legs contracted, others become so by ill Swadling in the time of their Infancy, and by untoward Carriage in their Nurses Arms. Somtimes one foot is longer than the other which Causes halting.

Stink Palsie Somtimes the Feet do *Stink* intollerably, by reason of their much heat and Sweat; which must be helped. Oftentimes there happens a *Palsie* 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 whol Thigh as low as to the Ankle-bone, even as far as that most thick Nerve does reach, which comes from the *Os Sacrum*. *Knees pains.* 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.*

Wounds of the Ankle. Fluxions of Rheum into this Joynt are long lasting, dangerous and hard to Cure, in the Judgment of *Pardus*, which daily 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. NOw I wil shew you in what places Issues are to be made to purge out Wheyish Humors, which flow either through the Vessels or betwteen the Skin. I wil begin at the Head.

in The Crown of the Head. And first of al 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 Lambidoides*.

Fore part of the Head. Likewise in the hollow behind the Ears, when the Eyes or Ears are Diseased.

The Neck Somtimes on either side of the Neck, as far as the third or fourth *Vertebra*.

The Arm In the middle of the Arm between the Muscles *Deltois* and Biceps.

The Brest In the Brest, 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 cald *Gloutii*, 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 Knee; also on the inside of the Leg, two Fingers beneath the Ham.

's Somtimes 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 whol body as are usually opened. Veins which now adaies are opened in the Head, are in the *Forehead*, the hinder-part of the Head, and in the Temples. *The Veins which are wont to be opened. in*

The Forehead Vein is termed [a] Præparata 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 Aftenship-Vein. *The Fore head* *Hind part of the Head.*

The ancients did open the Veins behind the Ears, but that operation is now out of use: *Hippocrates* saies the cutting of those Veins 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 Veines of the Head, by reason of the external Veins, which through the holes of the Scul have communion with the *Menings*.

I know *Hieronimus Fabricius ab Aqua Pendente* disallowes 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 throatle 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 later Greek writers, *Paulus Æginet a* and *Aretæus*, mention the opening of inner Veins of the Nose: and *Aretæus* himself, declares the Instruments which the Ancients 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 *Aretæus*. *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. *Acut.* 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 Friar, Father *Joseph. le Clerc*, the great Politician and familiar friend of the Cardinal *Richelieu*; as *Simon Pimpernel* a most expart Surgeon of *Paris*, himself told me, he having opened the said Veins, in the Friar aforesaid.

In the Neck the [a] external Jugular is opened. *Trallianus* in Cure of the Squinsie 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 *Actuarius* commends this Practice in dangerous Diseases of the Head. *Cæsalpinus Lib.* 2. *Quæst: Medic. Chap.* 12. Commands the opening of this Vein in a Squinzy, because the Jugular Veins are more filled, than the shut cover and Mouth of the *Larynx*. *In the Neck.*

(*Prosper Alpinus in his* 2. *Book of the Ægyptian manner of healing Diseases Chap.* 9. Writes that this is a common Remedy in that Contrey.

[a] T. 1. *f.* 1. H. [b] T. 1. *f.* 1. I. [a] T. 1. K.

Jacobus

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* tels 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 *Vertebraes*, 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 lets 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 Cupping-Glasses be fastened with Scarification.

Ludovicus Mercatus in Lib. 1. *Practicæ Cap.* 19. Commends this Remedy against the Convulsion. *Hippocrates in his Book de Visu*, burnes and pricks the Veins of the back: which Remedy is propounded by *Alexander Benedictus Lib.* 1. *de Morbis Curandis, c.* 5. And *Gattinaria* 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* accompanyed 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 waryness, 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 Physitians, 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 Physitians, and to my self, 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 Animadversions, Chap.* 4. *Sect.* 61. 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 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 Ancle bone; or the continvation 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 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 *Vertebraes* thereof be out of Joynt, eſpecially the ſecond; in Magnitude, if it be ſwelled, as in the *Bronchocele*, Kings-Evil and Squinſie.

Similar Diſeaſes of the Neck.

The Organical Diſeaſes.

Bronchocele is a Swelling in the Neck, near the *Larynx*, ariſing from an humor collected in that place, or from the Kernel of the *Cartilago Thuroides* being longer than ordinary and producing ſuperfluous fleſh; or it is an Impoſtum proceeding from the Tumor *Atheroma* or *Steatoma*, or it is a Dropſie. *Bronchocele* 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 Mountaines; 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 Judgment of *Fernelius*.

Bronchocele

It may be queſtioned, whether the matter be contained between the *Muſculus latus* and the Skin, or whether it lie al 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 Membrana *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.

Bronchocele 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 ſwel; and therefore look where there are Kernels, there the ſwellings ariſe.

Kings-Evil

Scirrhous Tumors have in them ſomwhat 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 al Parts of the Body where there are *Glandules* or Kernels. And ſomtimes in certain places of the Body, a portion of Fat grows hard and makes a Scirrhous Tumor and ſomtime 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 *Bronchocele*.

Gongrone.

Angina the ſquinſie, is a Tumor of the Neck either internal or external: or an internal or external inflamation 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 al 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, til ſuch time as the upper Part of the *Larynx* be unſtopped. For in that kind of Squinſie, where no outward ſwelling appears, the *Larynx* alone is inflamed and obſtructed. In other Squinſies the Circumjacent Muſcles of other Parts are affected: In the *Cynanche*, the Fluxion is in the *Arytænoïs* 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 Leek thrust into the Throat, with some sharp biting Powder sprinkled upon it may do good, as also some strong drawing Medicine or a Vellicatory applied to the *Larynx*, and Scarifications made here and there about the *Larynx*. Touching the Squinsie, read *Hippocrates* in the 27. and 34. Aphorismes of his sixt Book. In the third Book of his Prognosticks, And in the 49. Aphorisme of his seventh Book.

Chap. 8. *Of the Teeth and Gums.*

I 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 wil begin with the *Teeth*, the Instruments of Chewing and of Speaking; for those that are Tooth-les cannot wel 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, til 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 til 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 wil shoot forth another Tooth, if the first be plucke 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 al Childrens Diseases, because Children are troubled with many Diseases upon that account, springing from the pain of Teeth-breeding, and bringing them to their Graves.

In grown Persons. In *Persons grown up* the Teeth are distributed into two ranks or [a] 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 fastened 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 recive 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 *Root*, 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. oooo.

The Medicinal Consideration.

Diseases of the Teeth in Infants. Tooth-Sicknesses of Infants, have two times in which they are wont to torment and kil. The first is when the Tooth first sprouts within the Gum, which is called *Odaxismos*, which causes the Gums to Swel and be inflamed, brings Feavers, continual Vomiting and Loosness: the other is the time of the breaking forth of the Tooth, which is called *Odontophua*, and then the poor Infants are most of al vexed and tormented with pains.

The

The teeth of grown Persons are troubled with divers Diseases, as *Distempers*, *Dryness* through Age, and *Looseness*; with Organick Diseases in *Number Deficient*, when they fal 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 grown persons.*

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 Scituation, when they stand not close together, or when the lower Teeth are not just against the upper, or when the upper Teeth fal within the lower, or when Teeth grow in the Palate of the Mouth.

Diseases common are, when the Teeth Scale and moulder away with rottenes, or when they are broken. *Symptomes of the Teeth are.*

Symptomes 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 likenes 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 smal a Part. *Celsus* Book the sixt Chap. 9. *Setting on edge* *Tooth-ach.*

Simple Affections of the Teeth are Blackness, Rustyness and a clammy ghrishness (which *Hippocrates* counts the sign of a strong Feaver) also a stony Crust which grows upon them.

Symptomes 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. *Stinking.* *Excrescence.* *Worms.* *Bleeding.*

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 cloathed with the Gums flesh, and to abide and serve to chew the Meat with the other Teeth? *whether a Tooth may be fastened in the place of one drawn out?*

He that shal consider that the Teeth have Life, do receive Veins, Arteries and Nerves; do feel, are pained; and firmly tied and fastened with certain bands into the Gums: wil never say that a strang 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 shal do. Yet some Physitians in favour of a Norman Tooth-drawer, would perswade 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 Eare, 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.

Somtimes a bony Fungus or Spungy substance grows out of the hole of a Tooth, and comes to be so big as to fil 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. *How the Spungy excrescence is taken out of the Tooth-hole.*

You shal 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 rely upon this Regeneration of Teeth, *whether Teeth do breed in al Ages?*

so as certainly to make account thereof, and expect it after seven years are over.

To *Clense* the *Teeth* you shal find an *Admirable* Water, in the *96. Counsel* of *Fernelius*

Chap. 9. *Of the Gums.*

The natural Constitution of the Gums. 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

Preternatural. 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. Inflamation of the Gums is called *Parulis*: if the Flesh grow from an Ulcer, its

Epulis. termed *Epulis*. Somtimes the Gums are *Cancerated*, and somtimes they bleed

Cancer. immoderately.

The Gums are Eaten up by Ulcers called *Aphthæ*: in the Scurvy (which the Old Physitians called *Stomachache* and *Oscedo*) the Ulcers of the Guns are Malignant.

Aphtæ. Somtimes these *Aphthæ* or Ulcers of the Gums are so Malignant, that they eate into the Tongue, *Uvula*, and *Tonsillæ*, without suspition of the Venereal Pox. such are described by *Aretæus*, and such appear in that strangling Spanish Disease, which the Spanjards cal *Garotillo*, and which is common to the inhabitants of Naples (who cal it *Ulcus Syrianum Faucium*) perhaps by reason of their Commerce with the Spanjards, who are much subject to the Kings-Evil: and therefore the Malignant Humor of the Kings-Evil does Produce such Symptomes in the Mouth and Jaws.

Chap. 10. *Of the* Palate.

The structure of the Palate. THe *Palate* is the [a] Vaulted Roofe of the Mouth, which is a very thin bone, cloathed with a [b] Nervous Skin, which is wrinkled, by reason of the Crevesses which are ingraven in the bone: and therefore it sticks very hard to the bone, which has no *Periostium*.

Its Rottenness. This most tender bone does many times become rotten in the Whores-Pocks, the Palate being boared through (if care be not taken in time) whether the infection be lodged in the Mouth, or within the Nose: which Hole so boared 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] *Gargareon* 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 Quil is to the Musical Instrument, whose strings are struck therewith. It is therefore called the striker by *Paulus Ægineta* in the 51. Chapter of his sixt 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 fal into a Consumption.

Its Muscles. It has [a] Muscles for motion, though it be moved very obscurly or rather suspend-

ed

ed in *Æquilibrio*. Of these Muscles you may read in my History of the Muscles. *Lib.* 5.

To this Particle are adjoyned certain *Lateral Ligaments*, which being widened and spred forth by a Defluxion of rheum, they resemble the wings of Bats or Flitter-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 termd *Staphyle*, if it represent a Pillar, tis called *Columella* and *Chion*; if it grow loose and slap by reason of the Rheum, tis called *Chalasis* Gargareonis; and then it is contracted and drawn back, by sprinckling salt or Peper 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. L L. &c. [b] T. 13. f. 15. D. [c] T. 13. f. 15. D. [d] T. 13. f. 15. A.

[a] T. 13. f. 15. B B. C C. &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.*

The Kernels there placed are called [a] *Antiades* 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 swel and grow to such a greatness, that they descend into the Throat like two Apples and hinder the Patient from swallowing and fetching breath. *Diseases of the Tonsillæ.*

They are often inflamed and Impostumated, and then they must be pricked deep in with a lancet, to let out the blood or quitror, otherwise they choak the Patient. Sometimes they are inflected 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 Spungy substance, compassed about with a thin Membrane. Although it seem one, yet is it divided into two Parts, which are so separated, although closly connexed; that one side may have the Palsie and the other be free, and the one side may be discoloured and the other not. *The Tongues Substance.* *Number.*

It is placed in the Mouth and throat, born up by the Basis of the [c] *Os Hyoides*, and tied with a strong band. It was very conveniently thus seated, that it might discover the Diseases which lie hid in the three Cavities of the Body *viz.* The belly Chest and Head. For it is soaked and tainted with the moist and suliginous Excrements of those Parts, and has the Color of that Humor which bears most swey in the Body. *Situation.*

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 al 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 breath 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 *Linguæ*, the bottome of the Tongue. That it may not run out to far, or wander from its bounds,

Frænum it is retained by a band under neath, which is called *Frænum Linguæ*, the bridle of the Tongue.

Its Veſſels. It has Veins from the Jugular, Arteries from the Carotick. The Veins under

Kernels. the Tongue are called *Hypoglottides* or *Ranulæ*: and two Kernels placed there are likewise termed *Ranulares*, in which, grown round and hard, the foundation of the *Elephantiasis*, a kind of Leprosie, is bred, as appeares by the swelling of the Lips, Pushes of the Face, and thickness of the Tongue.

Muſcles 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.

[a] *T.* 13. *f.* 16. *and* 17. [b] *T.* 13. *f.* 14. *A. &c.* [c] T. 13. *f.* 11. *and* 12. *A.*
[a] *T.* 13. *f.* 14. *A.* [b] *T.* 13. *f.* 14. *B B.* [c] *T.* 13. *f.* 14. *a a. b b.* [d] *T.* 13. *f.* 14. *B. C. D. E.*

The Medicinal Consideration.

Diseases of the Tongue.

Similar. The Tongue is subject to divers Diseases, Similar, Organick, and common. For it is liable to al kinds of distempers; to looseness or softness, hardness, Density

Organical. and Rarity of substance.

It is Organically Diseased, when it is swollen in al its dismensions and cannot be

Common. conteined within the Hedg of the Teeth.

It is inflamed, when the Tumor called *Batrachium* rises under the Tongue, and turnes to an Impostum: out of which being opened, there flowes a substance like the white of an Egg and somtimes true quittor. 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.

It is also Ulcerated by those simple Ulcers termed *Aphthæ*, and somtimes with Malignant Ulcers, which putrifie, Eat and consume the same.

Whether its substance wil grow again. 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.

Its Symptomes Symptomes of the Tongue, of the first kind, are two, the Marring of Speech

Speech Abolished. and Tasting. Speech is marred three waies, by Abolition, Imminution and Depravation. *Abolition* of *Speech* is termed *Anaudia*. Depravation of speech is of

Traulotis. two sorts, *Traulotis*, *Psallotis* or *Balbuties*. *Traulotis* is when the Patient cannot pronounce some one letter, and *Psallotis* or *Pselliſmos* is, when he cannot pro-

Psallotis. nounce divers letters. *Ischnophonia*, *Stammering*, is a stoppage of the Tongue,

Stammering so that the Patient cannot proceed in his discourse, but repeats one and the same

Tonguetied letter often over before he can proceed. *Anchyloglossos* and *Mogilalia* are when the

Taſt Vitiated Tongue is tied either too strait or too loose.

There is a threefold marring of the Taste, not distinguished by names: for it is abolished, depraved and diminished.

The

The depravation of taſt happens when the Tongue is filled with ſome evil Humor. So that what ever it taſts is infected with that Humor and taſts thereof. Taſt is aboliſhed when the Tongue perceives no taſt in any thing. *Taſt depraved*

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 Taſt. *Palſie of the Tongue.*

In a total Palſie of the Tongue, there is great fear that the Patient wil fal 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 Color changed, which comes not only from the primary diſtempers thereof, but cheifly by Sympathy with the Bowels. *Tongue diſcoloured.*

There is a certain trembling or wavering of the Tongue obſerved in Diſeaſes of the Brain, which is a forerunner of the Phrenſie, according to *Hippocrates* in his Coicks.

Chap. 13. *Of the* Larynx, *or Head of the Wind-pipe.*

THe *Larynx* is the Head of the [a] *Aſpera Arteria* or Wind-pipe, the inſtrument of modulating our ſpeech, and the Channel by which Air is breathed in and out. *The Larynx. its Scituation*

Tis 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 ſwel 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 [b] *Thuroides*, the ſecond [a] *Cricoides*, and thoſe are the two largeſt and hardeſt. The third is the [b] *Arytænoides*, which is placed upon the *Cricoides* and ſhuts up the *Larynx*. Within there is obſerved a fourth, which is called [c] *Glottis*, being the principal Inſtrument of framing the Voyce, which is contracted and dilated with the *Arytænoides*: but the *Arytænois* 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 Exſpiration or the going out of the breath, by which all the Muſcles are looſened, and Expulſion ceaſes from the inferior Parts. Only the *Glottis* Acts, in the Modulation of our Speech. *Griſtles Thuroides Cricoides. Arytænoides. Glottis.*

And that nothing either ſolid or Liquid might fal into the *Larynx*, it has a cover, which is called [d] *Epiglottis*. It ſtands alwaies open for Reſpiration ſake, nor is it depreſſed ſave by the weight of what is eaten and drunk. *Epi.*

The whol *Larynx* is *Moveable* by way of *Aſcent* and *Deſcent*, through help of Muſcles, for to Facilitate our ſwallowing. *Its Motion.*

Again, two Cartilages or Griſtles are moved by themſelves *viz.* The *Thyroïs* and the *Arytænois*. The former is widened and contracted, the latter is ſhut and opened. For thoſe are contrary motions, which are performed by [e] 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 ſhal ſpeak in my Doctrine of Muſcles. *Its 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 [a] *Aſpera Arteria*. Either thoſe parts were boney or the Halter way too thick, ſo that it could not ſufficiently force and rend the ſame.

The Medicinal Consideration.

Diseases of the Larynx. The *Larynx* is subject to a distemper, a Tumor and Inflamation, which when it happens, it hinders Speech and Breathing and strangles the Patient without any appearance of swelling, without.

Squinzie. Within fifteen or twenty hours it kils 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, wil 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 al breathing is stopped, and consequently sudden death must needs follow.

Privation of Speech. The Action of the *Larynx* is breathing, and the forming of speech and singing. Privation of speech is termed *Aphonia*, the depravation thereof is *Raucedo* Hoarsness: the Imminution thereof is called *Ischnophonia.*

Hoarsness.

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 waies 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 stif, so that it wil not be born down save by the weight of solid meat, with which that which is liquid slips along.

When it is become 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 crumms of bread and some portion of what is drunk, do slip into the Wind-pipe.

Nature has provided against this inconvenience, having by the sides of the *Glottis*, which is almost alwaies 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. *E E.* [b] *T.* 13. *f.* 1. *and* 2. *f.* 8. *A.* [c] *T.* 13. *f.* 3. *and* 4. *f.* 9. *and* 10. *D D.* [b] *f.* 5. *and* 6. *f.* 10. *a a.* [c] *f.* 10. *beneath A.* [d] *T.* 13. *f.* 7. 9. *and* 10. *A A.* [e] *f.* 8. 9. 10. *&c.* [f] *f.* 9. *and* 10. *between A. and E.* [g] *f.* 9. *and* 10. *E E.*

Chap. 14. *Of the* Aspera Arteria *or Wind-Pide.*

Use of the Weasand. 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 sooty 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

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 in stead 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-band brought from the top of the Hip as low as the Ankle.

[a] T. 1. f. 1. L. T. 24. f. 1. B B. [b] T. 1. f. 1. M. T. 24. f. 1. C C. [c] T. 1. f. 1. N. T. 24. f. 1. f f. &c. [d] T. 1. f. 1. P.
[a] T. 1. f. 1. Q. R. T. 24. f. 4. a a a. &c. [b] T. 1. f. 1. S S. T. 24. f. 4. m. [c] T. 24. f. 4. f f.

Chap. 6. *Of the Arteries which are opened.*

THe Ancient Physitians were wont to open Arteries as wel as Veins. Howbeit *Horatius Augenius* in his Book of Blood-letting, disswades 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 Venæ Sectione*, commends the opening of the Smaller Arteries in very bitter and old paines of the Head. *whether Arteries may be opened?*

Heurnius 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 loose ten Porringers of the venal blood. And *in his Commentary upon the* 23. *Aphorisme 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 al learned Artists would think of it. *What Arteries are to be opened?*

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, Inflamations and extream pains of the Eyes and Ears. *In the Forehead.* *In the Temples*

As for the opening of the temporal Artery *Thadæus Dunus*, in the 12. Chap. Of his *Miscellanies*, shews how profitable a Remedy, it is.

Lazarus Sotus aforementioned, in the same place, observes that the Arteries behind the Ears are profitably opened in *Portugal*.

Ludovicus Mercatus a Spanish Physitian suspects this *opening of these Arteries*, for fear it should make Men Barren. But daily 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 Spunge, 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 Ægineta*, *Aetius* and *Albucasis*, is to be rejected, who did first cut the Skin before they opened the Artery. *In the hind Part of the Head.*

Galen in his Book of Blood-letting near the end, in an Inflamation of the Liver opened the [a] Artery, which Runs out between the Thumb and Fore Finger. *In the Hand*

Which, *Prosper Alpinus observes to be very usual in* Egypt, *in his third Book and* 12. *Chap. De Medicina Egypt.* 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 the Foot*

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 Orifice grow together again: and therefore in a lean Body, an Artery being unawars opened in the Arm, may be closed again, if it be timly and closely tied as is fitting, to avoid *Aneurisma*.

An experiment of Benedictus for the Rheumatism.

Before we think of opening the Arteries of the Head to turne away Fluxions, that experiment of *Alexander Benedictus* wil not be unprofitable, to apply unto the Shorn 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 Benedictus* 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 a foresaid.

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 al the Muscles of the Body, I wil begin at the Frontal or [a] 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 assigne to each of them its Muscle, and I can find no other save the Orbicular [b] Muscle of each Eye-Lid; for the Eye-brows cannot be drawn down without the Eye-Lids be closly 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 spred 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 fourth

The [b] 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 closly shutting the two Eye-Lids, it lifts up the lower and draws down the Eye-brow.

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 Scituation and action. One is termed [c] *Supernus and Attollens Oculum*, the upper, and the Eyes up lifter; another is called [d] *Infernus* and *Deprimens Oculum*, 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 or the *Students Muſcle*; the other placed at the ſmaller corner is called [f] *Indignatorius*, the *Diſdeigners* Muſcle. *The Attollens.* *The Deprimens* *The Adducens*

They al *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 Abducens*

The Contranitency 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 greater Corner, and might be fixed in continual reading or looking upon ſomwhat, Nature has framed two other Muſcles, which are termed Oblique, becauſe they direct the Oblique motion of the Eye, which is none at al, 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*, conteins in it a wonderful peice 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 Major.*

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. *The Obliquus Minor.*

[a] T. 19. f. 1. *AB.* [b] T. 15. f. 1. *F F.* [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. *F.* [b] f. 3. *and* 4. *G.* [c] 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. *Of the external Ear.*

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. *The common.*

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. *One proper.*

The later Anaromiſts 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. *Internal Ears* *First.* *Second*

In Bruts 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. = [a] T. 20. f. 5. A. = [b] T. 20. f. 5. C C. =

Chap. 12. Muscles of the Nose.

One Common. THey are common and proper.

The common is only one, being the upper portion of that Orbicular Muscle which compasses the [c] 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 largly Nosed, two [e] little Muscles are found, spred upon the extream Gristles 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 somwhat long and thin, and arising from the bone *Zygoma*, it is terminated in the meeting of each Lip.

2. Buccinator. The other common one, is vulgarly termed [e] *Buccinator* or the Trumpeter, it were more rightly called *Bucco* the Cheek driver, because it stirs the Cheeks, whilst 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 swel. 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.

Chap. 14. *Muſcles of the lower Jaw.*

THey are on either ſide ſix. The [a] *Temporal* Muſcle, being a very ſtrong one lifts up the Jaw. It ariſes from the whol 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 *Pterygoideus* [b] *Internus*, ariſing from the Cavity of the *Apophyſis Pterygoides*, and terminated at the corner of the inferior Jaw. It is called by *Galen Maſſeter Internus*. *Pterygoideus Internus.*

The Jaw is drawn down wards by the *Digaſtricus* or *Twi-Belly'd Muſcle*, and the *Muſculus Latus* or Broad Muſcle. *Digaſtricus.*

The *Digaſtricus* or *Twi-Belly*, being in the [c] middle Nervous and fleſhy at the Ends, ſprings from the *Apophyſis Styloides*, and being in the Middle reflexed about the *Stylo-Ceratoides*, it is inſerted into the Chin, under the bending of the Jaw.

The *Muſculus* [d] *Latus* or *Broad-Belly*, ariſes from the upper Part of the Breſt-bone, the *Clavicula* and Shoulder point, and cleaves firmly to the Baſis of the inferior Jaw, muffling the Neck and whol Face; and by reaſon of the afore-ſaid Adheſion, it is ſaid to draw the Jaw downwards. *The Latus.*

Pterygoideus [e] *Externus*, the *external wing faſhiond Muſcle* forces the Jaw forwards, which being ſwelled does lightly drive the Jaw-bone forewards: which happens in the overſhooting of the Jaw-bone, when the lower Teeth are above the upper Teeth. *Pterygoideus Externus.*

The Jaw is plucked about this way and that way by the *Maſſeter* or *Chaw Muſcles* being in its Original Twi-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 [g] Hyoides, is placed in the Neck to a prop and foundation for the Tongue and *Larynx*, it has obtained Muſcles as wel 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 cal it *Mylo-byoideus*, becauſe, it does not any waies touch tha Tongue.

[g] T. 15. *f.* 1. *P P. f.* 2. *A A.* [a] T. 15. *f.* 2. *a a.* [b] *f.* 2. *D D.* [c] *f.* 1. *T T. f.* 2. *C C.* [d] T. 10. *f.* 1. *ζ ζ.* T. 15. *f.* 2. *F.* [e] *T.* 15. *f.* 2. *E E E E.* [f] *f.* 1. *S. f.* 2. *B B.* [g] T. 13. *f.* 11. *and* 12. *A B C. &c.*

The *Os Hyoides* is lifted up by the Muſcle [a] *Geniohyoideus*, it ariſes from within the Chin and is inſerted into the Baſis of the *Hyoides*. *The Geniohyoideus.*

Aſſiſtant hereunto is the Muſcle [b] *Mylohyoideus*, it ariſes from within the Jaw in the Quarters of the Grinding Teeth, and reaches to the Baſis of the Bone *Hyoides*. *Mylohyoideus*

The bone *Hyoides* is drawn downwards by the Muſcle [c] *Sternohyideus* which ſprings from the top of the Breſt bone, and drawn out upon the Weſand is inſerted into the Baſis or bottom, of the ſaid bone *Hyoides*. *Sternohyoideus*

The Muſcle [c] *Styloceratbyoideus*, from the *Apophyſis Styloides* is carried into the Horns of the *Os Hyoides*. *Styloceratbyoideus.*

CHAP.

Chap, 16, *Muscles of the Tongue.*

Genyogloſſus. THe Tongue is forced forward by the Muſcle [c] *Genyogloſſus*, 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 carryed unto the Root of the Tongue.

Styloglóſſus. It is forced ſidewaies to the right and left, by the Muſcle [g] *Stylogoſſus*, which taking its beginning at the *Apophyſis Styloides*, is extended into the middle, very near of the Tongue.

[a] *T.* 13. *f.* 13. *B B.* [b] *f.* 4. *E E.* [c] *f.* 13. *D D.* [d] *f.* 1. *E E.* [e] *f.* 13. *C C.* [f] *f.* 14. *B B.* [g] *f.* 14 *D D.*

Chap, 17, *Muſcles of the* Larynx.

THe whol body of the *Larynx* conſiſting of *five Griſtles*, is moved upwards and downwards.

Hyothyroideus. It is drawn upwards by the Muſcle [a] *Hyothyroideus*, 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 Breſt bone, and ſtretched out upon the Channel of the *Aſpera Arteria* or Weſand, it aſcends unto the the Baſis of *Thyroides*.

Two only of the Griſtles of the *Larynx* are movable, *viz.* The [c] *Thyroides* and the [d] *Arytænoides*, and to procure their motion they have little Muſcles, which ſpring out of the immovable Griſtle *Cricoides*.

Cricothyroideus Anticus. The *Thyroides* is dilated by the Muſcle *Cricothyroideus 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 [f] *Cricothyroideus Lateralis*, which ſpringing from the lateral part of *Cricoides*, is inſerted externally into the ſides of *Thyroides*.

Thyroarytæneideus. The *Arytænoides* is opened by the Muſcle [g] *Thyroarytænoideus*, which ſpringing from the inner and foremoſt part of the *Thyroides*, ends into the ſides of the *Arytenoides*: or rather it takes its riſe from the *Cricoides* and *Thyroides*, being placed between both.

Arytænoideus. The *Arytænoides* is ſhut by one only Muſcle called *Arytænoideus*, which [a] compaſſes about and ſhuts the *Arytænoides*, like the Sphincter Muſcle, and alſo with its Baſis it Streightens the Glottis, for to make the voyce ſound the better.

The *Epiglottis* has [i] no Muſcles to lift it up and ſhut it down in Mankind, as it has in Brute Beaſts.

[a] *T.* 13. *f.* 8. *B B.* [b] *f.* 8. *C C.* [c] *f.* 1, 2. 8. *A.* [d] *f.* 5. *and* 6. [e] *f.* 3. *and* 4. *f.* 9. *and* 10. *D D.* [f] *f.* 9. *C C.* [g] *f.* 9. *B B.* [h] *f.* 10. *B B.* [i] *f.* 9. *and* 10. *A.*

Chap, 18, *Muſcles of the* Pharynx.

THe *Pharynx* which is the beginnig 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 *Oeſophagæus*.

Spheno-Pharingæus. The firſt is [a] *Spheno-Pharingæus*, 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 ſeemes 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 *Oeſophageus*, does draw together and cloſe the [d] *Pharynx*, which growing out of one ſide of *Thyroides*, and compaſſing round the hinder part of *Oeſophagus*, is implanted into the other ſide of *Thyroides*; or being outwardly faſtened to both ſides of *Thyroides*, it draws together the beginning of the *Oeſophagus* and purſes the ſame like the *Sphincter* Muſcle of *Anus*. *Oeſophagæus.*

[a] *T.* 3. *f.* 2. *and* 3. *B B.* [b] *f.* 2. *and* 3. *A A.* [c] *f.* 2. *and* 3. *C C.* [d] *f.* 2. *and* 3. *D D.*

Chap. 19. *Muſcles of the* Gargareon, Uvula, *or* Mouth Palat.

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 ſmal Tendon [g] which paſſes through a chink ingraven 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. *B B.* [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] *Maſtoideus*, and bows the Head; it ariſes from the top of the Breſt bone and middeſt of the *Clavicula*, and is obliquely inſerted into the *Apophyſis Maſtoides*. *Caput flectens. Maſtoideus.*

Somtimes in the forepart of the Neck, there is another Muſcle next the Long Muſcle, which helps the *Moſtoideus* to bend the Head: and I have many times ſhewed this Muſcle, and ſomtimes I have ſeen it wanting.

Six Muſcles do extend the Head: of which two are large, the other four ſmal. *Extenders.*

The firſt of the larg 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. *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 foreſaid *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

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. 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

Obliquus major. 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. K K. f. 3. H. f. 4. F F. — [b] f. 2. H H. — [c] f. 2. I I. f. 3. E F. — [d] f. 3. and 4. I I. — [e] f. 3. i. f. 4. K K. — [a] T. 14. f. 3. L. f. 4. G G. — [b] T. 14. f. 3. K. f. 4. H H. —

Chap. 21. *Muscles of the Neck.*

The Neck benders. 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 uneven-sided 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 al the bodies of the *Vertebra's*, ending into the former part of the first *Vertebra*.

The Scalenus. The *Scalenus* arising from the [d] first Rib of the Chest, it is inwardly ingrafted by oblique Fibres into al the overthwart or transverse Eminencies of the Neck-bones: through it the Vessels are drawn, which are to be distributed into the Arm.

The Extenders The Neck is extended or stretched out by two Muscles.

Spinatus 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 al the transverse Eminencies of the Neck.

[c] T. 13. f. 18. A A. — [d] T. 13. f. 18. B B. — [e] T. 14. f. 4. D D. — [f] T. 14. f. 4. E E. —

Chap, 22, *Muscles of the Shoulder-blades.*

Shoulder blads lifter. THey are four in Number. The Muscle *Levator* [g] *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 blad 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-blad is drawn forwards by one only Muscle termed *Serratus* [b] *Minor*, which arises out of the four upper most Ribs, and ends in the *Coracoides*.

Rhomboides It is drawn backwards by the [c] *Rhomboides* or lozing fashioned, or diamand fashond Muscle, which arises from the three points of the lower *Vertebraes* of the Neck,

Neck, and the three points of the uppermoſt *Vertebraes* of the Cheſt, and is inſerted into the external Baſis of the Shoulder-blade.

Although by its own weight it return to the natural Scituation: 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. *Muſcles of the Arm.*

THey are nine. The *Muſcle Deltoides* and *Supra Spinatus* do move it upwards. *Arm liſters.*

The *Deltoides* [e] does ariſe from the middeſt of the *Clavicula*, the Shoulder tip, the whol ſpine of the Shoulder-blade, and is carried out unto the middle of the Arm. *Deltoides*

The *Supraſpinatus* being thruſt into the Cavity above the *Spina* or ſharp point of the *Scapula*, and being conveighed under the Shoulder tip, is inſerted into the Neck of the Arm. *Supraſpinatus*

The *Latiſſimus* and *Rotundus Major*, do move the Arm downwards: the *Latiſſimus* [f] ſprings from the ſharp prominencies of the *Os Sacrum*, of the *Vertebraes* of the Loins, and of nine *Vertebraes* 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 whol lower Rib of the Shoulder-blade, and ends very near in the middle of the Arm. *Rotundus major.*

The *Pectoralis* and *Coracoidæus* draw it forward. The *Pectoralis* ariſes out of the firſt ſixt and ſeventh true Ribs, the Breſt-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 *Coracoidæus* [c] ſprings out of the *Apophyſis Coracoides*, and ends very near in the middle of the Arm; it draws the Arm towards the left Shoulder. *Coracoidæus.*

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 is 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 *Omoplata* or Shoulder-blade, and is carryed out unto the Neck. *Immerſus*

The three laſt Muſcles which act al at once, do carry about the Arm upwards with a ſudden motion ſtanting 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 *Brachiæus 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 conveyghed through the cleft of the Arm, the other taking its Riſe from the *Apophyſis Coracoides*, they are after united and make one Tendon, *Biceps*

Tendon, which is inserted into the inner Part of the *Radius*, there where it bunches out.

Brachiæus internus.

The *Brachiæus* [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 Brachiæus 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.

Brachiæus externus.

For the third Muscle *Galen in the first Book and last chapter of his Anatomical Administrations*, reckons a lump of Flesh which is confounded with the two foregoing Muscles, and inserted into the same place. I cal it *Brachiæus externus*, because being spred 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 Poplitæus*. It arises out of the lower and hinder Part of the Arme, 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. Somtimes it cleaves so fast to the Fleshy end of *Brachiæus Externus*, that there is no apparent difference to be discerned between them; and then it is Judged to be a portion of the *Brachiæus 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 form 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 thereinto inserted, being altogether Fleshy. Also it Knits the *Ulna* to the *Radius*, as if it were a Ligament.

The *Radius* is drawn down backwards by two external Muscles.

Supinator Longus.

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. [c] *T.* 22. *f.* 2. *and* 3. C. [f] *T.* 22. *f.* 1. B.

[a] *T.* 22. *f.* 1. G. [d] *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. *a. 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.

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*, the other *Radieus*, by reaſon of their Scituation. *wriſt-benders*

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 aloft. *Cubiteus Internus.*

The *Radieus* [b] *Internus*, having its original in the ſame place, and being ſtretched out upon the *Radius*, is inſerted into that bone of the *Metacarpium*, which ſuſtaines the fore Finger. *Radieus 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 extenders*

The *Radieus* [c] *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. *Radieus 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 faſhiond 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 ſpred into the hollow of the Hand, as far as the firſt Articulation of the Fingers. *Long Palmar Muſcle.*

In its original it is Fleſhy and preſently after leſſens it ſelf into a ſmal 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 ſence 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 peice of Fleſh four Square* of a Thumbs breadth is found upon the Ring-ſhaped Ligament, which is redder then the Fleſh, between the Thumb and the middle Finger, and is ſomtimes ſingle and ſomtimes 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 Fleſhy part of the Hand called *Thenar*, and to be inſerted into that ſame eigth bone of the Wriſt, which is placed out of order. *Short Palmar Muſcle.*

Its Office is to hollow the Hand and so to make *Diogeneſs* his Diſh to drink out of, together with the Muſcles of the Thumb and the *Hypothenar*. This Muſcle ſhal be named *Palmaris brevis*; the *ſhort Palm Muſcle*.

[a] T. 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 foure [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 [c] divided into four, it is carryed 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 ſtraitly infold the Tendons of the *Muſculus Profundus* and Sublimis, leaſt 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 Oyly 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 Interoſſeans.

Extenders

The Muſcles which extend the Fingers are *Common* and *proper*.

Extenſor Magnus.

I cal them common, which ſerve the four Fingers, ſuch as the *Extenſor magnus Digitorum* [the great extender of the Fingers] or which beſide extenſion, do cauſe other motions, as the *Lumbracales* and *Interoſſei* joyned 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 Auricularis* [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 movers.

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.

Interoſſeans.

And this motion is performed by the *Interoſſean* Muſcles: of which there are three [d] External and as many [c] Internal, ſpred in the ſpaces between the Bones of the *Metacarpium*.

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 ſmal Tendon, they creep ſide longs over the three bones of the Fingers, until they come unto the Roots of the Nailes; 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 ſhal obſerve two Muſcles, which are as it were external interoſſeans, which are ſpred without, upon the firſt and fourth bone of the *Metacarpium*, the one of which called [f] *Hypothenar*, is *Peculiar* to the little Finger, and may be divided into two. *Proper.* *Abductor minimi.*

It *ariſes* from the third and fourth Wriſt bone of the ſecond Rank, and is ſidewaies inſerted into the Joynts of the ſame Finger, to draw the ſame towards the outſide.

The other belongs unto the *fore Fingers*, and lying beneath the *Antithenar*, it 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 Indicis.*

Beſides the Tendon of the common extender, it has a *Peculiar extenſive Muſcle*, which may be termed Indicator the [g] Pointer, becauſe this Muſcle ſerves the Finger to point withal. *Proper extenders.* *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 greate extender. *Of the little Finger.*

Mean while you ſhal obſerve the *Lumbrical* or worm Muſcles, which are ſomtimes three, other whils 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.* [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.*

[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.* [g] *f. 3. l.*

[a] *T. 22. f. 3. ζ.*

Chap. 29. *Muſcles of the Thumb.*

THe Thumb has peculiar Muſcles, whereby it alone is bended, extended and moved ſidewaies. *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 Joynt of the Thumb, by a double and ſomtimes 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 Joynt of the Thumb.

The Thumb is *bended* by [d] one Muſcle, which growing out of the Inſide of the Cubit, it carryed unto the ſecond and third Joynt thereof. *Bender.*

It is *moved ſidewais* by two Muſcles. *Lateral movers.*

[b] *T. 22. f. 3. M.* [c] *T. 22. f. 3. L.* [d] *T. 22. f. 2. D.*

The *Thenar* [a] ariſes from the inſide of the Wriſt, beneath the Thumb, and is inſerted into the ſecond Joynt 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 Joyned unto, and seated beneath the Thenar, grows out of the three lower bones of the *Metacarpium*, and is inserted into the second Joynt of the Thumb. It may be called *Hypothenar Pollicis*, because it is spread out under the Thenar.

[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 Brest with their help, as *Auxliaries*, such as are the upper Mu cles of the Shoulder blade.

Which widen. 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 fift 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 Brest 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 uppermore 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 *Vertebras* 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 forward 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 Midrif.

Triangular Muscle. The *Triangular Muscle*, growing out of the middle and inner Part of the Brest-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 Brest, the *Sacro-Lumbus*, *Intercostalis internus*, and *Serratus Posticus inferior*.

Sacrolumbus. The *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 clasp, 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 fil 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* [f] *inferior*, growing out of the spines of the three lowest *Vertebraes* of the Back, and the first of the Loins, is *Terminated* into three or fower of the lower Ribs.

This same *Serraticus Posticus* inferior, is just opposite to the *Serraticus Posticus* superior, and both of them by a broad and *Membranous Aponeurosis*, 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 ad eight Muſcles of the Belly, becauſe more Muſcles are requiſite to cauſe violent Exſpiration.

[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 Midrif.*

THe *Diaphragme* or Midrif is an [a] admirable kind of Muſcle, both in regard of its compoſition and continual Action, whiles it does night and day inceſſantly fan the Natural and Vital Parts, ſerving nevertheles as a Wal of partition to ſever the one from the other. *Uſe of the Midrif.*

It ariſes from the Circumference of the baſtard Ribs, through which it is obliquely drawn about, as far as to the *Vertebraes* of the Loins: the end or Sinewy Part thereof, is in the Nervous Centre. *Its Original.*

When we draw in the Air, it is contracted and benr, 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 *Mediaſtinum* drawn upwards, and of ſtraight is made Convex or bunching like the ſurface of a Bucklar. *Its Motion.*

[a] *T.* 10. *f.* 1. 11. *f.* 6. *and* 7. *the whol.*

Chap. 32. *Muſcles of the Back and Loyns, wherewith the Back-bone is moved.*

THe *Back is not 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 remaines 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 *Vertebraes*, and receives none; and becauſe it is Contiguous with the Loins, *The Motion is attributed to the Loyns rather than to the Back*: although it belong to the whol Back-bon.

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 Loins 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 *Vertebraes* 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 whol 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 whol 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 Loins are diſtended by *four Muſcles, on either ſide two*, which are ſo infolded al along the Back-bone, that either we muſt make ſo many pares, as there are *Vertebraes*, or we muſt ſay there is only one Pare of Muſcles diſtributing Tendons to al the *Vertebraes*, according to the Opinion of *Galen*. *Extenders.*

The *Semi-Spinatus Muſcle*, takes a [b] ſinewy beginning, from al the Spines of the *Os Sacrum*, and ends into the tranſverſe Apophyſes of the Loyns and whol 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 *Vertebræ* 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 wil nevertheless serve to erect the Spina; and they wil be ever more *Antagonists* against the Muscles which bend the *Spina*, *viz.* The *Quadratus*, and the *Musculus Obliquus* ascendens.

For they receive Nerves, as wel in their upper as middle Parts.

[a] *T. 14. f. 2. O O. f. 4. C C. f. 1. N N.* [b] *T. 14. f. 3. D D. f. 4. A A.* [c] *T. 14. f. 4. B B.*

Chap 33. *Muscles of the Belly.*

BEcause those [a] ten Muscles, which are found displayed upon the Belly, were accurately discribed, *At the beginning of the first Book*, I wil 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 forwards.

THe frame of the *Ilian* 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 Cheft resting and the Thighs remaining unmoved, unless they follow the Motion of the *Ilium* Bones.

By what moved 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.

THey are *Proper* or *Common*.

Proper Muscle of the Stones. Cremaster.

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 fag-end of the Oblique ascending Muscle, bordering upon the *Os Pubis*, whose Flesh is redder, thinner and as it were severed from the Flesh of the said oblique ascendent Muscle. It infolds 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, Scituate 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 wil; their is a [c] round fleshy Muscle which being rould back over the Prostatæ, does shut

ſhut the bladders Neck; and being made broad it expels the Urin; and by wringing or ſqueezing the *Proſtatæ* or Auxiliary Teſticles, it ſquirts out the Seed in Venereal Conflicts. Now the Neck of the Bladder being Fleſhy, performes 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.*
[a] *T.* 14. *f.* 4. *BB.* [b] *T.* 14. *f.* 3. *DD. f.* 4. *AA.* [c] *T.* 6. *f.* 2. D D.
[d] *T.* 6. *f.* 2. *BB.* [e] *T.* 6. *f.* 5. *F F.*

Chap. 37. *Muſcles of the Yard.*

THe Yard has four Muſcles, two on each ſide.

Yards Erectors

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 ſidewaies as far as the middle of the Body thereof.

Accelerators.

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 ſpred out under the *Vertebra* or Piſs-pipe, it is drawn out as far as to the middle of the Yard.

It haſtens the ſquitting 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 cal 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 of Office. Of which I have treated in my firſt Book, in the Chapter which deſcribes the Womb.

[a] *T.* 6. *f.* 1. *a a. f.* 5. *HH.* [b] *T.* 6. *f.* 1. *bb. f.* 5. *II.*

Chap. 39. *Muſcles of the Fundament.*

I Have deſcrided 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.

Extenders of the Thigh.

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 Glutæi*; that is the Buttock Muſcles.

Maximus and *extimus* [a] *Gloutius*, the greateſt and outmoſt buttock Muſcle, is bred out of the ſpines of *Os 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.

Gloutius maximus.

Secundus and *medius* [b] *Gloutius*, the ſecond and middle buttock Muſcle, ſprings out of the external Part of the *Os Ilium*, and is inſerted into the great and exteenal *Trochanter*.

Medius

Minimus *Tertius* and *intimus* [c] *Gloutius*, 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*.

Benders. The Thigh is bended by three Muscles.

Psoas. *Primus Lumbaris*, The first Loyn Muscle called [d] *Psoas*, spred over the bodies of the Lumbal *Vertebraes*, in the Cavity of the belly; is bred out of the transverse Apophyses of the lower *Vertebraes* of the back, and being carryed along upon the inner surface of *Os Ilium*, it is inserted into the lesser *Trochanter*.

I have in Men, oftimes found a little Muscle spred 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 straitly 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 Cut-Purse*, it was my hap to see one of these Muscles, she having been hangd 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. *O O.* 1. 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 foreside.

Drawer to. 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 *Ossa 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 Climbe Trees, ascend to the Main mast and Ride on Horse-back.

This treble headed Muscle is the first that receives the Excrementitious Humors of the body which fal into Legs, because of the Vessels which pass that way.

Withdrawrs. 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. *C C.*

The Quadrigeminals. The *Musculi Quadrigemini*, are four little Muscles, interchangably placed upon the Articulation of the Thigh in the hinder Part thereof.

First The first and [a] uppermost of the *Quadrigemini* being longer than the rest and as it were pear fashioned, is by others termed *Iliacus externus*. It arises from the lower and external Part of *Os Sacrum*.

Second The [b] second of the *Quadrigemini*, arises from the Tuberosity or bunchy Part of the Huckle-bone.

Third The [b] 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 *Pterygoideus internus*, interposed between the two Jaws, does drive the lower Jaw forwards.

The Fourth. The *Quartus Quadrigeminorum* [c] *Quadratus*, is broader and more fleshy than the other three, being distant from the third of the *Quadrigemini* two Fingers breadths;

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*. *Oblique wheelers.*

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 thorough 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. *Obturator internus.*

Its Tendon is folded up and incloſed by the ſecond and third *Quadrigeminal* Muſcles, 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 *Quadrigeminal* Muſcle. *Obturator externus.*

It governs the internal wheeling motion of the Thigh.

When the Quadrigeminal 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 it were half 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, wil have the Leg to be turnd inwards and outwards by certain Muſcles ordained to that end. *The Motion of the Leg.*

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 Leg benders.*

The firſt of thoſe four, is called [b] *Semi-Nervoſus*, the Half ſinnew Muſcle. It ariſes from the Tuberoſity or bunching Part of the Huckle, and ends in the hinder and inner Part of the Leg. *The Semi-Nervoſus.*

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. *The Semi-Membranoſus.*

[a] *T.* 23. *f.* 4 *e.* [b] *T.* 23. *f.* 3. *G G.* [c] *T.* 23. *f.* 3. *H H.*

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 Biceps*

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 along the Inſide of the Thigh, it is inſerted into the inner Part of the Leg. *The Gracilis.*

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. *The Popliteus.*

Extenders.

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 *Ilian* bone and carryed into the fore part of the Leg, or rather of the Thigh, and gitts in the Muscles of the Leg it self, like a [e] *Membranous* swath, al save the *Musculus sutorius*.

The Membranosus.

The 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 sit Cross-Leg'd.

Rectus gracilis.

The *Rectus* [g] *Gracilis*, Springing out of the lower Spine of *Os Ilium*, and being carryed right out al along the Thigh, ends on the fore Part of the Leg, beneath the *Epigonatis*.

Vastus externus.

The two Muscles called *Vasti* 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. 23. f. 3. III. [b] T. 23. f. 3. F F. [c] T. 23. f. 4. H. [d] T. 23. f. 2. F F. [h] T. 23. f. 1. G G.

Vastus internus

The other which is [a] internal, arises from the Root of the final Trochanter, and fals into the inside of the Leg, a little below the Patella.

Crureus.

The Muscle termed [b] *Crureus* placed under the two *Musculi Vasti*, springs out of the fore bone of the Thigh, between the two Trochanters, and cleaving to the whol 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 Vasti* and the Crural Muscle, being united al together about the Knee, the 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 Phalanx 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 meane while you shal 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 firme, 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 *Tibiæus* and *Peronæus*.

Tibiæus anticus.

The *Tibiæus* [c] *anticus*, taking its rise from the upper *Epiphysis* of the Leg neare 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-fashion'd 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. H H. [b] T. 23. f. 1. &c. [c] T. 23. f. 1. K. [d] T. 23. f. 1. ζ.

Peronæus anticus.

The *Peronæus* [a] *Anticus* is in its Original joyned to the Peronæus 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 foreſide into the bone of the *Metatarſus*, which ſuſteines the little Toe.

The Foot is extended by the after-Muſcles. The firſt and outmoſt are the [b] *Gemelli or twins*, ſo called becauſe they are equal in Bulke, 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. *Veſalius* was the firſt that obſerved that. To ſeveral beginnings of every one of them, there are ſeveral little [c] Bones placed like unto Seſamine Seeds or like Tares 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. *Gemellus internus.* *externus.*

Plantaris [d] *Muſculus*, which lurks between the *Twins* and the *Soleus*, ariſes from the external knob of the thigh, being fleſhie on the upper part, and quickly ending into a very ſmal and longiſh tendon, it is drawn under the Heel, by the inner Ankle-bone, and diffuſed into the ſole of the Foot. *Plantaris.*

It performes 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 lieing under, might be firmly faſtened.

[a] T. 23. f. 1. L L. [b] T. 23. f. 1. d d. f. 2. D D. f. 3. K K. [c] T. 23. f. 3. e e. [d] T. 23. f. 3. M.

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* remarkeable veſſels have their paſſage, both Veins, and Arteries and Nerves: whence it comes to paſs that the pains of the Caſſe 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* terms 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 *Tibiæus poſticus* and the *Peronæus poſticus*. *Tibiæus poſticus.*

The *Tibiæus poſticus* does ariſe from the upper part of the Tibia, and being affixed to the whole bodie thereof, through the cleft of the inner Anckle 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 *Peronæus* [c] *Poſticus*, does ariſe from the upper and hinder part of the *Perone*, And being carried with the Peronæus anticus through the cleft of the external ankle bone into the bone of the *Metatarſus*, which ſuſtaines the greate 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 inter-oſſeans. *Peronæus poſticus.*

The Muſcles Peronæus anticus and Poſticus, as they are diſtinct in their original, ſo are they alſo diſtinct in their inſertion, although they are drawen through the pulley of the external ankle: but the Tendon of the other Peronæus Flexor, is inſerted into the outſide of the *Os metatarſi* which ſuſteines the little Finger.

The Tendon of the other Peronæan Muſcle, whoſe office is to extend the part, begin

being scituate behind, is carryed further and more inwardly under the Muscle called *Pediæus*. These two tendons are separated one from another, being incloſed in two distinct sheaths or scabberds, of a nerve-gristly substance.

[a] T. 23. f. 3. f. 3. L L. [b] f. 2. E E. [c] f. 23. f. 2. F F.

Chap. 43. *Muscles of the toes.*

The Annular 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 within a Ring-fashioned or *circular and transverse* [a] *ligament*, which does incompass them beneath the Ankles, just as we see in the Wrist.

Toe-stretchers.

They are extended by the *Musculus longus* and *Brevis*.

cnimodactylius

The longus, or [b] *long Toe-stretcher* called in Greek *Cnimodactylius*, takes its rise from the fore and inner side of the *Tibia*, there where it is joined to the *Fibula*, lurking close under the *Tibieus anticus*, and goes down-right all along the *Fibula*, till haveing passed the Ring-fashioned ligament, it ends into the three Articulations of the [c] foure Toes that it might at once and by one motion, move the three joyntings of the foure Toes aforesaid.

Pediæus.

Brevis Digitum tensor, or the [d] *short Toe-stretcher*, or *Pediæan* Muscle, springs out of the Heel and the external and upper part of the neighboring *Astragalus* or bone so called, and being spred 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*.

Perodactyleus.

Longus [c] *Digitum flexor* the *Long Toe-stretcher* called also *Pero-dactyleus*, arises out of the hinder and upper part of the *Perone* or *Fibula*, and being carryed along under the inner anckle, through a peculiar cavety of the Heel, it is divided into foure tendons, which are drawne through the slits of the short Toe-bending Tendon (as we see likewise in the Hand) and then inserted into the third Joynt of foure Toes.

[a] T. 23. f. 1. g. [b] T. 23. f. 1. M M. [c] T. 23. f. 1. f f. [d] T. 23. f. 2. G. [e] T. 23. f. 4. I I. f. 6. C.

Pediæus internus.

Brevis [a] *Digitum flexor*, or the *Pediæus internus*, or *short Toe-Bender*, springs from the inner and nether part of the Heel, and being parted into foure, 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 sidewaies by the Interossean Muscles. They are eight in number, foure internal and as many external, which are otherwise disposed in the foote than they are in the hand.

The Interossæans.

The [a] external arise from the spaces of the Bones of *Metatarsus*: the internal, being *scituate* in the [c] Hollow of the foote, and knit unto the bones, and seeme to take their original from that lump of [d] Flesh, which possesses and fils up that same Cavity of the Bones of the *Metatarsus*: but the membrane being taken away, they are seene to arise from one nervous pointed or acuminated Original, fixed on the inside neare the Heele, and divided into four tendons, and to end into the second Articulation, whereunto the worme-fashiond or lumbrical Muscles do cleave.

And therefore the external inter-ossean Muscles, doe fill up the empty spaces of the Bones of *Metatarsus*.

The Lumbrical or worm-fashion'd [e] Muscles, do not arise from the tendons of the *long Toe-bender*, as in the Hand, but from a fleshy lumpe, which lies hid underneath the *short Toe-bender*; and that has its original from the Heel.

Chap.

Chap. 44. *Muſcles of the Great* Toe.

THe *great Toe* [f] *Bender*, being ſcituate neare 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 Foote, 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 ſecurities ſake is intercepted, with two greater Seſamoidean Bones. *The great toe-bender.*

[a] T. 23. *f.* 4. *L. f.* 6. *A.* [b] T. 23 *f* 2. *aaaa.* [c] T. 23. *f.* 5. *dddd. f.* 6. *ffff.* [d] T. 23. *f.* 6. DD. [e] T. 23. *f.* 6. *eeee.* [f] T. 23. *f.* 4. *K. f.* 6. *B.*

Somtimes 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 [a] *Pollicis* the *great Toe-ſtretcher*, ariſes from the exrernal ſide of the *Tibia*, where it is ſeparate from the *Fibula* and creeping along the ſurface of the Foote, it is inſerted into the whole great Toe, in its upper ſide. The other ends into the Bone of Metatarſus, which is ſpred beneath the great Toe. *The Stretcher.*

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* [b] *Policis*, the Drawer aſide of the great Toe. *The Abductor,*

The other being externally ſpread upon the firſt Bone of *Metatarſus*, may be called *Abductor* [c] *minimi digiti*, the drawer aſide of the little Finger. It anſwers to the *Thenar* and *Hypothenar* of the Hand. *The little Toes Abductor.*

Furthermore the *Great* Toe has in the ſole of the Foot another *Tranſverſe* [d] *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 Joynt of the great Toe, beneath the ſame. *The great toes drawer to.*

This Muſcle is oppoſed to to the *Abductor*, that it might draw the *great Toe* back againe.

The fleſh being taken away, we find a threefold or fourfold Membrane, I ſuppoſe it is that Maſs of fleſh which fils the Cavitie 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 Foote which is termed *Veſtigium*, there is contained a [a] Lump of fleſh which fils up the Cavity and empty ſpace of the firſt Joynts: from whence writers ſay Tendons are drawn to the ſeveral Toes. *The Maſſa Carnea.*

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 ſpred under the Tendons of other Muſcles. *Its Vſe.*

Chap. 45. *An Introduction to the Art of* Muſcular-Diſſection, *ſhewing an Accurate* Method *to cut up the* Muſcles *of the whol 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 Anatomcal 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 Method*

The

The Frontal Muscle.

The frontal Muscle. The Skin of the forehead, being circulary cut off above the Eye-brows 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-browes. They are in the middle of the Forehead distinct one from another.

[a] T. 23. f. 6. D D. [b] T. 15. f. 1. E.

The Orbicular Muscle of the Eye-Lids.

The Orbicularis *The Ciliaris.* The Skin of the Eye-Browes 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 al sides, and is spred under each Eye-lid. Also, you shal find the *Musculus Ciliaris*, stretched out orbicularly under the Tarsus.

Muscles of the Lips.

Zeugomaticus. Afterwards, the whol Face being made bare and the Skin flead 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 shal pluck away with your nailes or with a paire of pinsers, or with a very sharp pen-knife, that the Musculous flesh may more evidently be distinguished.

Lip-heavers. From the Zygoma towards the Lips, you shal search for *five Muscles* besides the Zygomatick muscle: and you shal find two above the upper Lip; each of which is exactly to be separated from the other. That Muscle which is neerest the Zygoma, belongs unto the neather Lip, which is lifted up thereby. The other being very neare to the [c] Nostrils, is reckoned to belong to the upper Lip. The *lateral* [f] *Muscle* broad and Fleshy which opens and forms the Cheeks, and therefore is called *Bucco*, must not be stirred out of its place.

Buccinator.

Lip-depressers. In the neather jaw, as far as to the middle of the lower Lip, you shal search for two Muscles, having first taken away the skin.

[a] T 15. f. 1. F F. [b] T 19 f. 1. C C. [c] T. 15. f. 1. L. [d] T. 15. f. 1. K. [e] f. 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 fastend to the Corner of the mouth, drawes 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 asmuch as the Fibres of the former Muscle, do seeme 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 curiously taken away, two Muscles discover themselves being fastened unto the bones and laps of the Nostrils, which arising out of the space between the Eye-Browes, are carried into the laps of the Nostrills.

Nostril-widners. Other Anatomists ad (but only in such as have great Noses) *two little* [d] *Muscles spred athwart upon the ends of the Nose laps*, which widen the Nostrils, as the former do lift them up.

In

Other Anatomiſts ad (but only in ſuch as have great Noſes) *two little* [d] *Muſcles ſpred athwart upon the Ends of the Noſe-Laps*, which widen the Noſtrils, as the former do lift them up. *Noſtril widners*

In the Interim you ſhal 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 Neighboring parts.

The *internal Muſcles of the Noſtrils* are ſeldome found, and only in ſuch as have jolly toating Noſes.

The Temporal Muſcle.

That ſame thick and fibrous Fleſh which is ſituat between the ſmaller Corner of the Eye and the Ear, is called the [c] Temporal Muſcle; whoſe tendon being drawn along under the Zygoma, is [f] terminated into the Top of the lower Jaw. *Temporalis.*

[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. *P P. f.* 2. *A A.* [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 croſs-waies interſected. *Maſſeter*

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 *Parotis*. this cannot be ſeen unleſs the broad Muſcle, which reaches unto the Eare, be torn away. This Kernel being plucked out, you may proceed to the Muſcles of the Eares. *Conſtitution of the Parotis.*

The Muſcles of the Eares.

Although the Eares in Man-kind remaine firme and immoveable, yet have they their [b] proper muſcle placed behind them. The *firſt is a very litle one*, divided into two or three fleſhy fibres, very friendly imbraceing the ligament of the Earth. you muſt ſearch for it at the root of the Ear.

The other Muſcles of the Eare, 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 lifter, Four ſtraight ones and two oblique. Six of theſe ariſe out of the deepeeſt part of the Eie-hole; *The Eye-lid-lifter*

[a] T. 15. *f.* 1. *S. f.* 2. *B B.* [b] T. 15. *f.* 1. *Q. R.* T. 20. *f.* 1. *H I. &c.*

You ſhall find two above the globe of the Eye, of which the one being firſt in ſituation, is the [a] Lifter-up of the upper Eye-lid; and the other is called *Attollens* [b] *Oculi* the Eye-Lifter. You ſhal 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 ſixt [d] large oblique Muſcle, which at the great corner of the Eye, or by the ſpace betweene the Eye-browes above the Teare-pipe or *foramen lachrymale*, runs back about the Cartilage or Griſtle, as about a pulley, or as a bridle about the Annulary 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 [c] *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* [e] *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 [g] Kernel, and taking its revolution above the *Muscle Humilis*, but below the [i] *Indignatorius*: it is terminated aloft upon the Globe of the Eye, by the Muscle called [k] *superbus*.

In the Anatomical Dissection of the Eye, this Muscle is to be lookt after in the second Place, and to be warily preserved, least we teare it in peices, 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. E. 4. 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 streight Muscles and the little crooked one.

That you may plainly discover the *Obliquus Major* or greater Crooked Muscle, with its revolution to the pully, you shall take out the Eye, leaving that greater oblick Muscle, but cutting the rest away with your scissers.

Muscles seated in the Neck.

The Neck, which we make account reaches from the Basis of the Head unto the shoulder-blades, comprehending seven Spondyls or Vertebra's, has divers Muscles in its fore side; of which some appertain unto the Head, to the *Os hyoides*, some to the *Larynx*, others to the tongue, and others to the *Pharynx*.

Latus. And first we met with the *Musculus* [a] *latus*, the broad Muscle, which infolds the whol 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 Eare; it must be very exactly separated from the Fleshy parts which lie beneath it, because it is an exceeding thin Muscle.

The Musculus Latus being revelled or drawn back, in the fore part of the Neck under the Chin you shal find *nine as far as to the Larynx, and beneath the Larynx six.*

Mastoideus. Towards the outward part of the Neck, there appeares the thick and *round Muscle Mastoideus*, which ascends slanting from the Clavicula to the Mastoides. this Muscle ought to be separated at its original, that the others may be seene. But observe, by the way, that this Muscle is very often broken asunder by the Halter in such as have bin hanged.

Coracohyoideus Vnder the Mastoideus there lies lurkeing the *Coraco-hyo-ideus*, a lean and longish Muscle, oblickly stretched out from the *Scapula*, to the *Os Hyoides*, for the retraction whereof, it is ordained.

[a] *T. 15. f. 2. F. T. 15. f. f. 1. g g.* — [b] *T. 14. f. K K. f. 3. G.* — [c] *T. 13. f. 13. F F.*

Then you shall see afterwardes the *Carotick Arterie*, and the *internal Jugular Veine*, and the *Nerve of the sixt Conjugation, interposed betweene the said two Vessells.* And then you shal pass unto the Muscles seated beneath the Laxynx.

The first which presents it self is the [a] *Sternohyo-ideus*, which is bred out of the top of the sternum or Breast-bone. Under this lies the [d] *Bronchius* which belongs to

Then the Larynx.

Then you ſhal diſſect and ſhew the Muſcles placed above the Larynx and under the Chin.

The firſt is *Digaſtricus maxillæ internæ*, or the *Twi-bellyed Muſcle of the lower Jaw*, which is ſmal and nervie in the middeſt thereof, that it might be turned back about the *Stylo-cerato-ides*, and ends into the Chin, inwardly. *Digaſtricus.*

There are two *Glandules* or *kernells* under the Chin neare neighbors to this Muſcle, which in rheumatick defluxions do often ſwel. They are termed by *Veſalius*, I know not why, *Animellæ*. You muſt remove theſe *Glandules* that the reſt of the Muſcles may be diſcovered, alſo you muſt ſeparate the *Digaſtric* or *Twi-belly* from the Chin.

Vnder it lies the Muſcle [d] *Mylohyo-ideus* 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 *Os Hyoides* within, will ſhew you how to diſſect. *Mylohyoideus.*

Under this *Mylo-hyo-ideus are found two remarkable Nerves, Branches of the Seventh Pair*, and the *Muſcle* [e] *Genio-Hyo-ideus*, riſing from the inſide of the Chin and ending into the *Os Hyodes*, but ſo cloſely linkt with his Mate, that it is diſtinguiſhed no otherwiſe, than by a white line which is manifeſt within. *Geniohyoideus.*

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. D D. [b] T. 13. f. 5. C C. [c] T. 15. f. 1. T T. f. 2. C C. [d] T. 13. f. 14. E E. [e] T. 13 f. 13. B B. [f] T. 23. f. 13. C C. [g] T. 13. f. 14. C C.

Afterward you ſhall come unto the hollow of the Neck under the lower corner of the Jaw, where the Kernel was ſcituate, which was formerly taken out. In this place is found the [a] *Stylo-gloſſus*, which is inſerted into the *Ceratogloſſus*. *Styloglosſus.*

Beneath there appear two Muſcles, the one of which being lean and altogether fleſhy, is called *Stylo-hyo-ideus*, 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 *Twi-belly*. The firſt was obſerved in the Neck under the Chin. *Stylohyoideus*

Under the *Stylo-gloſſus*, lies ſculking the *Stylo-Pharingæus*. Under the corner of the lower Jaw-bone, there is internally and immediately faſtened the *Pterygo-ideus* [d] *internus*; which takeing 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. *Stylopharyngæus.* *Pterygoideus internus.*

From the Baſis of Os Hyo-ides on the outſide, preſents it ſelf the ſhort Muſcle [e] *Hyo-thyro-ideus*, which is inſerted into the middle of the Thyroides. This whol Muſcle, is commonly found broken by the Haltar, in ſuch as have been hanged. *Hyothyroideus.*

Al theſe Muſcles having been ſhewed and taken away, there appears the [f] *Oeſophagæus*, a broad and Membranous Muſcle ſpread under the *Oeſophagus*, which it embraces, and is externally terminated in the Wings or Skirts of the *Cartilago Tyroides*, or Griſtle ſo called. *Oeſophageus.*

Muſcles of the Larynx, Pharynx and Gargareon.

The *Oeſophageus* being ſhewed and ſeparated, take away the whol Larynx that you may ſee thoſe little Muſcles which are proper to it. You ſhal obſerve eight or ten of them, of which ſome are ordained to move the *Thyroides*, and others pertaine to the *Arytænoides*.

In the formoſt and loweſt part of the *Thyroides*, are placed the two Muſcles called *Crico-arytæno-idei antici*. *Cricoarytenoidei*

[a] T. 13. f. 14 D D. [b] T. 15. f. 1. T T. [c] T. 3. f. 2. *and* 3. C C. [d] T. 15. f. 2. D D. [e] T. 13. f. 8. B B. [f] T. 3. f. 2. *and* 3. D D. [g] T. 13. f. 8. D D.

By the ſides and lower Corners of Thyroides are ſituate the Muſcles called [a] *Crico-arytæno-idei Laterales*. In the hindermore and outward ſide of the *Cri-*

Thyreotenoidæus Aritenoidæus.

coides, you shal find the two Muscles called *Cricoarytænoidei*. Haveing separated the Tyroides, inwardly and towards one side, you shal see the Muscle *Tyroarytænoideus*. To these is added the [d] circular Muscle infolding the whol Arytænoides.

But al these Muscles cannot be seen unless the *Oesephageus* be taken away, and the [c] *Parisitmian* Kernels pluckt of, 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.

The Pharyngei.

Afterwards you shal search for two other Muscles of the Pharynx, viz. the [g] *Sphenopharyngeus* and [h] *Cephalopharyngeus*.

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 and of the whole back as far as Os sacrum being pluckt away, you shal observe many Muscles; the first of which is called *Trapezius* or *Scapularis*, which with the Latissimus does cover the Neck, Back and Loynes, at 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 Hind-part of the Head, does compass al the Muscles of of the Neck, and must in the lower part thereof be separated from the [i] *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. & 17. [f] *f.* 7. 9. & 10. *A.* [g] T. 3. *f.* 2. & 3. *BB.* [h] *f.* 2. & 3. *AA.* [i] T. 13. *f.* 15. *BB. CC.* [k] T. 14. *f.* 1. & 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 Backbone. Under these lies the [b] *Serratus Supernus minor posticus*, the upper and smaller Saw-Muscle situate 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 scapulæ.

Neare unto which is placed on the side of the Neck, *Levator* [d] *proprius Scapulæ* or the Muscle appropriated to pluck up the shoulder; whose orginal cannot be discovered, unless the Mastoideus haveing 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*, neare unto which at the side of the Neck, lie certain portions of *Musculus Spinatus*, and the *Sacrolumbus* ariseing 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 ow their service to the Neck. The first of these is [f] *Transversarius*, inter-posed between the transverse and Spine Apophyses of the Neck and Back.

Semispinatus.

Under this is spread the [g] *Semispinatus* immediately covering the Bodies of the Vertebra's.

Obliquus major.

Upon the first and second Vertebras of the Neck, are seen *eight smal Muscles*, in each side four, of which the two *Greater* [h] *Oblique* Muscles, are carried from the transverse Apophysis of the second Vertebra, to the transverse one of the first.

Rectus major.

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 *Streight* and the *Crooked*, or the *Rectus* and *Obliquus*. The[k] *Minor Rectus* lies hid under the Major Rectus, which you ſhal unlooſe at the Head and pluck it a ſide, that the *minor Rectus* may appeare.

[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. EF. [f] f 4. EE. [g] f. 4. DD. [h] f. 2. L. f. 4. GG. [i] f. 3. & 4. II. [k] f. 3. 1. f 4. KK.

The Muſcle called *Obliquus* [a] *minor*, is carryed 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 wel the ſtreight as the Oblique or crooked ones, that they may be the more apparently ſeen. And you ſhal begin your Section of the Muſcles of the Head and Neck at the reſpective *Spines* or *pointed Eminencies* of the *Back-bone*. *Obliquus minor.*

When you have viewed the Muſcles aforeſaid you ſhal 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 *Pterygoides*, 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 *Pterygoideus Externus* to difference it from the Internus deſcribed before. *Pterygoideus externus.*

Muſcles of the Arme.

Theſe Muſcles being adminiſtred, you may proceed to others. And firſt you ſhal ſeparate the [c] Pectoral Muſcle either from the Breſt-bone, or from its loweſt part, by which it is joined to the Serratus Major. *The pectoral muſcle.*

Meane while obſerve that the *Serratus Minor* or [d] *Smaller Saw-Muſcle*, lies under the *Pectoral* or Ribs: leaſt you ſhould teare the ſame, whiles you diſſect the pectoral Muſcle, which you muſt cut up, as far as to the middle of Claviculæ. To which place being come, you ſhal ſeparate it from the *Deltoides* or *Delta-ſhaped* Muſcle, unto which it is faſtened by a firme, but obſcure band. Then you ſhal ſeparate the *Delto-ides* from its original. *Serratus minor*

From thence you ſhal proceed to the Muſcles which are ſpred 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*. *Infraſpinatus.*

Next thereunto, is the Rotundus [f] *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. & 3. C.

Beneath that, you find the [a] *Rotundus major*, ſtretched out beneath the lower Rib of the *Omo-platæ* or ſhoulder-blade. *Rotundus major.*

Under the ſcapula you ſhal find the Muſcle called *Immerſus* or [b] *Subſcapularis*: it fills the Hollow of the Shoulder-Blade. *Rotundus Immerſus.*

You ſhal 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 Loines.

From the Omoplata or ſhoulder-blade, deſcend unto the Back & 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. *Latiſſimus.*

You muſt while you cut it up at the Spines of the Vertebra's, take heed of ſpoileing a Muſcle which lies beneath it, and is termed *Serratus* [d] *poſticus infernus*, the *Hinder and lower Saw-Muſcle*, being a little one. *Serratus poſticus.*

Which

Which after you have pluckt off, from its original by the Os sacrum, as far as its Insertion, you shall shew *three other Muscles*, stretched out from the Os sacrum, all along the Spina or Back-bone.

Sacrolumbus. Of which the first being lateral and seated towards the Ribs, is called [e] *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 wil guide you from the top to the bottome,

Quadratus. where you may separate it from the [f] *Musculus quadratus* which belongs unto the Loins, but in its original it is exceeding hardly separated from the Spinatus.

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. C C. *D D.* T. 22. *f.* 1. *F.* [d] T. 14. *f.* 2. *F. G.* [e] T. 14. *f.* 1. L L. *f.* 3. B B. [f] T. 14. *f.* 2. *O O.*

Spinatus. Now you shal separate the [a] *Spinatus* from Os sacrum, by easily and gingerly taking away the hard Aponeurosis which is spred out over the *Musculus sacer*; which being taken off, if you lengthen out your section above, you wil discerne the difference between the Spinatus and the [b] Sacer.

Sacer.

Which when you have attained, thrusting your pen-knife streight 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 middest 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 Bodie being turned and laid with the face upwards, you shall sever the [c] *Serratus Major* laterally, and putting in your hand underneath, you shal find it stretched out under the Omoplata or shoulder-blade as far as to the Clavicula. And then

Subclavius. you shall see the [d] *Muscle subclavius* placed between the Clavis and the first Rib.

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 shal carefully and gin-

Intercostalis. gerly separate the [e] *external intercostal Muscle* form the [f] *internal.* The fibres Cross-waies interposed, will distinguish the one from the other.

[a] T. 14. *f.* 3. *D D. f.* 4. *A.* [b] T. 14. *f.* 4. *B B.* [c] T. 10. *f.* 1. *C D.* [d] T. 10 *f.* 1. *F.* [e] T. 10. *f.* 1. *G G.* [f] T. 10. *f.* 1. *H H.*

Muscles of the Cubit.

When this is done, you shall returne unto the Arme to make observation of the Muscles of the Cubit, which are seated in the Arme.

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 [a] *Biceps* or *Twi-headed Muscle*, which from its Original to its Insertion, may very easily be divided into two. But you must mark, that *one Head* of the *Biceps*, which growes out of the Coracoides, has a certain flesh adjoyned to it, which creep along the side of the Pectoral Muscle, as far as to the midle of the Arme, unto which it is fastend most firmly; and *this Portion of Flesh* makes a Muscle, which is ordained to draw the Arm forwards,

Coracoideus. which from its original I call [b] *Coraco-ideum*, the *Coraco-idean Muscle.*

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 sprang out of the tendon of the pectoral Muscle.

Brachieus-internus. Under the Biceps is placed the [c] *Brachieus internus* or *Inner Arme-Muscle*, whose original is at the end of the Muscle [d] Deltoides. This Muscle must be separated sidelongs from such as border upon it.

In

In the outer part of the Arme *three Muſcles are placed*, viz. the *Longus*, *Brevis* and *Brachieus externus*, and *beneath the Elbow*, the *Angoneus* is ſeated.

The external are the [c] *Longus* and [f] *Brevis* which embrace that Maſs of fleſh which makes the Brachieus externus. In their original they [g] are diſtinguiſhed by the tendon of Muſculus latiſſimus which comes between them: but at their Inſertion they grow together by a firme and ſinewy tendon. And therefore they are eaſily, in their upper-part, ſeparated from the *Brachieus externus*; but in their lower parts towards the Elbow, they are very hardly divided from the Brachieus. *Longus Brevis.* *Brachieus externus.*

Now thus you ſhal proceed: you ſhall curiouſly take away the nervous tendon neare the Elbow, and goeing upwards by little and little, you ſhal gently cut on the one ſide and the other, alſo inwardly; diligently obſerveing the line which ſeparates the long Muſcle from the ſhort, until you have ſeparated the *Brachieus externus*, from the Muſcles which are placed above it. Then you ſhall ſee it ariſe from the Bone of the Arme, a little beneath the Neck thereof, with a fleſhy ſubſtance.

[a] T. 22. *f* 1. *G.* = [b] T. 22. *f* 1. *H.* = [c] T. 22. *f* 1. *I I. 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 *Angoneus* [a] cannot be ſeen til you have pulled away the ſinewy membrane wherewith it is covered. It ariſes at the lower part of the Arme neare 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 ſhal find the Muſcles of the Radius, the wriſts, the Fingers, and the Thumbe. And in the Inſide of the Cubit as far as to the wriſts, you ſhal find *Nine Muſcles*; on the outſide you ſhal meet with ſeven.

In the inſide you ſhal find them diſpoſed in this Situation and order following. The firſt that preſents it ſelfe is the *Longus* [b] *Supinator Radij*, which ariſes from the external apophyſis of the Arme, and is ſtretched out upon the Radius. *Longus Supinator radij*

Next to that, is the *Radieus* [c] *Flexor Carpi*, after which follows the [d] *Palmaris* Remarkable by a very ſmall and very long Tendon. *Wriſt-benders.*

By the Palmaris is ſeated the [e] *ſublimis Digitorum Flexor*, and next to it, ſo as to touch the ſame, you have the [f] *Cubiteus Flexor Carpi*.

On the upper part of the Cubit, near the Joint, between the Longus Supinator and the Radieus flexor, *the round Head of the Pronator* [g] *Radij* ſhewes it ſelfe; which is a very ſhort Muſcle, ariſeing from the internal Apophyſis of the Arm and obliquely carried to its inſertion into the Radius. *Pronatores Radij.*

Vnder the Radieus, lies the *Flexor* [h] *Pollicis*.

Beneath the Sublimis, lies the *Profundus* [i] *Flexor Digitorum*, and in the lower part of the Cubit, by the wriſts, lies the [k] *Quadratus* ſpred under the Tendons of the Muſcles, being three Fingers broad, and immediatedly faſtened Croſs-waies, into the Radius and Cubitus. *Finger-benders*

[a] 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* [a] *Carpi* is ſtretched out. *Extenders of the wriſt.*

Next to it, is the *Alter* [b] *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* [c] *Digitorum* is placed, which has a parcel of fleſh annext unto it, ſpread under the Muſcle of the Extenſor Pollicis. *of the fingers.*

Vnder it, near the Cubit, lies the Extenſor parvi Digiti, by the Wriſt.

Under the Tendons of the *Extenſor Digitorum* you ſhal find *two other ſmal Muſcles*, the one of which is the *Extenſor* [d] *Policis*, the other is the [e] *Indicator* ordained to wait upon the *Index* or *Foreſinger*, whoſe Tendon is united by certaine Fibres with the Tendon of the *Extenſor Digitorum*.

The

The best way to dissect these muscles.

The division of all these Muscles is *easie 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, neare the Wrist, on the inner side of the Cubit, you shal *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.

Muscles of the Hand.

In the Hand, you shall find *Seventeen Muscles*.

In the Palm or Inside of the Hand there are Thirteen; *viz.* the *four* [f] *Lumbricales*, the [g] *Hippothenar*, the [h] *Thenar*, the [i] *Anti-thenar*, the *Abductor Indicis*, the *Massa Carnea*, and the *four Interossei* [a] *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. C C C C. 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. [a] T. 22. f. 2. ffff.

In the outside of the Hand you shal find only the *four Interossei* [b] *externi*; with the Tendons of the Finger-stretchers, or of the Thumb-stretcher, and of the little Finger-stretcher.

Muscles of the Abdomen or Belly.

In your anatomical Administration of the Muscles of the Belly you shal thus proceed. The first you meet with, which must be plucked out, is the *Musculus* [c] *Obliquus descendens*, which you shal see conjoyned with the [e] *serratus major*, [d] tooth within tooth, as if the Edges of two Sawes were Put together, and Joyned one within another, or as some parts of the Scul are coupled by the sutures. You shal know the difference of the *Serratus* and *Obliquus* one from another, by certain white lines and by the different posture of the Fibres. You shal separate the *Musculus Obliquus* from its intanglements with the Teeth of the *serratus major*, with help of a very smal and sharp Pen-knife.

Obliquus descendens.

The first tooth is interposed between the Musculus rectus and a portion of the *Serratus*: the second and the [c] 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 therfore into sight, it wil be convenient to pluck up a portion of the *Latissimus*, as far as to the hinder spine of the *Os Ilium*; and then you shal take those four Teeth off from the Ribs, and in conclusion you shal cut off the Muscle, from the whol Rib which apperrains to the *Os Ilium*.

If you be industrious and can endure to take paihs, you shal observe that the second, third, and fourth Tooth [or Finger] of this Muscle, doe 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. 1111. [c] T. 1. f. 2. H H. T. 2. f. 8. A. [d] T. 2 f. 8. a a. [e] T. 1. f. 2. F F. 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 insinuate it self into the sinewy Head of the Tooth of the Muscle: the other sticking fast unto the Rib, does make the [a] nervous intersections of the *Musculus Rectus*. The Muscle being thus cut up, must be turned back upon one side of the Belly.

You shal in the meane while observe, that the [b] *Aponeurosis* of this Muscle, is bored through near the *Os pubis*; as the [c] *Aponeurosis* of the *Obliquus* [c] *ascendens*, and of the *Transversus* are perforated, near the foremost and lowest Spine of the *Os Ilium*; and therfore 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 fal down into the Groine or Cod.

These

Theſe Holes are broken in Ruptures into the Cod, or elſe dilated, which are diligently to be obſerved, in reduceing of the Gut when it is ſtrangled in the Groine.

And if at any time an Inciſion be made in the Groine, to reduce the Gut, that hole ought to be made wider by Inciſion, that the Gut may more eaſily returne into the Bellie.

Above the Obliquus aſcendens towards the Hypogaſtrium, you ſhal find a little Nerve which inſinuates and winds it ſelfe 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 Loines, and is a portion of thoſe nerves which are diſſeminated into the Oblique Aſcendent and the Tranſverſe Muſcles.

When you have cut the [f] *Oblique Aſcendent* from the Rib of Os Ilium to which it cleaves very faſt, you ſhal bring it to the Loines, where it may be ſeparated from the Tranſverſe. Then you ſhal ſeparate it from the Ribs themſelves as it returnes upwards. And it wil be convenient to turne back this Muſcle to the contrary ſide, after the manner of the primus Obliquus; and when you ſhal come unto the Muſculus Rectus, you ſhal 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 pul them aſunder, without rending them.

[a] *T. 2. f. 9. d d d.* [b] *T. 2. f. 8. b b.* [c] *T. 2. f. 8. B.* [d] *T. 2. f. 9. A.* [e] *T. 2. f. 8. d d. f. 9. bb.* [f] *f. T. 2. f. 8 B. c c.*

While you cut the Tendons of the oblique Muſcles from the ſhare Bones, be very careful leaſt you mangle the Apophyſis of the [a] Peritonæum which is carryed through thoſe Tendons, and teare the [b] Muſcle Cremaſter placed upon the ſaid Apophyſis, and alſo leaſt you teare the Tendon of the Tranſverſe Muſcle lieing beneath.

You ſhal know the *Muſcle Cremaſter* by its colour and Conſiſtence. For it is a peice of red fleſh, thin, ſprinckled with ſtreight fibres, ſevered ſome ſpace from the fleſh of the Oblique Deſcendent, and according to the Length of the Groine, incloſeing the Apophyſis of the Peritonæum. You ſhal find ſuch a parcel of fleſh in women, but ſhorter and narrower, placed upon the production of the Peritonæum. *How the cremaſter is known.*

Between the Oblique aſcendent and the tranſverſe Muſcle towards the Loins, many veins are ſeen, which are the offspring of the Lumbal and the Hypo-gaſtrick Veins. But you ſhal take preciſe notice of two remarkable nerves or ſinnewes, which beſides the little intercoſtal twigs inſerted into the Teeth of the Oblique Deſcendent Muſcle, do ariſe out of the two 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 medling with the ends thereof. If you ſhal diligently and leaſurely pare off the extremities thereof oppoſite unto the Linea Candida or white Line, you wil 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 ſhal very rarely find a fourth Interſection. *Muſculus rectus.*

[a] *T. 2. f. 9. E E.* [b] *T. 6. f. 2. D D.* [c] *T. 2. f. 8. e e. f. 9. C.* [a] *T. 2. f. 9. dd.*

Towards the end of Rectus Muſculus, on the inſide you ſhal obſerve the Epigaſtrica [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 the right Muſcles is *a real* [c] *white Line* ſtreched out from

the xiphoides as far as to the Conjunction of the Share-Bone; and it is simply done of them, who cal the growing together of the 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 certaine black-blewish Line remaines 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 againe.

Pyramidalis. Over the lower end of the Right Muscles lies a smal *Muscle called*[i] *Pyramidalis* which you must curiously part into two, and having taken away one, you shal see a most strong sinewy Tendon of the Musculus Rectus, fastend to the Os pubis or Share-bone.

Transversus. The *Left Pyramidal Muscle* is oft times shorter and narrower than the right.

The *transverse*[g] *Muscle* which cleaves to the Peritonæum, is not easily drawne off yet if you are desirous to take it away, you must cut it from the Loines, 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. DD [g] T. 2. f. 9. Af. a a &c.

Muscles of the Yard.

The Yard-Erector. In a Mans Yard on either side in the Groine and the peritonæum you shal 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 spungy 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 spungy [c] ligament of the Yard, although it be fastened by a bit of flesh to the foresaid sphincter or Arse-Muscle, that it may beare up the fundament. which fleshy portion or bit of flesh forementioned I am wont to shew for the Levatores externi ani, or external Arse-Heavers.

Muscles of the Fundament.

The sphincters of Anus. *The Levatores ani.* The Fundament has sixe external Muscles belonging unto it. The *Sphincters, and foure external Lifters*, for the *Levatores interni* or *inner-lifters* do lie out of sight. In women there is a *fift Muscle* which belongs to the Coccyx or Crupper-Bone.

In the first place you shal 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 shal seek for them behind the Crupper-bone and above the accleratores on the forside, putting your hand in beneath, or putting in a little knife made of boxe-wood. But you shal more evidently discerne the largeness of the *Levator Ani*, if you shal take away the Bladder, the *Intestinum Rectum* or Arse-Gut and the womb of a woman, and withal shal sever the Conjuction of the share-Bones.

For then you shal see *a broad* but *thin* peice of flesh, drawn out from the Os Sacrum as far as to the Spine of the Os Ischij, underproped 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 *Obturator Internus* is situate.

The Muscle peculiar to the Coccyx in women. Besides those Levatores there is another found to arise from the farthest extremity of the Os sacrum and the Crupperbone, viz. a thin and sharp pointed peice of flesh shewed with right fibres, enclosing the lateral parts of the Crupper-bone or

Coccyx

Coccyx on either ſide, which holds 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 voidance of Dung more eaſie, by drawing back the Crupper-bone when men are at ſtool.

[a] *T. 6. f 1. aa. f. 5. HH.* = [b] *T. 6. f 1. bb. f 5. II.* = [c] *T. 6. f 5. KK.* = [d] *T. 3. f 4. O.* = [e] *T. 6. f 3. NN.* =

The internal Sphincter.

The *internal Sphincter* (if we muſt needs admit, and allow of a third) is no other than *a Membranous parcel of fleſh, ſomwhat black and blue*, which comprehends the *Rectum Inteſtinum*, or Arſe-Gut, like a Sheath or Scabberd, being adorned with ſtreight 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 in-ſide. So the *Rectum Inteſtinum* is diſtinguiſhed from the reſt, neither is the Scituation of the Membranes, or Coats, varied.

The Bladder-Muſcle.

The Bladder-muſcle in men.

The *Bladder-Muſcle* [b] *Sphincter*, is placed in a Man above the *Proſtatæ*, which it imbraces for the Space of two fingers breadth, and is eaſily found without the Channel of the Piſs-pipe: If you ſhal cut up the Pipe with a pair of Sciſſers from the Nut of the Yard, as far as to the *Proſtatæ*.

You ſhal examine *if you can find two Sphincters of the Bladder, one beneath, and the other above the Proſtatæ*, which I never obſerved.

[a] *T. 2. f 5. Q.* = [b] *T. 6. f 5. FF.* =

Demonſtration of the Double Sphincter.

Now that part of the Neck of the Bladder, which reſpects the Bones of the Share, is manifeſtly fleſhy, between the two Kernels called *Proſtatæ*: and there a two-fold Sphincter may be allowed; one fleſhy, placed upon the *Proſtatæ*, and in that ſence above them; but under the *Proſtatæ*, is the Membranous Muſcle of the Neck of the Bladder: the other broad Muſcle above the *Proſtatæ*, and turned back under the ſame, wil be the Second Sphincter Muſcle, becauſe it does circularly imbrace the *Proſtatæ*, above and beneath.

The Bladder-Muſcle in Women.

The Neck of the Bladder in women, is very neer as long as ones Thumb, being Nervous, Spongy, and black within, like the Piſs-pipe, 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 percive an hard and long tumor or ſwelling. and the uppermore carnoſitie of the Privie Part, which cloſes and ſtops the end of the Bladder, is both in Girles and women allwaies found larger than the reſt, and the other glandules being by frequent child-bearing torne and defaced, this allwaies remaines to the End of their lives.

Muſcles of the Clitoris.

Latus.

You ſhall ſeek the *Muſcles of the Clitoris*, after this manner; having leaſurely taken away much fat till ſuch times as ruddi fleſh appeares, you ſhall ſever the *Latiſſimus 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 Privity, for the moveing or ſtraitening whereof, I concevie this Muſcle is ordaind. The other is the *Gracilis Muſculus* faſtened to the *Ligement* of the Clitoris.

Gracilis.

Muſclus of the Thigh.

Pſoas.

In the Cavity of the Belly, when the Entralls are removed, you ſhall obſerve above the Loyns the *Muſculus longus and rotundus*, the long and round Muſcle which is termed [a] Ploas, which you ſhal ſeperate from its original to its inſertion which is in the ſmall Trochanter

[a] *T. 10. f. 1. O. O. T. 23. f. 1. A.* =

I have oftentimes in Men, and sometimes in Virago's, or manly Women, observed *another lank Muscle* placed over the Psoas aforesaid. *It* seems for this Cause added, that as a Ligament or Band it might strengthen, and as it were gird in the soft and loose flesh of the Muscle Psoas.

Iliacus. The Cavity of *os Ilium* is filled by the *Musculus latus* [a] *Iliacus* or *broad iliak muscle*, which together with the Psoas being conveighed along upon the Os Pubis and by its tendon united to the Psoas, is terminated in the small Trochanter.

Having turned the Body, you shal 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 Muscle*, you shal seperate towards its tendon, both before and behind, having first made it cleane and freed it from the fat.

Then you shal proceed in your section upwards til the whole is on all sides cut of, til 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 shal cut off the said Muscle in the fore part.

Medius. Under this lies the *Gloutius* [c] *Medius* or *middlemost Buttock muscle*, which may easily be separated in its upper and lateral part towards the *Os sacrum*. But beneath

Minimus. the middle part of the *Gloutius Secundus* the [d] *third* is placed, immediately fastened to the *Os Ilium*: this Muscle you must not cut of.

Between the middle and the lesser Buttock Muscles there are *two remarkable veins*, which from the *Hypogastrica* doe creep over the *Obturator Internus* [e] with an Arterie, Hand in Hand, and a portion of the *Nervus major posticus*, 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 shal 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] *Pyriformis* unto which the *two* [b] *Parvi* or *little ones* doe follow in order, coupled together, that between them and in their Bosome as it were, they might contein the Tendon of the *Obturator internus*.

To these two there is orderly adjoyned the [c] *Quratus Quadrigeminus* being *broader and more fleshy than the rest*.

Obturator internus. The *Obturatores are two, the* [d] *internall and the* [e] *external*, the Internal has its orginal out of the Circumference of the Oval hole; and its Tendon being carried along between two Ligaments, and being hid in the bosome or holowness of the second and third Quadrigeminal Muscles, it is carried into the Cavity of the great Trochanter. And therefore you must pul asunder the second and and third Quadrigeminals, before this Muscle can come in sight.

Now the Ligaments through which the Tendon of the Obturator *Internus* is carried, *are two*; the *one being external* is carried from the Os sacrum to the Tuberosity of the Of Ischij: the *other being internal* and placed beneath the external, 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 Quadrigemminal Muscle be plucked back, and that the Propagation thereof may more evidently appeare, you shal take away the Musculus *Triceps* or Three-Headed Muscle.

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 shal therefore anatomise and shew *eleven Muscles of the Thigh*, placed above the Os Ilium.

In the hinder part are nine, *Three Gloutij* or *Buttock Muscles*, which being drawen aside, there appeare *four Quadrigemini* and *two Obturatores*. In the fore

part

part and hollowneſs 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. 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. f. 4. F. [e] T. 23. f. 4. e.

Muſcles of the Leg.

In the Thigh from the Haunch to the knee and Ham you ſhal obſerve and ſhew eleven Muſcles.

In the fore part you ſhal 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 ſtreightneſs and length of the thigh the *Rectus Gracilis* is drawne out. Neare 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 lies ſculkeing within the Thigh.

Sutorius. *Membranoſus.* *Rectus.* *Vaſti.* *Crureus.*

In the hinder-part of the thighs you ſhal find *four*, diſpoſed after this manner. Unto the Triceps on the Inſide is faſtened the *Gracilis Poſticus*: bordering upon it, is the *ſeminervoſus*, with the *Semimembranoſus*, and between this and the vaſtus externus is the Muſculus Biceps placed.

In the forepart of the thigh, you muſt begin at the [a] Long Muſcle; which being cut of, you ſhal cleverly take away the Faſcia [b] lata, either all of it or as much as you can, and you ſhal bring it as far as to the knee.

Then you ſhal cut of the *Gracilis* [c] *Rectus*.

Afterwards you ſhal proced 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 ſhal cut up.

Then you ſhal diſſect the *Vaſtus* [d] *Externus* by the latus externum; but it is harder to ſeperate the *Vaſtus* [e] *internus*.

[a] T. 23. f. 1. II. [b] f. 1. E. ccc. [c] f. 1. F F. [d] f. 1. G G. [e] f. 1. H H.

And you ſhal begin to ſeparate the ſame at the lower part neare the Patella, and thruſting in your hand, and neatly mannageing your penkniſe, you ſhal cut it towards the upper parts: and ſo the two Vaſti ſhal be ſevered from the [a] *Crureus*.

From theſe, you ſhal come unto the [b] *Triceps*, which may more truly be termed *quadriceps* or rather *quadrigeminus*, becauſe of foure 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 ſometimes found *four other portions perfectly diſtinct one from another*, beſides the Pectineus, and the laſt portion was verie 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 joyned as a ſiſt*, 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*, & 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 II. [f] f. T. 23. f. 3. F F.

Muſcles

Muscles of the Tarsus.

In the Leg from the knee unto the Tarsus are found 13. Muscles; in the hinder part you shal find five placed after this manner.

Gemelli. Popliteus. Plantaris. Soleus.

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 selfe.

The *Soleus* lieing beneath the Gemelli, does immediately cover the shin-bone.

Foot-benders

In the lateral and external Part of the Tibia, by the Spine, there appeares the *Peroneus* [e] *Flexor pedis*, Neighbour to which is the *Longus* [f] *Extensor Digitorum.*

Extenders.

After which followes the *Extensor Pedis*, tibieus [g] 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 lateral part of the Tibia. In the lower part of the Tibia, between the flexor pollicis and the Tibieus posticus, the *Flexor* [l] *digitorum medius* holds its place.

The separateon of these Muscles.

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 shal diligently search for the *Popliteus* or Ham-Muscle, situate obliquely over the Head of the Soleus. Then you shal observe the *fleshy Head of the Musculus Plantaris*, which lies lurkeing 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 meta-tarsi, which sustaines the little Toe: The other being drawen under the sole of the feet, is carried into the Os metatarsie which sustaines the Great Toe.

[a] T. 23. *f.* 1, *d d*, *f.* 3. K K. [b] *f*, 4. H. [c] *f.* 3. M. [d] *f.* 3. L L. [e] *f.* 1. LL. [f] *f.* 1. M M. [g] *f.* 2. E E. [h] *f.* 1. N. [i] *f.* 2. F F. [k] *f.* 4. K. *f.* 6. B. [l] *f.* 4. I I *f.* 5. C. [m] *f.* 1 E. *c c c.*

In the Foote you shall take notice of *seventeene Muscles.* In the out side of the Foote there are *five*, viz. *the* [a] *Pedieus* and the *foure interossei* [d] *externi.*

In the sole of the Foore 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] *Carnea*, the *foure external Interosseans* and *as many* [f] *internal.*

Upon each side of the Foote is placed *one Muscl*, viz. the *Abductor* [g] *Pollicis*; and *Minimi Digiti abductor.*

In the hollow of the foote, there is placed another *Massa carnea, spread under the first, and cleaving immediately to the Bones. it may be perfectly divided into foure or five portions*, although in the middle spaces of the Bones of Metatarsus the *Musculi Interossei* are conteined.

Furthermore in the Sole of the Foote you shal find that same *Internal Muscle* which is opposed to the *Abductor Pollicis* or Great-Toe withdrawer, like unto the *Antethenar* in the Hand. It may be called [i] *Musculus Transversalis.*

Chap. 46. *Of the Veines, Arteries and Nerves belonging to the Limbes.*

the Veines of the upper Limbes.

The Veines of the Limbes begin in the Arme at the Arm-pit, and in the Feet they take their Original from the Groines.

Axillaris.

The *Vena* [k] *Axillaris* neare the Arme-pits does produce the Humeralis, which is called the [l] *Cephalica* or *Head-Veine.* It has no Arterie to accompanie the same, and it holds its Course through the whole Radius.

A little

A little after it sendes forth the [m] *Thoracica* which is expanded into external parts of the Chest, and meets with smal twigs of the *Vena* [n] *azygos*. *Thoracica.*

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 [q] 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 D. = [f] f. 5. d d d d. = [g] 1. f. 3. O. f. 5. b b. = [h] f. 3. P. f. 5. c. = [i] f. 5. b b. e = [k] T. 24. f. 1 A. = l. f. 1. B B B. = [m] f. 1. l. 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 Veines are opened beneath the Bending of the Arme. *Mediana.*

But the Basilica has an [d] Artery under it or very neare it, and a [e] Nerve and the Tendon of Musculus [f] Biceps, which bends the Arme: which parts must (in the opening of a veine) be avoided, for if they happen to be cut, they bring great Inconveniencies to the Arme.

The Cephalica being streched out upon the [g] Radius neare 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* veine, 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 thumbe veine. *Salvatella.*

The *Mediana* [k] vena is to tally external and runs under the Skin, into the palme of the Hand.

The *Basilica* creepes through the [l] internal and external parts of the Cubit, with a two-headed branch.

Now the Veines have one thing peculiar to them in the Limbes viz. that they manifestly do communicate with the Arteries. This *Galen* proves in his third *Book of Natural 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 Veines and Arteries.*

Moreover the veines in the [m] Limbes and internal Jugulars have *Valves*. In the greater channells 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. t t. &c. = [c] f. 1. f f. = [d] f. 2. *A. by* L. = [e] f. 3. 1. 1. &c. = [f] *T.* 22. f. 1. G. = [g] T. 24. f. 1. i i. &c. = [h] f. 1 a = 1. f. b = [k] f. 1. g = [l] f. 1. o o. x. y. &c. = [m] f. 7. *the whol* = [n] 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 Limbes and in the internal 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. *Harvy*, unto which I willingly give my Assent. *Their use.*

Let us pass on from the Veines to the Arteries of the Arme. The *Ramus superclavius* proceeding to the Arme-pits, is termed [a] *Axillaris*. It accompainies the Vena Basilica, whereas there is no Arteria Cephalica. *The Arteries. Axillaris.*

Neare the Arme-pits it produces the [b] *Thoracica* and in its progress bestowes certaine 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 carryed on, to the Inside of the Hands. *Thoracica.*

For the outside of the Hand above the Metarcarpium, 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 Cosin spread out into the hand according to the length of the Thumbe 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 foure lower Vertebra's of the [f] Neck, and the two first Vertebras, of the [g] Back, [h] *five* or sixe Nerves take their Original, which being ouer-whelmed 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] T. 24. f. 2. A. [b] f. 2. c. d. [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 *foure superior ones* are under the Deltoides scattered over the internal part, accompanying the Vena basilica and the Artery of the Arm, and creeping betweene the Muscles Biceps and the Brachieus externus.

The [a] *fift and sixt* [b] *Nerve*, being bowed back under the scapulary Muscle *Rotundus major*, they are disseminated into the hinder Muscles of the Head.

There remaine then the Quatuor Primi alreadie described, which being carryed through the Arme and Cubit; they are dispersed into the said Cubit and the Hand

Primus. The *Primus* [c] *Nervus* beneath the head of the shoulder is over-whelmed in the *Coracoidæus* and drawne along under the inner side of the Biceps, and lurking under the Tendon of the said Muscle, it joines it self to the Vena Cephalica, where it growes small: also it is placed beneath that Veine, below the bending of the Arme.

Secundus. The *Second* [d] *Nerve* being undivided and thicker, does descend to the bending of the Arme, being covered only with fat, and at the bending of the Arme it is placed beneath th Arteria and Vena Basilica.

Howbeit the Vena Basilica a little below the Cubit does, towardes the interior part, recede a little from that Nerve, that it may be united to the Vena Cephalica.

But foure fingers beneath the bending of the Arme, being alwaies superintendent to the Basilica, it passes undivided along, unto the wrist, the veine appeares above.

At the Wrist tis cleft into *ten small branches* affording *two little twigs* to every finger, which crepe 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 Tuberositie of the Arme.

Tertius. The *third* [e] *Nerve* is carryed along undivided unto the Angona, where being conveighed through a Cleft which is betweene the Elbow and the inner Condylum or Tuberosite of the Arme, according to the length of the Cubit, and being drawne out over the Cubitæus externus, it is carryed unto the wrist, towards the little finger. And therefore by leaneing on the elbow, the whole Arme is benummed. Being divided neare the Hand into foure branches, it is spred 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. hh.

Quartus. The *fourth* *Nerve* is the thickest of all interwoven with Veines and Arteries, and sunk deep in the *Brachiæus externus*; it is carryed from the forepart of the Arme into the Hinderpart, and descending there through unto the Radius, and being carried all along the same, it is joyned to the vena Cephalica, and looses it selfe at last into the wrist.

The veines of the lower Limbes. Poplitea. I proceed unto the vessels of the Inferiour Limbes. The Crural [b] veine, does in the groine produce a remarkable branch viz. The [c] saphena, which according to the longitude of the sutorius Musculus descends unto the Ham. Beneath which, in the Ancle 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 veines, or the saphena receives that same branch, from those cruralls.

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 Apparencie, which is a new name brought into use by the late Greekes, unknowen to *Galen*. *Saphena.*

When the crural veine has produced the *Saphena*, it is soon after divided into four branches, of which, the two [e] 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 Cruræus.

[a] T. 24. *f.* 3. *i i.* [b] T. 24. *f.* 4. *A.* [c] T. 24. *f.* 4. *a a a.* [d] T. 24. *f.* 4. *f f f.* [e] T. 24. *f.* 4. *a.* beneath [f] T. 24. *f.* 4. *b b*, &c.

The Ramus tertius which penetrates into the inner parts, is termed *Ischiadicus.* *Ischiadicus.*

The fourth is called [b] *Muscularis.* *Muscularis.*

These branches being propagated, the Trunke 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 aloft 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 veine, yet so that in the compass of the Ankle two notable veines 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 crurall Veine.

Neither of these Veines can be safely opened unless they swel, by reason of the neighbouring arteries, which the Vena Saphena placed in the inner Ankle is free from. And this Veine is opened in all diseases alwel of Men as of Women. Yet nevertheless in the Sciatica, the Veine beneath the Malleolus externus, is more advantageously opened, because it has greater Communion with the Part affected, namely the Coxendix or Hip.

The Distribution of [c] *Arteria Cruralis*, is not equal to the Vena Cruralis, because it produces no Saphena. For a little lower than the Groine, it transmits two [f] within the Musculus triceps, which are lengthened out as far as to the Gloutij. *The Arteries.* *Cruralis.*

Afterwards it sends forth [g] two, into the former parts of the Thigh.

[a] T. 24. *f.* 4. *c c.* &c. [b] T. 24. *f.* 4. *d d.* [c] T. 24. *f.* 4. *b b.* [b] T. 24. *f.* 4. *g g.* [d] T. 24. *f.* 4. *g g.* [e] T. 24. *f.* 5. *A A.* [f] T. 24. *f.* 5. &c. [g] T. 24. *f.* 5. *d d.* &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 laterarlly creepe all along the outside of the Leg upon the *Musculus Peroneus*. The other being thrust into the Muscle soleus, and sliding downe unto the Heele, 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 foreside 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 whirlbone 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 Loyns, neither is it visible, unless the Muscle Psoa be torn asunder, within which they lie hid.

The second. Then besides those fore-mentioned, you shal see another *smal Nerve*, drawn through the oval hole of the *Os Pubis* and spent upon the neighbouring Muscles viz. the Triceps.

Of the Hind-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 somtimes of three, oftener 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, somtimes into 5 four, it bestows little smal 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. E E. [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 Nervs in its passage, and being drawn through the Cleft of the inner Ankle-bone, it is distributed into the sole of the Foot in as many Branches as there are Fingers.

Another is carryed into the [b] fore part of the Foot, fastened unto the *Perone*, and so slipping downe 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 paine, 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 this bastard sciatica Caustick are to be applied, and Issues made at the bending of the Buttocs, also those parts must be anoynetd and smeared with an Epispastick or drawing Plaster.

You shal observe by the way in a bastard sciatica, that those nerves are watered by the Hypogastrick veines and the Arteries above the same, and therefore the nerves cannot be dried unless the Hypogastrick veines are emptied, by many times letting blood in the Armes and Feet, and by Hors-leeches often applied to the Veines of the Fundament.

Now Galen in the 8 Chap. of his 16. Book of the use of the parts of our Body, shewes the reason why this same Nerve is not mixed with other fore nerves as it is in the Nerves of the Arme, but is carried behind the thigh; viz. Because the joynt of the Arme stands farther from the Vertebra's of the Neck, than the joynt of the Thigh does from the Vertebra's of the Loines and Os sacrum.

The second. About the Beginning of this great Nerve, there is another adjoined, which riseing 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 Gloutij and the Flexores Tibiæ, as far as to the Ham.

The Medicinal Consideration.

Varices what they bee? Diseases of the Veines belonging to the Limbes, especially to the Leg and Thigh, are the *Varices* which are knottie dilatations, in which the Blood is collected, as it were into Certaine Satchels. Now they are cured with astringents with a close and convenient ligature. *Their Cure.* Or the veines 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 selfe, is tied up and cut off. *Whether a veine cut off will grow againe?* Many conceive that the veines cut off are bred againe; they bring for an example the veines which are seen in a very great *Sarcoma* or fleshy Excrescence; but Fernelius has rightly observed, that they are not veines, but channels between the Skin which nature has framed as gutters to water and nourish the Sarcoma or fleshy Excrescence.

Many

Many thinke that the veines which are cut, being tied together with a ſtring do grow againe, which I do not beleive.

Hippocrates cals the veines *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 Veines are dried, they draw ſharp and cholerick humors in burning fevers. Alſo the ſame Author ſaies, that the veines do draw more than the fleſh Lib. 1. *de Morbis*. Eſpecially if they be more hot and dry than ordinary.

Bloody ſweats whence they proceed?

When the Veines 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 mouthes of the upper and lower veines, but alſo through the Skin of the whole Body, in manner of a bloody ſwear, which I have obſerved two or three times.

The motion of the veſſels how abuliſhed?

A ſtoppage of the Veines 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 meanes to put the veſſells into motion againe.

Somtimes the Pulſe of all the Arteries is intercepted, not excepting the Groine or crurall Arteries, the Motion of the Heart ſtil 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 yeares, but in extreme weakneſs. *Balduinus Ronſæus* ſaw one in the ſame condition, as he affirms *in his medicinal Epiſtles*.

How the motion of the pulſe in the Arteries can be ſtopped, while the Heart moves.

Hereupon, a queſtion may be raiſed, how the pulſation of the Arteries can be ſtopped whiles the Heart beates after its wonted manner, though ſlowly; whether it be not neceſſary in ſuch a Caſe that the Aorta be obſtructed neare the Heart, and that the irradiation and influlx of the arterial blood be by that meanes interce ped. And then the Blood of the veines approaches the Heart, being drawne thither in the diaſtole or dilaration thereof, that it may receive the ſeale 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 veines 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 neare the Heart, I found the ſame inequality in the *Cæliac Arterie*, which did beat vehemently, although the pulſe appeared equal and wel 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 drawen back unto the Cæliac Arterie which is a branch of the Aorta, it did produce ſuch an irregularity as aforeſaid.

The Pulſe is laſt felt in the crural Arterie

The *Crural Arterie*, ſeeing that it is evident in the Groine, 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 remaines after the pulſe is extinguiſhed in other extreme parts of the Body, wherein it is uſually felt to beate. And therefore when no pulſe can be felt in the other uſual places, it muſt be ſought for, examined in this crural Artery, not only in Men but in women alſo, provided the Rules of Honeſty be not broken. And if when a diſeaſe is at the Heigth, we can feel no pulſe in this part, death is neare at hand.

Aneuriſma, what it is?

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 ſeldome ſeen in the trunk of the Aorta becauſe of its thickneſs.

The End of the Fift Book.

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 treates 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 al the Diseases and symptomes 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, until she finish her work. But the Physitian, that he may attaine unto the knowledg 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 Composition. So when we pul down

down an house, first we throw off the Ceeling, then we demolish the walles, and lastly we dig up the foundation. Wee in like manner in our takeing 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 al other parts. we shal consider of them in the way of a new kind of *Osteologia* or History of the Bones, which is no less, e necessary than the doctrine of the Skelleton of the Bones.

Why we treat of the Bones in the last place?

Having therefore explained and demonstrated the softerparts 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 boiled 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, whiles 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 knowledg in the Body of Man.

The Doctrine of Bones demonstrated in a dead body, is better, & 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 a diligent observation of the Bones, while they are knit and fastened 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-fashioned, 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 hollowness being encreased by a Gristle brim.

For the perfect knowledg of Mans Body.

And

Moreover, The external Conformation and Quality of the Bones, is more evidently discerned in the Bones of a Carkass, 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 Mucous, or slimy substance lodged between the Bones; also the internal substance, or Marrow, or Marrowish Juyce, are manifestly discovered in the Bones of a fresh Body, which are not at all in dry and withered Bones.

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 examine 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 Reperition, and Representation of the bones, we shal 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 al other parts, for they grow as long as the body encreases, according to *Aristotle*. And if we beleeve *Hippocrates* in the Sixt Book of his Epidemicks; Women have their Courses, til their bones have attained their utmost perfection.

Where notwithstanding we ought to begin.

Chap.

Chap. 3. *What is to be observed in the Bones of a dead Body not boyled.*

The Natural Constitution of a Bone in what it consists?

IN the first place, you shal observe the Natural Constitution of the Bone, that you may discern the fault of a bone which is out of Order.

A bone in a living Body naturally disposed, ought to be, 1. Hard, to procure the bodies stability. 2. It ought to be Oyly without, because it is nourished. 3 It must be covered with the Periostean Membrane, that it may have sence; for if it lose the Periostium, it becomes senceless. 4. It must be white tinctured 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 oyly moisture, to facilitate its motion. 8. It must have a continued and even substance.

In what the preternatural.

And therefore you shal know that a Bone is misaffected, if it be soft, as *Ruellius*, *Fernelius and Hollerius* 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 split, but only subject to break. Scaliger in his commentary adds: I have seen the thigh-bone by reason of the venerious disease, or by use of I know not what medicaments, bowed like an horne. Geographers write that in a Country of Ethiopia, the inhabitants have naturally from their birth bodies so flexible, that they can turne and wind them into any posture. I have red in Hippocrates of a boy that was borne 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 shal be drie 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 periostean membrane. If it be solid and concrete without cavities or parts, it renders the body heavie and sluggish, and can containe 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 signe 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 *Syracusian Lygdamus* is reported to have been, who in the three and thirteth *Olympiade* was the first who at the *Olympick Games*, became Victor at all Exercises and won the Paneratian Crowne: his bones were found to have no marrow in them, as *Solinus relates* in his 4 Chapter. *Antigonus* in his Book of wonders Chap. 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. Booke of *Athenaus* his Deipnosophists. *Aldrovondus* 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 periostean 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 pocks when it is of long standing and confirmed, howbeit it may spring from some other cause. Finally being depraued and mishapen, or disjointed, it hinders and mars 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 soddered together one the outside: Yet does it still remaine divided within.

CHAP.

Chap. 4. *Of the Nouriſhment, Sence, and Marrow of the Bones.*

The remote matter that nouriſhes 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 hollownes and poroſitie 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 Joined together or ſoddered up by a callus. How can it be (may ſome man ſay) that the blood ſhould nouriſh the bones, ſeeing they have no veines, 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 Jaw-bone alone has veines. *Galen* indeed in his 8. Booke *de Placitis*, attributes unto every bone a Veine greater or Leſſer according to the Proportion of the Bones: and in his *Comment upon the firſt Booke 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. *Booke de Uſu Partium*, that the veines of the Bones are ſo ſmall and fine, that thay 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, beſtowes upon ſome greater, upon other leſſer Veines, moreover the little holes which are found about the extremities of the bones, do manifeſtly declare that ſomwhat there is which goes into the ſaid Bones now their is nothing goes into the bones but little Veines. If we beleive *Platerus*, the Arteries doe 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 ſenſe of feeling, becauſe all the feeling they are capable of, is by means of the perioſtean Membrane which does incompaſs them. Nevertheles *Nicolas Maſſa* call's God to witnes 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 paine, ſo that he could not endure to have it touched with a rough inſtrument in regard of the paines it cauſed, and it was freed from the perioſtean Membrane. Yea and he bored the bone, and found that it had the ſenſe 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.

The immediate matter.

whether the Bones have Veines?

whether they have Arteries?

Or Nerves?

Threefold Marrow of the Bones.

We canot looke into the Cavities and Marrowes of the Bones; unles they be firſt broken. I obſerve a threefold Cavity of the bones and a threefold marrow.

In the greater Cavites of the larger Bones, *the Marrow is reddiſh*; in the leſſer Cavities of the ſmaller bones the *marrow is white*; In the ſpungy bones there is contained a *marrowy Liquor*.

whether the Marrow of the Bones be compaſt with a Membrane.

In the meane 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 *Paræus* does imagine. Hippocrates himſelfe, in his Booke *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.

Chap. 5. *Of Articulations or Jointings of the Bones.*

To the Articulation of the Bones there concurs.

LET us proceed to the Joinings-together of the Bones.

There does concur to the Articulations of the Bones, the Head, the Cavitie, the Griſtle, the Flegmatic moiſture, and the Ligament.

an Head.

Every *Head* is in its owne nature and original an Epiphyſis, but in proceſs of time it degenerates into an apophyſis.

The

The Head is within of a Light spungie and porous substance, being filled with blood or with a marrowy Juyce, on the outside it is covered with a very hard shell or bark, very thin and compact, which is crusted 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] *Condylos*

A Cavity. The *Cavity* of the Bone which receives the Head, is also crusted over with a *Gristle*, which if it be deep, it is called in Greek [a] *Cotyle*, if shallow, 'tis called [b] *Glene*.

A Gristle. It is sometimes encreased with a Gristle brim, lest the bones should too easily slip aside, and fal out of their places.

A flegmatick Humor. And in the Cavities themselves, there is contained a clammy, thick, and Oyly *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 extreamly 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 often times 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 color 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] *Perna*, and that of the *Astragalus* with the three Bones of the *Tarsus*, which are termed [g] *Æneiformia*. 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 Ilium*, 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. d d. f 4. a.* [b] *T 21. f 1. & 2. ll.*

[a] *T 21. f 4. B.* [b] *T 21. f 4 F.* [c] *T 21. f 7. a a.* [d] *T 21. f 8. a* [e] *T 21. f 5. A.* [f] *T 21. f 5. B.* [g] *T 21. f 5. E E E.*

Conjunctions of the bones for Motions sake, are seen in the Fingers, Wrists, Elbows, Shoulders, Hips, Shanks, Ankles, Ribs, Spondyls; in a word, in al movable Articulations.

For Perspirations sake, we see bones joyned 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 through-fare of some certain Vessels, which go partly out, and partly in; to which intent the Sutures of the Skull were contrived.

For Securities sake, and to avoid the violence of breaking, &c. we see the said Conjunction, in al 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 *Galens* 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 joyned 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 *Diarthrosis*: 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 *Gynglymos*. *Particulars of each sort.*

Of the second kind of Articulation, viz. *Synarthrosis*, there are in like manner three sorts, *Enarthrosis*, *Arthrodia*, and *Gynglymos*; 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 Dissect. Muscul.* Chap. 22. neare 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 differencing of Parts, and to save from harm by stress 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. *Examples of the sorts.* The [a] Ribs are joyned to the [b] Brest-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 joyned to the [f] *Scaphoides* with an obscure motion, which is *Enarthrosis*. *Lib. de Ossibus*, Chap. 24. *Gynglymes* is found in the Vertebras of the [g] Back, which is to be counted as a kind of *Synarthrosis*; the *Gynglimes* of the other Vertebras, 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 cals 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 Sternon or Brest-blade [k] being immovable, are joined 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 Brest-blade are Joined together by symphysis, because they grow together as the Person comes to yeares, so that no markes 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*.

Symphysis is an immovable union of the Bones, which is performed either with somwhat intermediate or without. *Symphysis, what it is?*

In regard of the threefold Medium, some *Symphysis* is called *Synchondrodis*, from the Cartilage Gristle which is the Medium of the Union, a second is termed *syneurodis*, from the nerve which is the medium, a third is called *Syssarcodis* from the fleshy Medium. To which we may ad a fourth termed *Neurochondrodis*, because the Union is made by a Medium which is of a mixt nature, being partly nervy, and partly gristly. But more may be seen of this, in *Galen* his Doctrine of Bones. *Its Differences.*

[a] T. 10. f. 2. 1. 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 appeare in the bones of the [a] lower Jaw, in the Bodies of the [b] Vertebras, in the bones of the [c] share one with another, and in the conjunctions of the [d] Ilian bones with the [e] *Os sacrum*, in the growing together of the vertebras 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, *sine 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 wherewith the bones are incared, and the Gristles, both such as are common to divers bones articulated together, and likewise such as are proper to the particular bones to cruft the ends of each of them: all these shal be treated of in our particular Muster and Surveigh of the Bones.

The Medicinal Consideration.

The General Diseases of the Bones are, *Caries* or Rottennes, and putrefaction, *General diseases of the Bones.*

 which *Caries*

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 al Joynts, but especially infesting the Hip-bone. Of these kind of Diseases, read the *Medicinal Definitions of Gorræus*, and *Foesius* in his *Oeconomia Hippocratis*.

Hydarthrosis. Of kin to this, is *Paracelsus* his *Synovia*, or *Hydarthrosis*, 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 beleeve *Galen*) too curiously differenced by the latter Physitians 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 *Alphithedon*, 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 cals *Apoclasma*, and *Galen* terms *Hapagma*, when a bone is broken there where it is joyned with another bone.

Luxation. Luxation, or Disjoynting, is a Disease of the bone in Scituation, when it is removed out of its place.

There is a two-fold 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 distorsion, or wrenching, a fall, and extension of a Member. The Internal causes are, a thin Humor, which does relax the Ligaments, or a thick Humor which by little and little, fils the Cavity of the Joynt, 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 shal in the Limbs be cut in sunder, the straight or crooked bones do no longer serve to bend or stretch out the said Limbs.

Chap.

Chap. 6. *Of the Bones of the Skull.*

HAving diligently considered the Articulations, or joyntings 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 *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. *Things to be observed principally.*

And in the first place, let us contemplate the two-fold Table of the Skull, or the double Skul-board which is thinner in Women, than it is in Men. *Two-fold plate.*

The uppermore 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 intermediate space.

Now that same intermediate space, is a certain spongy Substance, which receives and contains a Marrowy Juyce, serving for the nutriment of those bones. The which Marrowy Juyce is reddish, by reason of blood flowing out of the smal Veins scituate in those parts; which is wont then to flow out when the Skul of a living man is boared through with a Wimble, 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 Juyce to nourish the bones. *Hippocrates* adds, The whol Head, a smal part excepted, resembles a spunge ful of smal Caruncles, or little bits of flesh, which if you press, and squeeze with your finger, you shal perceive blood to drop out of them: also you shal see smal Veins running up and down, which abound with blood. *Intermediate space.* *Why the Skull is double?*

Out of the foresaid Caruncles, being bruised with a vehement blow, the blood is squeezed, which putrifying, does corrupt the bone, which in the mean while appears sound on the out side: but the Sanies sweating out from the inner plate or Skul-board, does corrupt and putrefie the very brain it self. And if so be when the Skul 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 Skul.

That same spungy *Hyperjarcosis*, or breeding of proud flesh, which grows up in wounds of the Head, is bred out of the foresaid Duplicature of the Skul-bone, as *Hippocrates* has observed. Touching the Fungous Excrescences 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. *Proud flesh in Head-wounds, whence it proceeds?*

But *Hippocrates* his Caruncles, are vainly sought for in this intermediate space, whatever *Fallopius* pleads to the contrary in his Book of the Wounds of the Head, unless a man would call the spungy substance of the bones *Sarcia*, or Caruncles, in regard of their Function.

This *intermediate space* interposed between the two plates of the Skul, is called by *Hippocrates*, *Diploe*. Howbeit, *Galen* contrary to the Opinion of the Antient Physitians, cals the second, and inmost plate of the Skul, *Diploe*, in the sixt Book of his Method of Healing. *The space between the skul-plates, how called.*

The Use of this *Diploe*, Duplicature, or spungy substance, is three-fold: First to receive blood for the nourishment of the Skul: Secondly, That the Fleshy Excrescence in the Fractures of the Skul, might grow out of it: Thirdly, That the Fumes of the Brain might more easily be exhaled. *The use thereof.*

Somtimes an Humor is collected between the two plates by way of transcolation, which *Why there are two plates.*

which being in process of time corrupted, does cause most excessive pains, which often happens in an inveterate Venereal Pox, when the Skul is knobbed, and bunched with a certain *Exostosis*.

This double plate or board, of the Skul has been made by a wonderful contrivance of Nature, lest in al blows upon the Head, the wound should penetrate the whol substance of the bone. Hence it comes to pass, that somtimes one plate is cleft whil the other remains unhurt.

The Whore-masters Pox does often-times eat through the external plate, and somtimes through both the plates, without killing the Patient, who lives a long time after; as *Palmarius* avouches in Chap. 4. of his Book *de Lue Venerea*. 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 somtimes 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 al inclined to any loosness, 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. Matheus de Gradis*, *Vesalius*, *Lib.* 1. *Cap.* 6. *of his Anatomy*. *Baptista Montanus in his* 36. *Counsel*. *Zecbius in his Counsels*. *And Baptista Carcanus in his Book of Head-wounds*. See *Claudinus his Counsels*. I confess, that somtimes 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 Younglings to move and pant, *Gal. Lib.* 13. *Method. Cap.* 22. And in such a case to apply a Cautery, 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 pis thereon.

Whether Blackmoors have Sutures in their Skuls? It is written by *Herodotus*, *Aratus*, and *Arrianus* in the *Life of* Alexander *the great*, that the Heads of the Æthiopians, and Egyptians had no Sutures, which gave *Pareus* occasion to write, That the Æthiopians and Moors, and those which inhabit hot Regions towards the South, and the *Æquinoctial* Line, have Skuls 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 Skul was in al things like one of ours.

Cavities of the Head. In the Head there are many remarkable Cavities, which the Anatomists call *Sinus*. These you shal 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 al 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 Cels, 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 nostrils 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*, neer the Apophyſis Maſtoides, and cannot be ſeen unleſs the arched Vault of the *Concha* be broken, or the porus auditorius pulled in peices.

Whether flegm may be collected within the Cavity of the Sphenoides.

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 conveighed into the Palate: which way of the paſſage of Excrements, is by *Veſalius*, *Columbus*, *Falopius*, and *Valverda* rejected: who contradict *Galen* in this point, and maintain that this excrement is voided through the neighbouring holes which reſt upon the *Sella Sphenoidea*.

The reaſon of *Gallen* 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 ful either of flegm or ſeroſities: probable notwithſtanding it is, that the ſerous humor which flowes and diſtils out of the Choana, through the five-like plate of the Sella equina, is tranſcolated into the Cavities which are beneath, and from them powred back by certaine oval and ſufficiently wide Holes, and voided forth into the ſpungy 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 ſpungy 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 ſcul ſo much the lighter? or that they might be conduit heads or ſtorehouſes of aire, 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 conciſe nuation or conjunction with them. Againe the Aire which is required to be exceeding pure, would be defiled by paſſing to and fro through the ſpungy bones. Furthermore in the many dead bodies which I have diſſected, ſome of which might be ſnotty and flegmatick, I never found the mammillary Proceſſes any larger than uſuall. But by thoſe paſſages flegm ought to be derived unto the *Os Ethmoides* 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 Braine, are ſeldom perforated before, ſo as to have a through-fare into the Noſtrils.

The uſe of the ſinus Sphenoides.

Wherefore I conceive that al the ſnot and flegm of the noſtrils is not ſtraind 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 *Os Sphenoides*, if it paſs through the little holes of the Plate of *Os Sphenoides*, it may be derived into the Spungy bones of the Noſtrils.

By what waies the flegm of the noſe paſſes?

The ſaid ſpungy Bone is ful of holes being diſtinguiſhed, with bony Cells, in which ſmal *Caruncles* or *bits of fleſh* are contained, which being ſwelled, the diſeaſe *Polypus* is bred.

Afterward you ſhal conſider the Paſſage of the Noſtrils into the Palate, by theſe cavities which are diſtinguiſhed by the *Os Vomer*. At the roote of the pterygoidean Apophyſis, there appeares an hole compaſſed with a Griſtle, which is the extremity of that paſſage, which reaches from the Ear to the Palate, by helpe whereof Deafe perſons heare, 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

The Medicinal Consideration.

Primary diseases of the Scul.

Tumors

In the Skul, 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 *hornes*. An hard, ful and oblong tumor is called *Testudo*, of kin to which is the Tumor *Talpa*, which also is called *Topinaria*.

There is another tumor which is termed *Natta*, and growes sometimes chiefly in the Back, which hangs by a smal root. This threefold tumor, if timely care prevent not, is wont to grow to a greater Bulke. Hornes are wont to grow out in the Skul, the forehead, and elsewhere; yea and upon other bones. I have seen an horne a finger long, which grew out of the lower part of the Leg, like a spur. Of these kind of Hornes *Sennertus* has neatly treated, *in the fift Book of his Practice.*

Fracture

Besides these Tumors the *Fracture* of the scul 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 diacope, when an Arrow or dart falls upon the Head and peirces deep, the second is called Aposcheiparnismos, which is a kind of planing or shaving as it were, when a piece of the bone is pared away: the third is termed Hedra which is a gap or rase 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 apeichema, 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 skul to the Membrane or Meninx of the Braine; Ecpiesma which is a depression of the said Scul divided into thinner and smaller bits: camarooisis which is a vaulted Elevation of the broken Skul. Enthlasis so called, is indeed a contusion but without fracture, being as it were a flexure or bowing of the soft scul. Which kind of contusion is seen in brasen vessells, as pans and kettles &c. when they are battered only and not broken.

Caries / Exostosis

In the Bones of the scul we often find a Caries and Exostoosis 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 in such as are of yeares 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 freeer motion.

Channell.

Within the Jaw-bone there is a crease or Channel cut out, ordained to containe the Vessells, which is separated from the cavity which containes the marrow, that it might afford a smal portion of the vessels to every tooth.

This Channell of the Vessels is situate in the middle of the Jaw-bone, and is manifest; and therefore Hyppocaates writ in his book of the Nature of the Bones, that of all bones only the lower jaw-bone has veines.

[a] T. 15. *f.* 3. L.

Cahp. 8. *Of the Teeth.*

Afterwards you shal 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 forme of their holes or sockets.*

Whep

When the Teeth are broke, you shal find them stuffed with a slimy substance and with threds, 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 the dried ones together, and to observe the difference.

The way to shew the vessel appertaining unto the Teeth

But that you may discerne your selfe and demonstrate unto others the distribution of vessels, viz. of little veines, arteries and nerves into the Teeth: you shal take this course. You shal take an Oxes or a Rams neither jaw (in which these vessels are more apparent) and cut it on the inside, and open it until the marrow and Nerve appeare. The marrow being taken away, And the Membrane of the nerve being torne, the Nerve comes in sight, being composed of many little strings, from which certaine fine threds and other things resembling veines and Arteries, being wove together, do enter beneath into the Cavities of the Teeth roots.

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 smal and exceeding fine nerve distributed.

Then drawing a Grinder or Cutter leisurely out of its hole, you shal see very smal fibres inserted into the roots of the Teeth, which you shal reckon to be nerves.

What must be observed in a Tooth that is drawn out?

The teeth being pulled up cleane by the Roots, in the lowest part of the said roots, there appeares a matter which is partly fibrous, bred of the vessels, and partly clammie, which fastens the tooth into its hole as it were with Glew, by the way of *Syssarcosis*. An Oxe or Sheepes-tooth being cut asunder in the middest, the internal substance being clammie, is manifestly interwoven with vessels.

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. nn. [b] T. 15. f. 6. m. [c] T. 15. f. 6. oo.

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 Situation of the Os Hyoides.

The situation, 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.

It is placed in the Throat under the lower jaw-bone, hanging upon the Apophysis of the Styloides by the helpe and assistance of Ligaments.

Its structure. Its fastening.

It is made up of five bones, the middlemost of which being the greatest and the broadest, is termed *Basis* [b] *linguæ*, from which on either side there shootes forth a little [c] horn, which is for the most part gristly, seldom bony, being fastened to the upper sides of the Cartilago Thuroides, which two little hornes are accounted for the sixt and seventh bones.

Why it has many Ligaments?

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 fastened by *Ligaments and membranes unto the Apophyses of the Styloides, and to the upper Hornes of the Thyroides*; least one Muscle being palsied, that same counterpoise and equability in the motion of the Muscles should be dissolved, whereby it should come to be drawen on 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.

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 shal 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] T 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 joyned 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 smal 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-longs 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 Odontoides*, 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 antient Physitians, and let us diligently surveigh 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 obliquely.

In the Porch of the *Concha*, is placed the [d] *Tympanum*, which is not green as *Paurius* imagines, neither is it directly opposed to the external hole of the Ear, but stretched

ſtretched out ſlantwaies before the ſame, leſt any ſmal matters ſhould fall, or fly into the Ear, and finding the paſſage cleer and open, ſhould hurt the Drum. Whether anything 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 neer the ſame.

Now the whol ſtructure of the [c] *Concha* wherein *three little Bones*, the *Timpanum*; the *ſtring* annexed to the Tympanum, and a *Muſcle are contained*, are to be ſeen at one caſt of the Eye in yong 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 Skul. *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 *Os Lithoides*, is cut up towards the hind-part of the head, it is impoſſible but that ſomwhat appertaining to the internal ſtructure of the Ear, ſhould be pulled in pieces. *The way to ſhew the parts of the Ear.*

And thus you ſhal break the *Os Petroſum*, the Marrow of the Brain being taken away, and the Ear pluck't up by the Roots, and the circumjacent fleſh being removed.

The *Os Lithoides*, comprehending the Ædifice of the Ear, you ſhal cut aſunder with very wel-ſteeled, and extream 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 *Os Lithoides*, you ſhal ſee the three little Ear-bones, *viz.* The *Malleolus*, 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 BB.* = [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.* =

Then you ſhal ſee the [a] Drum with its ſtring, and ſmal 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 Eare towards the hind-part of the head, being faſtened to the little head of the Mallet or hammer. *The Muſcles*

But there are found two Tendons, or rather Ligaments; one which ſtaies the tail or handle of the Mallet; and a ſecond which is faſtened to the up per 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 Skul newly boyled or dried, you may diſcern the three little Ear-bones within the *Concha*. If you ſhal peep in fore-right into the external paſſage, and hold your Eye cloſe, with benefit of a cleer 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 might more eaſily give way, in motions of the Arm and Shoulder-blade. *The Griſtle of the Clavicula.*

You ſhal obſerve why it is formed after the manner of an Italian *S*. The Claviculæ are tied and faſtened together, by the Mediation of a ſtrong Ligament. *Its Ligament.*

Chap. 13. *Of the Breaſt-bone.*

THe Sternum, or Breaſt-bone, is in perſons come to yeers, of a bony [c] ſubſtance, but different in Nature from the reſt of the bones, becauſe it is of a reddiſh color.

[a] *T 20. f 4, & 5. B.* = [b] *T 21. f 1. BB. f 2. a.* = [c] *T 10. f 1. A A. T. 8. f. 2. A.* =

Of how many particular bones the Breſt-bone is made up.

Galen will have it compounded of ſeven Bones, ſo as that the ſeveral bones of the Breſt do by way of mutual articulation, anſwer to the ſeveral true Ribs, which *Hippocrates* ſeems to confirme. The Breſt bone [a] growing together in it ſelfe, has oblique diſcriminations, there where the Ribs are faſtened unto it. Howbeit in perſons growne up, there are three, ſeldom four diviſions remaining in the Breſt bone.

Valverda ſaies that the Breſt-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, though very ſeldom, it conſiſts of eleven bones, as I ſaw at Rome in the yeare 1554. in a girle about ſeven years old, this bone divided into ſixe bones, of which the five laſt, were cut from the bottome to the top, through the length of the Bone.

Bartholomew Euſtachius ads, how that it many times fals out, which none has yet obſerved, that the Bones of the Breſt-bone, the firſt and laſt excepted, viz. al the middle ones, or at leaſt ſome of them, are divided by a moſt evident line, ſomtimes ſtreight and ſomtimes crooked, through the midle longwayes: by which meanes it comes to paſs, that the Breſt bone is reckoned to conſiſt frequently often nine, ſeven, or eight bones.

The Hole of the Breſt bone.

Somtimes the Breſt-bone is peirced through the middle with a large Hole, which was obſerved by *Sylvius and Euſtachius*, being ordained for the tranſmitting of Veſſels. I have my ſelfe often obſerved the ſame, eſpecially in women.

In one woman the hole was ſo large, on the inſide of the Breſtbone, 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 *AA.* T. 8. *f.* 2. *A.*

Nicolas Maſſa brags that he was the firſt obſerver of that Hole in the Breſtbone, that ſomwhat might thereby breath forth of the *Mediaſtinum* and the neighbouring parts of the Breſt, or rather to give paſſage to the *Vena Mammaria* which is ſpred and branched forth into the Duggs.

In large-dugd and corpulent women, their larg dugs being removed, I have obſerved the Breſt-bone to be ſharpe and the Breſt narrow, which was the Cauſe of ſhortneſs of breath in ſuch women, the which narrowneſs of Breſt was cauſed, by the weight of their Duggs.

The Natural ſhape of the Breſt-Bone.

That repreſentation of the Breaſtbone as branched or jagged, is not true nor natural; for the Breſt-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, wil be in the upper part, and its point in the Cartilago [b] *Xiphoides*.

Of the Cartilago Xiphoides

The figure of which *Swordlike Griſtle* or *Cartilago Xiphoides*, by ſuch as are diligent obſervers, is found to be various: for ſomtimes it is ſingle and triangular, ſomtimes it is double, and like the Herb *Hippogloſſum*, Horſetongue or Tongue wort it has the larger part reſting upon the ſmaller: ſomtimes it is tripartite and reſembles a Trident; and other whiles it is bipartite reſembling a fork or Rake.

Nicolaus 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 there from, it ſeemes to be framed only for the midrifs ſake, or rather to hold up the Liver, faſtened thereto by a ligament.

Its Hole.

Amatus Luſitanus, in the 95. Cure of his fift Centure, obſerves that the Cartilago *Xiphoides* is bored through for perſpirations ſake, that the filthy vapors of the the ſtomach might by that hole breath out; which is a ſimple Conceit.

[a] T. 8. *f.* 2. *CC.* [b] T. 8. *f.* 2. *B.*

For

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 *Xyphoides*.

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 growen persons it causes perpetual vomiting, until it is reduced to a natural posture. *Its crooking*

Chap. 15. *Of the Ribbs.*

Every Rib does consist of a twofold substance, the one of which is [a] bony, which makes up the greatest part of of the Rib; the other is [b] gristle, of unequal length, which is joined to the Breast-bone, by that sort of Articulation which is called Arthrodia, that in the rising and falling of the Chest, it may yeild more easily. But they have another articulation with the vertebras of the Back-bone which is twofold in every Rib. *Twofold substance of the Ribbs.*

Now there are seven, which are called true and perfect Ribs, because they are joyned 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 Roote of the Cartilago mucronata. *The true Ribs*

And this is the Cause why *Aristotle*, whom *Plinie* 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 unto 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 Musculous flesh wherewith the Back-bone is covered being removed, its admirable figure is easily discerned, which is partly streight and partly oblique, somtimes bending inward and sometimes outward, which Hippocrates first discovered, and *Duretus*, *Hippocrates his Ghost* has described in *Coacis*. *The shape of the Back-bone.*

Every where between two vertebras, a thick cartilage is placed in the middle like glue. *Galen in his Booke de Ossibus*, writes that it is an hard and in some sort Gristlie Ligiment. *The Gristles of the Vertebras.*

All the vertebræ or turning Joynts of the Back, are covered on the outside with an hard membrane; and within they have a strong membranous ligament, drawen 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 certaine Vertebra, viz. that in the Back is found a certaine Vertebra which they have termed *Luz*, out of which as from a seed, the Bones shal be regenerated and spring up at the General Resurrection. This Bone *Luz* so called, *Cornelius Agrippa* and *Vesalius will have to be in the foote*. *A fable of the Cabalists touching a bone which they cal Luz.*

Howbeit *Hieronymus Magius in his fift Booke de Exustione Mundi*, relates that *Adrianus* learned experimentally of *Rabbi Josbua Ben Anime*, that the foresaid Bone is one of the Vertebra's of the Back.

For he found in the Back bone, one bone that a milstone turning upon it would not breake, the fire could not burne it, the water would not dissolve it, and at last being layed upon an Anvil and smitten with a sledge or smiths-hammer, it was so far

far from being broken in the least, that the Anvil was crackt and the sledge broken the Bone receiveing in the meane while no detriment. Which is as falſe as falſe can be. For all the Vertebræ, may be broken in peices, burnt and reduced to ashes.

Whence we may judge what credit is to be given to the Cabalists, who in things manifeſt, do ſo impudently mock and abuſe us.

The structure of the Loines.

If Aristotle had obſerved the ſtructure of the eleventh or twelfth vertebras, he would not have written in his third Book *de part Anima*, That the Back is fleſhy, but the Loines without fleſh, becauſe the Bending-places of al parts are voide of fleſh.

But the Loines are more fleſhy than the Back. But the Articulation of the twelfth vertebra is different from al 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 Vertebræ.

Crupper bone.

From the Loines you ſhal deſcend to the *Coccyx* or *Crupper-Bone*, and you ſhal obſerve its ſtructure conſiſting of three bones, its ſpungy reddiſh ſubſtance and triangular ſhape.

Which Part we read does in ſome Nations ſprout out like a taile. *Pliny records in the 22. the Chapter of his ſeventh Book*, that in India there is a race of Men that have hairie tailes, and are incredible ſwift. And *Paulus venetus, in the 28 Chap. of the fift Book of his Travells*, does avouch that in the Kingdom of *Lambri*, there are men that have *tailes* like doggs a ſpan long: who dwel not in Cities but in the Mountaines.

The *Nubienſian Arabick Geographie* mentions a tailed Nation, in an 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-tailes* in England, how that God to revenge the Injury done to *Tho. Becket* the Archbiſhop of Canterbury, cauſed Tailes to ſprout out of the Kentiſh Crupperbones.

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 Pareus*. This Impediment is cauſed by compreſſion of a very thick nerve ſeated on the hind-ſide of the Leg, which creeps along neare the Crupper-bone. The ſaid bone is eaſily reduced, by a mans finger put into the fundament.

The way to diſſect the verbra's of the Back.

In the next place you ſhal fal to diſſect the Vertebras of the back, that you may contemplate the admirable fabrick of the ſpinal Marrow, viz. how in the extreem parts thereof the nerves are parted, ending in the ſhape of an Horſe-taile; by reaſon of millions of little nerves woven together, which being agitated in water and diſhevelled, do expreſs the ſhape of an horſes taile.

Now you ſhal diſſect the Vertebre in this manner; Haveing taken away all the ribs at their joynts, you ſhal 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 ſhal forcibly cut on every ſide about the conjunction of each Vertebra, in order cutting off every vertebra, with their oblique apophyſis which helpe their articulation, til you come unto the Os ſacrum. This is a painful work; but he that would eate the kernel, muſt of neceſſity crack the ſhell.

Before the fiſtula oſſea 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 marrow.

The *Spinal Marrow* ſprings from the Braine and petrie-braine, and though it appeare like the marrow of the Braine, yet is it in ſome things unlike, becauſe ſofter and beſides its two membranes propagated from the Mennigs, wherewith it is infolded, it is incompaſſed with a third membrane ſtrong and nervous, which hinders the ſpinal marrow from bruiſeing or breaking, when we ſtoop or any waies bend our Backs. I am not certaine 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 loines.

Certaine it is, that the ſpinal [a] marrow deſcending by the [b] fiſtula oſſea, grows

continually

continually harder, and ſmaller, til it come unto the Loines, where it ſpends it ſelf into little [c] cords, and ſprings reſembling an horſe-taile; 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 threds, faſtened [d] one to another, and contained in the tenuis Meninx: which little filaments or threddy ſubſtances, do riſe ſo much the higher, by how much more the ſpinal marrow deſcends.

Its Original.

And that nature might by all meanes poſſible provide for the ſecurity of the Nerves; when they come forth of the holes of the vertebras, ſhe has compaſſed them about with a thick ſubſtance, which does ſo cloſely and firmely knit and bind together the fibres of the nerve, that they cannot be drawen aſunder one from another.

Progreſs.

After which knot and egreſs, they are eaſily ſeparated. But I beſech 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 cloathed only with the tenuis Meninx, ſhe has not drawen 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 turnes back the leſſer branch towards the ſpina, and carries the greater to the fore parts.

[a] *T.* 18. *f.* 5. *A.* [b] *T.* 2. *f.* 2. *a. &c.* [c] *T.* 18. *f.* 2. *o.* [d] *T.* 24. *f.* 9. *&c.* 10 *&c.*

How the animal ſpirit is carried through the Nerves?

It is a Queſtion amongeſt 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 ſpungy ſubſtance; but we find them all ſolid, woven together of many ſmal threds according as the Bulke and magnitude of every one requires.

Cæſalpinus in his 5 Book of Peripatetick Queſtions, ſuppoſes that thoſe little threds are a multitude of ſmal veines and Arteries, which make up one body as it were a fagot, being continuations of the Branches of the Rete mirable, 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 Cæſalpinus can demonſtrate ſuch a continuation of the Rete mirabile with the Nerves or the ſpinal marrow.

How many Nerves proceed from the ſpinal marrow.

Out of the ſpinal marrow [a] 28 pare of nerves do take their Riſe, *ſeven out of the Neck; twelve out of the Back; five out of the loines; foure from the Os ſacrum*, the branches whereof to ſearch out, is a wearyſome peice of worke, and muſt be done in a dead body provided for that intent alone, and with diligent Inſpection.

[a] *T.* 18. *f.* 1. *D. I. K. &c.*

The medicinal Conſideration.

The Dignity of the ſpinal marrow.

The dignity of the ſpinal marrow with reference to the neceſſity of Life, is equal to that of the Brain, and therefore Hyppocrates termed it *Aion*, becauſe he believed that the vitality of the animal was placed therein: as *Erotianus* proves in his *Onomaſticon* and after him *Foeſius* in his *Oeconomia Hippocratis*.

Plato in his Timeus does acknowledge the ſpinal marrow to be the foundation of Life Beneath the Head. *and Hippocrates* himſelfe teaches that men have moſt grievous ſickneſſes and hard to cure ariſeing from the marrow of their Back: for a fluxion thereinto cauſes a conſumption, and its drying up and withering is a greivous 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 ſpinall marrow be diſeaſed, either by reaſon of a fall or upon any other occaſion, or its owne accord, the Patient becomes both lame in his Thighs, ſo that he feels not when he is touched; and alſo in his Belly

and bladder impotent, so that at first he voids neither Urine nor dung, save upon meer necessity: but when the disease growes 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 *Ossea fistula*, I must shew you the natural figure of the *spina* or Back-bone; which is *Ithuscolios* streight bow'd through the whole length of it: but in the Neck and Loyns it is *Ithu-lordos* streight bowed inward, in the back it is *Ithu-cuphis* streight bowed outward, and therefore it is easie to declare the diseass which vitiate the Backbone, such as are *Lordosis, Cuphosis, Scoliasis, and, Seisis.*

Diseasses of the Back-bone.

Lordosis.

Lordosis, is a disease of the Backbone, when the vertebras theteof, are out of their place, and turned inward or forward.

Cuphosis

Cuphosis, is a disease of the Backbone, when its Vertebra's are dispointed and turned outwards or backwards.

Lordosis happens in the Back, as *Cuphosis* in the Neck and Loins.

Scoliosis.

Scoliosis is a crooking or wreathing the Backbone to one side.

Seisis.

Seisis is such a Commotion of the Vertebra's of the Backbone, as that they remaine indeed in their places, but so as their frame and fashion is disordered.

The cause of Scoliasis.

Scoliosis is the Inclination of the Back-bone to one side or another, when we goe, depends upon some fault in the twelft 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 doe beside.

For it is Joynted not by way of *Gynglimus* but by way of *Arthrodia*; and therefore if its Apophyses either upper or nether shal be depressed; it cannot sustaine the Trunke of the body bolt upright in motion, but it must of necessity leane 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 softnes 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 *Galens* 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 choak the Patient, becaus 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 spungie, fistulous, and perforated within and without: and therefore when this Bone is Diseased, the Patien 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 worne away with incredible raging pain, their *Os sacrum* being putrified: so that in conclusion they consumed away and dyed.

Chap. 16. *Of the Scapula.*

Its Articulion with the Brachium.

Having diligently Viewed the trunk of the Body, you shal proceed unto the Limbs; and you must principally observe the Articulation of the [a] Scapula or Shoulder-blade with the [b] Arme, 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 whol Joynt.

Alſo four muſcles viz: the [c] *Supraſpinatus*, [d] *infraſpinatus* the [e] *Rotundus minor*, and [f] *Subſcapularis*, doe with their broad tendons incompaſs the ſaid joynt. *Its Muſcles.*

The *Cavity* of the [g] Head *Omucopole*, being not ſufficiently proportioned to receive the Shoulder: which was ſo contrived to make the motion more eaſie and free, but it is augmented with a Griſtle which crowns the Lips of its Cavity. *Its Cavitie.*

Then you ſhal diſcover under the [h] *Deltoides* a broad and remarkable Ligament, which reaches from the Shoulder-tip as far as to the *Coracoides Apophyſis*, that it may hold in the *Arme* aloft, to prevent Luxation upwards. *Its Ligament.*

Afterwards you ſhal obſerve the extremity of the [i] *Clavicula* articulated with the Shoulder-tip or *Acromium*, which is therefore termed *Cataplein*, 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* cals 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 degenerate into a Bone, yet until they be 18. years old, it retains much of the ſubſtance of a griſtle contrary to the nature of al the other bones. Some whiles it grows ſo highly together with the ſpine of the *Scapula*, that in a perſon of middle age wraſtling or exerciſeing, it may eaſily be ſeperated, which happened to *Galen*, as *himſelf tels us in his firſt Book de Articulis.* *Its Articulation with the Clavicula.*

The like accident he obſerved in another, as he relates *in Comment. ad Part.* 1. *Sect.* 1. *de Officina*. *Hippocrtes* 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 *Epiphyſis*: from the likeneſs to a Crowes bil or an ancher, it is termed coraeoides and ancuroides. It prohibits the ſhoulder from ſlipping out on that ſide, according to *Galen in Com. in part* 1. *Sect. de Art*; and therefore it was framed for the ſecurity and ſtrength of the Articulation. *The uſe of the Apophyſis coracoides.*

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 ſeldome towards the fore part; *Hippocrates* did obſerve it once, and *Galen* ſaw it five times at Roome, as himſelf relates in *his comment*: *ad Part.* 4. *Lib.* 7. *de Articulis.*

Now the pars of the *Scapula* he thus diſtinguiſhed: as much of the whol Commiſſure or Joynting, as is ſubiect to the ſight he caled *Omos*; & that part which is under the knitting of the ſhoulder, he called *Epome*, which we terme *Acromion*: and that broad part of the *Scapula* which is ſcituate behind, and is covered with muſcles, is by *Galen* termed *Omoplatæ*. *The parts of Scaplua how named by Galen.*

From this place we may gather & fiſh out the Interpretation of an obſcure paſſage in *Cornelius Celſus*, in his *eighth Book Againe from the Neck two broad bones on either hand doe goe vnto the Scapulæ, our Countrymen call them Scoptula operta, the Greeks terme them omoplatas*, *Celſus* cals them *Scopula operta*, becauſe they ſtick 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*, cals *Montium Scapulas*. Alſo the ſmal branches of trees were called *Scopi*, hence the phrase *Vvarum ſcopi* vine branches uſed by *Varro* in his firſt *Book de Re Ruſtica*. *Cato* ſpeaks of *Scopulæ myrti* Myrtle branches. *By Celſus.*

It is worth obſervation which Women by long experience have learned viz. that broad ſhoulderd Men doe for the moſt part beget great Children, becauſe they are very hot hearted. And *Galen* ſais in his *Ars parva*, that by how much the Heart is hotter *whether broad ſhoulder'd Men 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 least they should die in their travil by reason of the largnes of their Children, which *Forestus* saies he had often seen come to pass in the 70 Observation of his 28. Booke.

Why french maidens have their right shoulder higher than the left?

The Cause of this is as hard to assigne as of another inconvenience, with which the young maides 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 shal hardly find ten that have wel proportioned shoulders.

Whether it is caused by the more frequent and stronger motion of the right arme, whereby the shoulder blade in widened, and raised up, by meanes of the interjacent muscles lifting themselves up. Ad thereunto that in persons that are growen up; their right shoulder is more heavy than there left, if we beleeve *Amatus Lusitanus in the last Cure of his 4 Centure.*

Why so few that can use both hands alike?

Why is the right Hand stronger than the left? and why are there so few Ambodexters that can use both hands alike? Is it because the Lungs and Liver doe 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 their right hand.

Is it because Mothers would make their daughters low shoulderd while they study to make them smal and waspe-wasted? For as *Terence* long since said, if a Girle 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 til they make them like Bull-rushes; mere *waspe-wasted Rush Candles.* Which is done, not without manifest detriment to their Health; whiles by the overgreat pinching in of the lower part of their Chest, the upper parts thereof are inlarged, whence proceedes that fame sticking out of their shoulders, or from contortion 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 percing into the substance of the Bone, through the which a remarkable veine does insinuate it selfe 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 appeares bloody when the Bone is broake.

Its Ligament.

The Articulation of the [a] *Brachium* with the [b] *Cubit*, is fastned and incompassed with a membranous and nervie *Ligament.*

Why the Radius is joined to the Cubitus?

The [c] Radius is adjoined to the Cubit, that it might direct the oblique motions of the Arme, which are performed downwards and upwards, which motions, haveing taken away the Muscles, you may observe, by turning the Radius to and fro backwards and forwards.

Why they part one from another?

The [d] Cubitus and the [c] 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 Ligament is interposed?

Between this space there is interposed a membranous [a] Ligament, by helpe of which the Cubitus and Radius are more nearely and straitly combined, and the interior muscles are separated from the external. It helpes also the equality of their motion, that both might be bent, or stretched outright at one and the same time.

Their Articulation 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 recei-

ved

ved by the Radius, the Bulke and thickness of the substance being changed. For the Radius is at the wrist thicker, that receiveing 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 shal observe, whether or no the styloides [b] apophysis of the Cubit do touch the wrist, being fastened thereunto by way of a joint. *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 Ægineta*.

They who deny that the Cubit in a Man does touch the wrist, do alleage that there comes between them a thick and moveable Gristle, which fills that space; and in very deed that same Cartilage or Gristle, seemes to be adjoyned by way of a supplement.

Chap 18. *Of the Wrist.*

The [c] wrist and [d] Radius, are joyned one to another by a nervous Ligament, which infolds the Articulation.

Moreover another [e] *Nervous ligament*, is observed, being shap'd like a Ring, which compasses the wrist round about, which contemes within it the tendons which are carried through the cavity of the wrist, and which lie upon the back of the wrist, saveing some particular ones: howbeit on the outside it seems smal.

[a] T. 22. *f.* 2. *e e.* [b] T. 21. *f.* 1. [c] T 21. *f.* 1. *F F.* [d] T. 21. *f.* 1 D. *E.*

The Wrist [a] bones are eight, disposed into two orders or rankes. *Number of the wrist bones.*

The first order consists of three bones.

The second is made up of toure bones. The fourth bone is over and above, out of ranke 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 *Vesalius* 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 forme that cavity, which is in the inner part of the wrist, and to this bone the Muscle Cubiteus flexor carpi does adhere.

The three wristbones of the first order, being joyned together, do make a cavity, which receives two Bones of the second order, which being joyned one with another, do make the joints Head: whence you may know that the first order is obscurely moved with the second, and that [c] the articulation is by way of Arthrodia, and in a dead body, having taken away the tendons, you may discover this motion. *Their Articulation.*

The rest of the wrist bones, being articulated with the Metacarpium, do cause no motion at al, or a very obscure one. It is very rare to find nine bones in the wrist; howbeit some have found so many.

Chap. 19. *Of the Metacarpium, Fingers and Sesamoidean Bones.*

After the wrist followes the [b] *Metacarpium* which is framed of five bones, if we beleive *Celsus* and *Rufftus*, whom *Plinie* does favour, when he attributes only two joints unto the thumb; Lib. 11. Cap. 43.

[a] T. 21. *f.* 3. [b] T. 21. *f.* 1. H H. *f.* 2. *G.*

Galen does better, who separates the first bone of the [a] Thumbe from the Metacarpium, because it is joined to the wrist by an Arthrodial diarthrosis, 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. Ad 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; & that it might performe manifest and strong motions, it has peculiar muscles and they are affixed unto the first Bone. When the *Athenians* would render the *Æginetæ*, their emulators, wholy unfit for warfare and Navigation, they cut their Thumbs of. And we cal such as are cashiered for their cowardize *Polletrunci*, thumb-les companions. They were by the antients in way of merriment termed *Murci*.

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 certaine cavity, in which the *Arabian Cautery* 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 eates, through the skin, and peices so deep as to flux the patient.

The Ligaments of the Hand. In the hollw 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. *G G. f.* 2. *H.*

The Sesamoidean Bones. Within the palme of the Hand you shal find divers *Sinewy-Ligaments*.

There are a few sesamoidean bones found in the inside of the Hand. There are none in the outside. They are found hidden among the first jointings of the fingers.

The Thumb in its second and third joint has some sesamoidean bones; in the first joint it has none.

The way to find those Bones. Now to find the sesamoidean Bones either in the hand or foot, you shal this do. You shal so cut out the tendons that stretch out the fingers, that you be careful not to take away the cartilages of the joints which are under them, which may seeme to be the sesamoidean bones.

Under these tendons, most frequently in the hand, especially in hard bodies, you shal perceive a certaine hardnes sometimes gristlie, sometimes bony. Then you shal cut crosswise the Ligaments of al the joints, until you make them appeare, their inside in the hand, their outside in the foote; in which side, you shal find the sesamoidean bones; haveing 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.*

From the Armes you shal proceed unto the Inferior Limbs.

Their Ligaments. Between the *Os sacrum* and the Tuberous bunching out of the Ischium, there intercedes a *Great and strong* Ligament.

Beneath the seame or growing together of the share-bone there is *another Ligament* stretched out.

And a [c] *circular Ligamem* comprehends the Articulation of the Thigh with the socket of Os Ischij, which being cut away, *another* [d] *Ligament somwhat long and bloody appeares.*

[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. *a a.* [d] T. 21. *f.* 7. *b.*

The said bloodynes is caused by reason of Certaine little veines which creepe 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 forefide of the *Acetabulum*: which being relaxed, and drawn from its place, there fals out such an halting as is incurable: in which the Thigh, though perfectly put in Joint, will still slip out again.

That same *tabes Coxaria*, *Ptbisis ischiadica*, mentioned by *Hippocrates* in his Book *De morbo Sacro*, and elsewhere, it is worth youre observation: when by reason of an Impostume or a fluxion into the Hip-bones Cavity or *Acetabulum*, the Ligaments corrupt and putrify, and the Hip grows lank and leane. 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 *thuroides*, from its resemblance of a door, is ascribed unto the share. It was contrived for lightnes sake, and is exactly covered with an hard membrane, which does sever the *Musculos obturatores*, which rest on either side thereupon. *The ovall hole of the Huckle bone*

That is false which *Aristotle* has written in his *fourth Book of the Live-wights* 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 forefide, and saddle-fashiond behind, for the convenience of sitting and firme walking. Which figure *Hippocrates* observs 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 hip.*

For such whose Thigh-bone is streighter than it ought to be, are crook-legd, and are lame in their knee; and they cannot stand nor goe 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 streight thigh-bones.

The Neck of the Thigh-bone, is somwhat long-fashioned and oblique, that it may pass along the tendon of the *Rotator Infernus*. But *Galen* suppotes 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, nervs and kernels, which are quartered neare 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 groins narrow and compressed, and when they walk are constrained to halt on one side, and are termed *Varii*. so sais *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 Joind to the Leg is termed the *Knee*, which is fastned by a two-fold 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 somwhat *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. Lib. 2. *de fracturis*.

That Part which is opposite to the knee behind, is termed *Poples* the *Ham*, being empty and void. The Vessells 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. *Chapt. 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 foreside double* (it should be on the hinder side) *there is a certain emptiness like cheeks, which being perced, 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. Veines, Arteries and nerves, which creepe through that hinder part of the thigh, which being cut, inevitable death follows.

Whence proceeds that sympathy which is between the knees and the; cheeks?

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 weepe, by reason of that old acquaintance of the knees and eyes, or Eye lids in the womb, where the child touches its Eyes and Suttaines them with its knees.

Chap. 21. *Of the Patella.*

Its connexion.

Upon the Articulation of the thigh and leg a smal bone is placed, which they call [a] *Mola* or *Patella*, the whirle bone of the Knee.

[a] T. 21. *f.* 1. *LL.*

It growes unto the knee, not fastened by any Ligaments: but only being [a] glewed to the tendons of the muscles of the shanke, it is so held close upon the knee.

[a] T. 21. *f.* 8. *d.*

Its use.

If you take a diligent view, you shal observe a *Ligament somewhat bloody*, which does firmely knit and bind the Patella to the hard fat which is palced beneath.

The office of this bone, is to defend the joint 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 keepes the thigh from luxation forward. And because the whole Body inclines forward, it hinders us from falling when we go downe a steepe Hil.

This *Galen* found by experience, in a certaine young man that was a wrastler, in whom, as he was wrastling, the Patella was disjointed, and did ascend towards the thighbone, whereupon two inconveniences followed, viz. a dangerous bending in his knee, and a trouble in going down Hil: and therefore he could not go down hil without a staf. *Paræus* observes in the 22. *Chapter of his* 14 *Book*, that he never saw anie 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 hil and downhill as formerly.

Vesalius his opinion touching the use of the Patella.

Notwithstanding *Vesalius* in *his Surgery* denies that the Patella confers any thing to the firmnes of the joint, 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 joint.

And he goes not much from the same opinion in *his Anatomy*, where he saies it performes the same office in the knee, which the Sesemoidean bones do in other joints.

Hippocrates in his book *de locis in Homine*, assignes another use of this Bone, namely to prohibit moisture from descending out of the flesh into such a loose joint as the knee is.

Seeing therefore the Necessity of the Patella is so graeat, I conceive it is but a fable which is reported of the Thebans, who, that they might be able to run more swiftly, took certaine Bones out of their knees.

Yet there have bin found about *Nova Zembla* certaine 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 seafaring 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. But Perone (which is rendred fibula) does signifie two things in *Hippocrates*, the whole Fibula, and appendix of that bone, as *Galen* expounds it, in his Interpretation of the words of *Hippocrates*. *The reason of these names.*

It is termed *Perone* from *peiro*, which signifies to boare or thrust through. Tis called Fibula in Latine from the Greek word phible, which signifies smal and lank; howbeit in Latine writers of Architecture, certaine beames or joices of wood placed to give strength to other parts of the building, are termed *Fibulæ*. For this Bone fibula does sustaine the outer knob of the shanke-bone unto which it is fixed, because the weight of the Thigh and of the whole Body, does most of all beare upon that part.

The lower ends of the Tibia and Fibula are termed [c] *Malleoli* Ankle-bones, both being fastened together by a *a strong circular Ligament*, through which the tendons of the Muscles are drawn, as was said of the wrists. *What the Malleoli are?*

[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 immoveable, so that any man would thinke, 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 Foote.*

In the Sole of the foot, you shal find very many Ligaments, by which the Bones are straitly united, that the foot might become hollow. You shal therefore observe the *Transverse Ligament*, which binds up the Bones of the Metatarsus, with the first ranke of Toe-joints, like that which we find in the Hand. *The Ligaments of the Foot.*

Chap. 24. *The number of Bones for a Sceleton.*

Two hundred thirty and two Bones are required to make a sceleton, 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 Cocyx or Crupper bone, because in the boiling and cleansing of the Bones, they do not separate Neither wil the [d] Coccyx, [e] Larynx, [f] Hyoides, nor [g] Sternum endure boileing.

I omit the fixe little Eare-bones, the Os hyoides and the Larynx, because they are not joined 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, 11. *&c.* [g] T. 10. *f.* 2. *A A*, [h] T. 20. *f.* 7. *A B C.*

Chap. 25. *Of Breaking the Bones.*

When you are sufficiently instructed in the number of the Bones, you shal break in peices 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 toddered 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 claviculæ 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 therefore as the Quantity of a Bones nourishment, and the space of time requisite thereunto, does alwaies hold proportion to the Bones thicknes: so that if the Nose-bone, that is to say the Bone of the upper Cheek which reaches to the Nose, doe 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 norishment, and the longer time they require to be toddered together; so 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 ben 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 ankle-bones, the [k] Heel-bones, the [l] Hand, and the [m] Foot-sole are healed. between the twentieth and thirtieth daies the [n] Thighes and [o] Arms: between the seaventh and twentieth and fortieth the [p] Arm-bones and [q] Thigh-bones are healed. the sence 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 Arme and Thigh, is reddish: the marrow of the middlenz'd bones which are hollow in some good measure, is white. The rest *of the bones being of a spungy substance*, or full of little Cavities, are replenished with marrowy Juice, 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. A A. &c. [e] T 21. f 2. B. [f] T 10. f 2. & 3. [g] T 13 / 19. T 10. f 2. & 3. T 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 G H. [n] T 21. f 1. M N. [o] T 21. f 2. D E. [p] T 21. f 1. C C. [q] T 21. f 1. K K.

Howbeit the inferior jaw-bone is hollowed in the base, and in the Chin it is of a stony hardnes, it contains red marrow, which does not fluctuate from one end of the Iaw-bone to the other. because of the hardnes and solidity of the jaw-bone in the Chin. Whence it is easie to be demonstrated that the *Maxilla* is a double bone.

The *Clavicula*, which *Galen* writes is fistulous, we find to be every where of a spungy substance. The Ribs, the Vertebræ, the shoulder-blades, the Hip-bones, the Tarsian and Metatarsian bones, also the wrist and afterwrist-bones, are spungy 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.

Chap. 26. *The Collection and ordering of Bones for a Sceleton.*

But if you are not minded to breake the bones, but desire to preserve and prepare them for a sceleton. You shal observe that there are two things required thereunto; first the purifieing and clensing of the bones, secondly their apt uniting and fastening together, which may be termed Sceleto-pæia. *Two parts of this worke.*

As for what concerns the clensing 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 remaine bare and naked. *The Clensing of the Bones.*

Pausanias in Eliacis relates that the Divel *Eurynymus* eates off the flesh of dead People, so as nothing but the bones remaine.

The Jewes imagine that there is an internal Divel named Azazel; who in Leviticus is named Princeps desertorum, and eates and devoures the flesh of the dead, leaveing 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 defie and execrate those wicked spirits.

Wherefore haveing cut the Bones one from another and taken their flesh off, you shal cast them into a large Kettle or Caldron, except the Brest-bone, the Hyoides, and Coccyx. Then fil the Caldron with scalding water, so as to cover all the Bones and set them on the fire and boile them foure or five houres.

You shal be careful while they are boiling that no bone stick out, so as to be fainted by the smoak.

Also you shal ever and anon take off the scum and fat which swims aloft, that the Bones may be the more neat and cleane.

Which that it may be more effectually performed, you shal perce the larger bones that are ful of Marrow, in the Head with an Awle that all the superfluous marrow may flow and soake 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 wil be greasie) and scrape and clense them with a smal knife.

Some, while they are boyling, throw in a pound of Lime or Chalke, to make them the whiter, but this eates off the Epiphysies and the Gristles which do crust the extremities of the Bones; which you must take heed you pul not away, when you scrape the Bones.

Then you shal put the Bones againe into most pure water boiling hot, and boile them for an houre, 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 wel with course linnen cloaths.

When the Bones are thus prepared, many lay them two or three moneths in the open aire to bleach and grow white. Others put them into a wooden case, bored ful of holes and hang them in a running brooke, or in the streames of a swift River, that the rubbing of the streame may whiten them.

I had rather lay them under the falling of a Mil-stream for the space of ten or twelve daies.

Bellonius in his Book de Admirandis, relates that he saw in the shoare of *Bononia* in *Picardy*, an inumerable company of exceeding white bones of Bodies which had been drownd and cast out upon the shore haveing been 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 neate, and cleane and whiter then Snow. Such as were those two Scelerons 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 juice remaine uncorrupted.

The Bones accurately cleanſed and dried, you ſhal 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 *Veſalius* 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 boileing, firſt in water, and then in oile, al 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 Artiſt; or it is done by imitation of another Sceleton neatly compoſed. You may read more of this ſubject in *Veſalius and Columbus*. Alſo *Carolus Stephanus*, has noted ſome things upon thoſe Authors, worthy of Conſidetation.

FINIS.

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The Names of several Books printed by Peter Cole *at the sign of the Printing-press in Cornhil neer the Royal Exchange.*

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12 Thankfulness required in every Condition.

13 Grace for Grace.

14 The Spiritual Actings of Faith through Natural Impossibilities.

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that End from. 2 *Cor.* 5 19, 20, 21.

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FINIS.

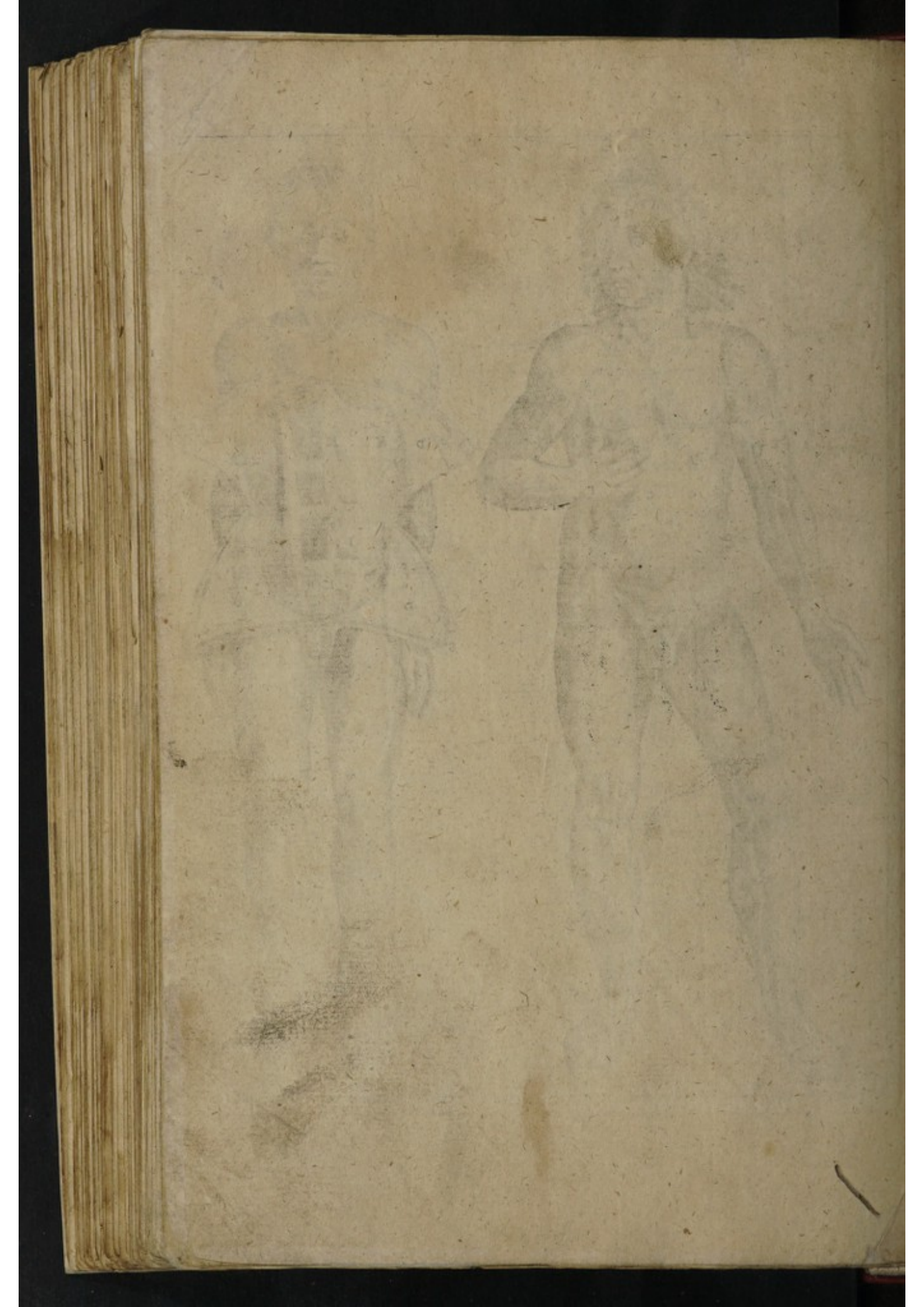
AN EXPLANATION OF THE TABLE OF THE FIRST BRASSE PLATE IN THIS BOOK.

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.

A The right Hypochondria.
B The left Hypochondria.
CC The Epigastrium.
DD The Bowels.
EE The Hypogastrium.
FF The Groyns.
G The Region above the Privities.
H The Vein of the Forehead.
I The Vein of the Temples.
K The external Jugular Vein.
L The cephalick vein of the right Arm.
M The basilick vein of the right Arm.
N The middle or common Vein, which is not in the same place in all Bodies.
O The cephalick vein of the left Hand.
P The vein of the left Hand, called Salvatella.
Q Q The Vein Saphæna descending.
R R The Vein Saphæna in the Foot it self.
S S The Sciatick Vein.

The Second Figure expresseth the common coverings of the Body of Man, and the Muscles under them laid open.

A A The Scarf-skin.
B B B B The Skin.
C C C C The Fat.
D D D D The fleshy Membrane.
E E Part of the pectoral Muscles laid open.
F F F Certain beginnings of the Muscles called Serrati antici majores.
GG HH II The Muscles of the Abdomen obliquely descending.
G HH Their toothed beginnings.
IIII The tendon of the oblique descending Muscles, under which the right Muscles of the Abdomen with their Nervous inscriptions appear.
K K The white line of the Abdomen.



THE TABLE OF THE SECOND BRASSE 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 shews the Muscles of the *Abdomen*: The tenth gives you a cleer sight of the Parts, the *Peritonæum* being removed.

FIG. I.

Expresseth the five *Vertebræ* of the Loyns, as they are observed on the fore part.

a a a a The *Transverse Proceß.*

FIG. II.

Laies open to your view, the *Vertebræ* of the Loyns, as are presented on the back Part.

a The hole for the Marrow of the Back.
b b The transverse Proceß.
c c c c The oblique Proceß.
d The acute Proceß.

FIG. III.

Represents the internal face of the *Os Coxæ*, 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 Coxæ.*

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 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 deciphers the *Os Coxa*, 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.

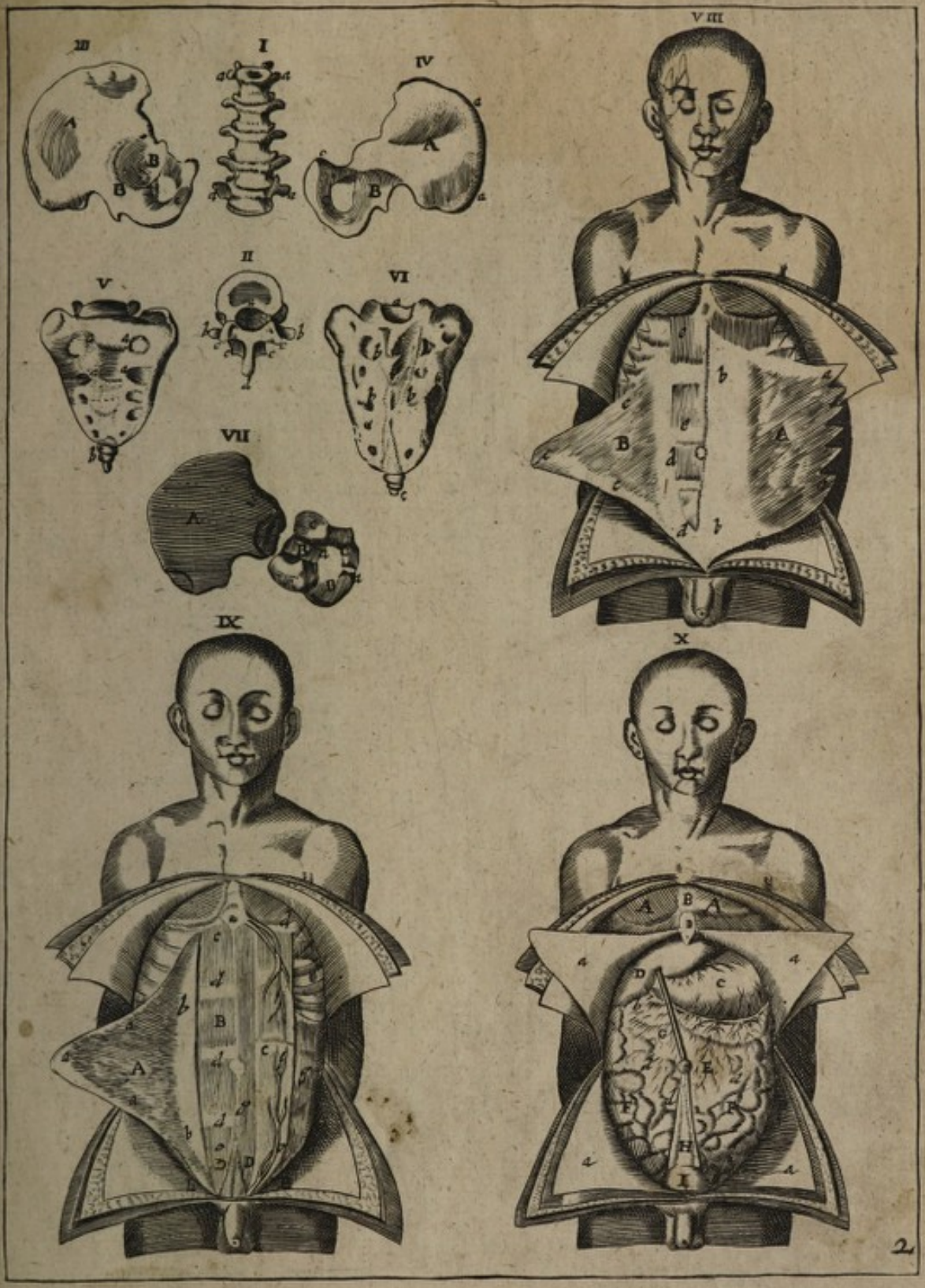
A The Muscle of the Abdomen obliquely descending, in which
a a Are the toothed beginnings.
b b The Tendon sticking to the white Line.
B The Muscle of the Abdomen obliquely ascending, in which
c c c Its beginning.
d d A portion of its tendon which covers the right Muscle.
e e The right Muscle of the Abdomen.

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 Shews 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 Proceß of the Peritonæum descending to the Cods.

FIG. X.

A Part of the Pectoral Muscle detected.
B The Sternum.
C The Stomach being something hid by the Liver.
D The Liver.
E The Omentum in its Scituation.
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 Bowels in their scituation.
G The Navil Vein.
H The Ligament of the Bladder composed of the Urachos, and the two Navil arteries.
I The bottom of the Bladder.
a a a a The Peritonæum divided.


III
I
IV
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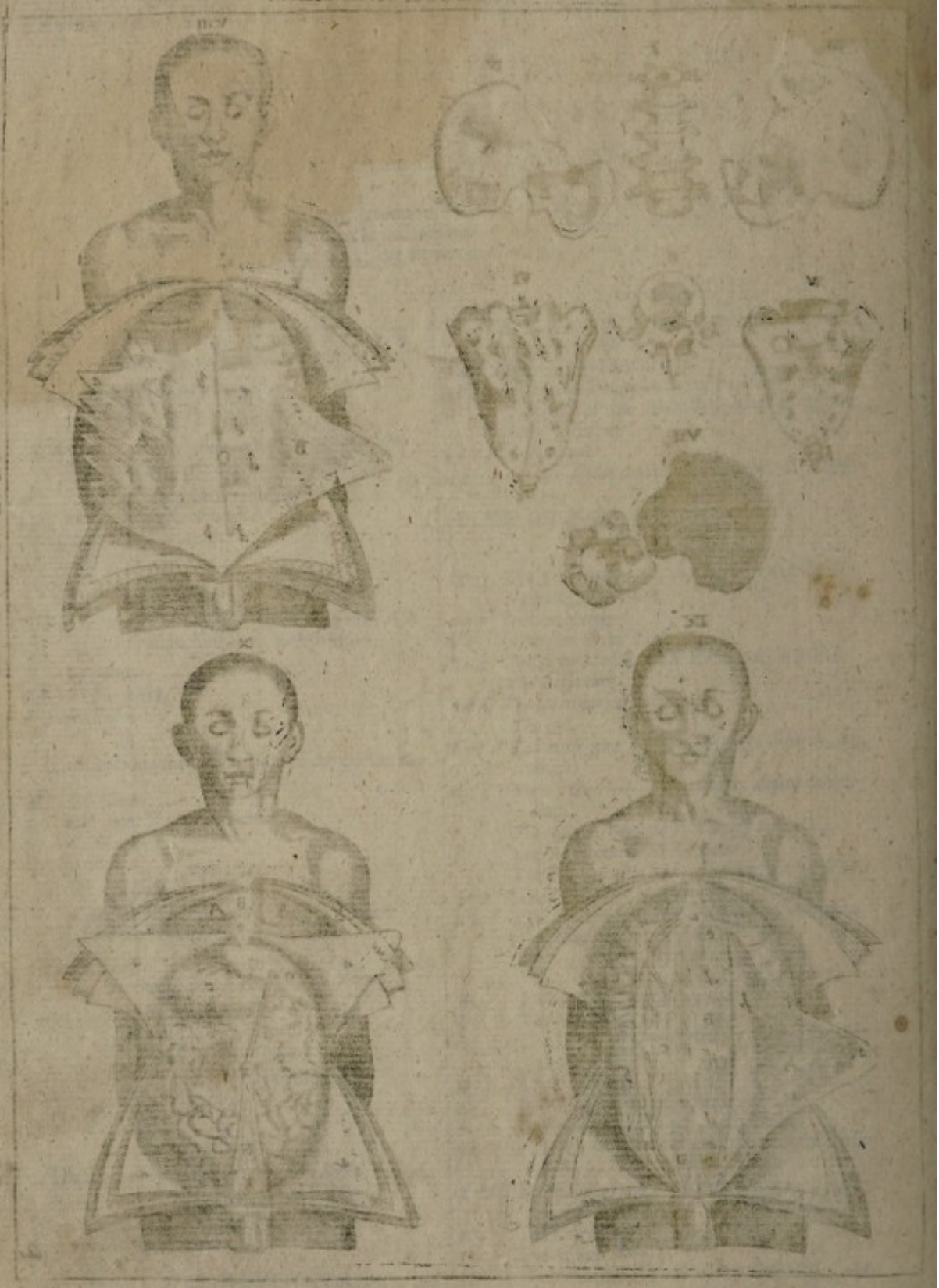
VII
VIII
IX
X



AN EXPLICATION OF THE TABLE OF THE THIRD BRASSE PLATE IN THIS BOOK

The Ornament and Figure I. The Gnomon Figure II. and III. The Scale Figure IV. The Triangle Figure V. and VI. The Pillar Figure VII. The Needle Figure VIII.

FIG. I.

FIG. VII.

AN EXPLICATION OF THE TABLE OF THE THIRD BRASSE PLATE IN THIS BOOK.

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 ſixt pair, figure VIII.

FIG. I.

AAAA. The Meſenterium *with the Guts adjoyned.*
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* Sphenopharingæus.
CC. The *third pair*, Stylopharingæus.
DD. The Sphincter *of the Throat.*
EEE. *A backward view of the* Gula.
F The *left external Nerve of the ſixt pair.*
G. The *right external Nerve of the ſixt 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* Cæphalopharyngæus *conſpicuous on the fore part.*
BB. The *Muſcles* Sphenopharyngæus.
CC. The *Muſcles* Stylopharingæus.
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 threed.*
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 ſhut, being opened in the beginning of the* Colon.
M. *The beginning of the right Gut, knit with a threed.*

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.

Ψ. *The Nerve of the ſixt 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, joyned to this ſixt pair which is carried to the Neck.*
c *A Nerve of the ſeventh pair joyned to the ſixt 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.*
ſſ *A Nerve from the external branch of the ſixt pair, which is carried to the internal muſcles of the* Larynx.
g g The *right Nerve called* Recurrens.
h h *Many Nerves diſtributed to the Lungues 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* Meſenteriam *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* Meſenteri[um] *and Guts.*
o The *branch which goes to the* Os Sacr[um].
pp The *extremity of the internal right* [branch] *which is diſtributed to the Womb* [and Bla]*der.*
qr The *branches from the internal* [right branch] *which make the plexure on that ſide.*
ϛ The *Nerve of the ſixt pair on the left ſide in which, the ſignification of the Letters the ſame, ſave only*
G *Is the Nerve from the left Recurrens, which is diſtributed to the* Pericardium, [and] *it ſelf.*
**** The *Nerve which from the external left* [branch] *machical 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.*

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AN UNFOLDING OF THE TABLE OF THE FOURTH BRASSE PLATE IN THIS BOOK.

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.
e The umbilicar 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.
G 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 joyned 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 joyns it self to the Omentum.
C The cleft of the Liver, out of which the umbilicar vein descends.
E The umbilicar 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 Cæliacal artery.
L A Nerve arising from the plexure of the costals.

FIG. VI.

The *Vena Porta* whol, distinguished into branches, as it is publiquely shewed.

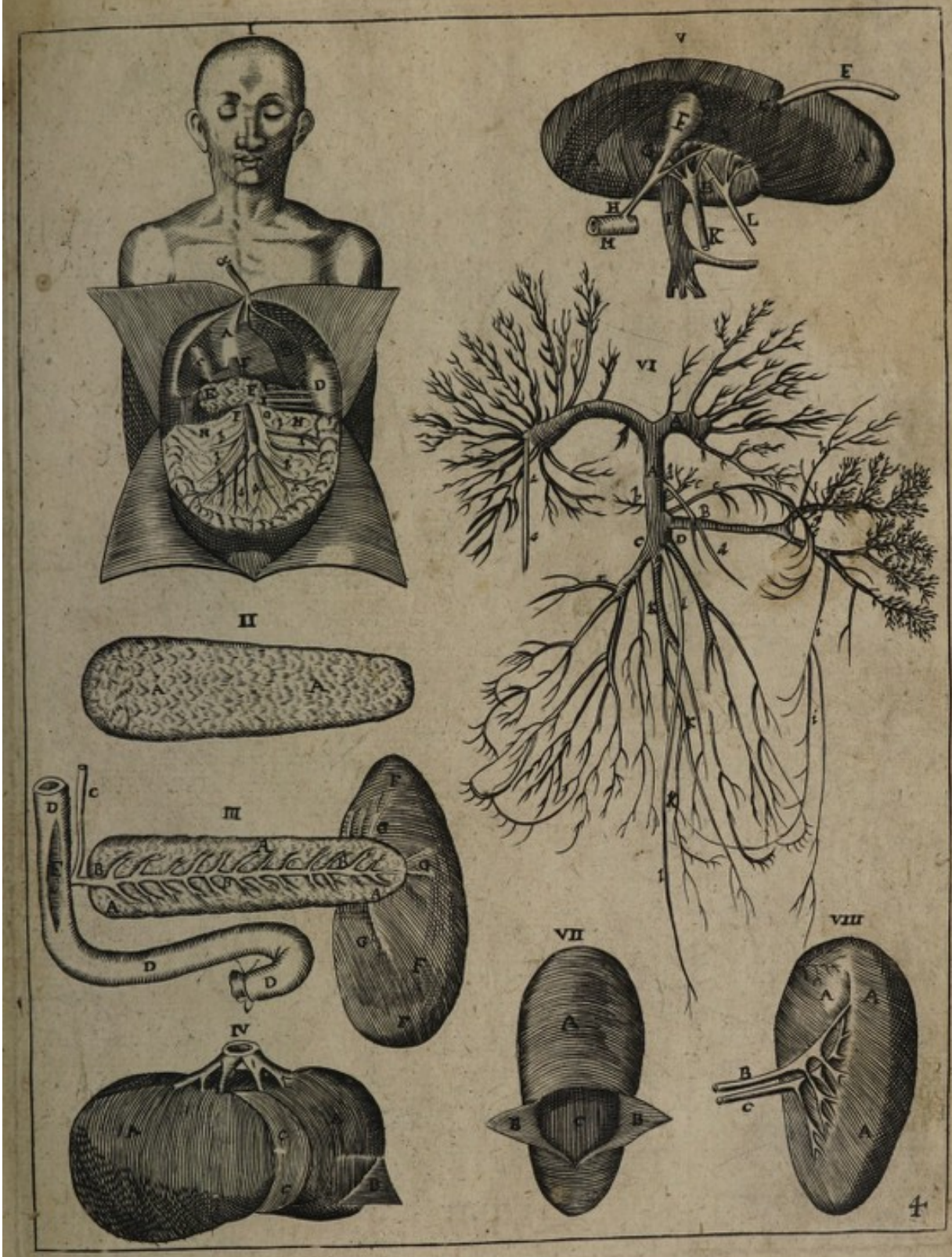
AAA The trunk of the Vena Porta; *A* the inferior portion, descending from the Liver. *AA* the deduction of it to the right and left with an infinite number of smal branches.
B The Splenical branch, divided first into great, afterwards into very many smal branches, and distributed like strings about the Spleen.
C The right Mesenterical branch.
D The left Mesenterical branch.
aa The umbilicar vein,
b The vein of the Gall.
c The vein of the Sweet-bread.
dd The vein called Gastrica dextra.
eee The greater Gastrica sinistra.
fg The lesser veins called Gastricæ sinistræ.
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 artery divided in like manner before it enter the Spleen.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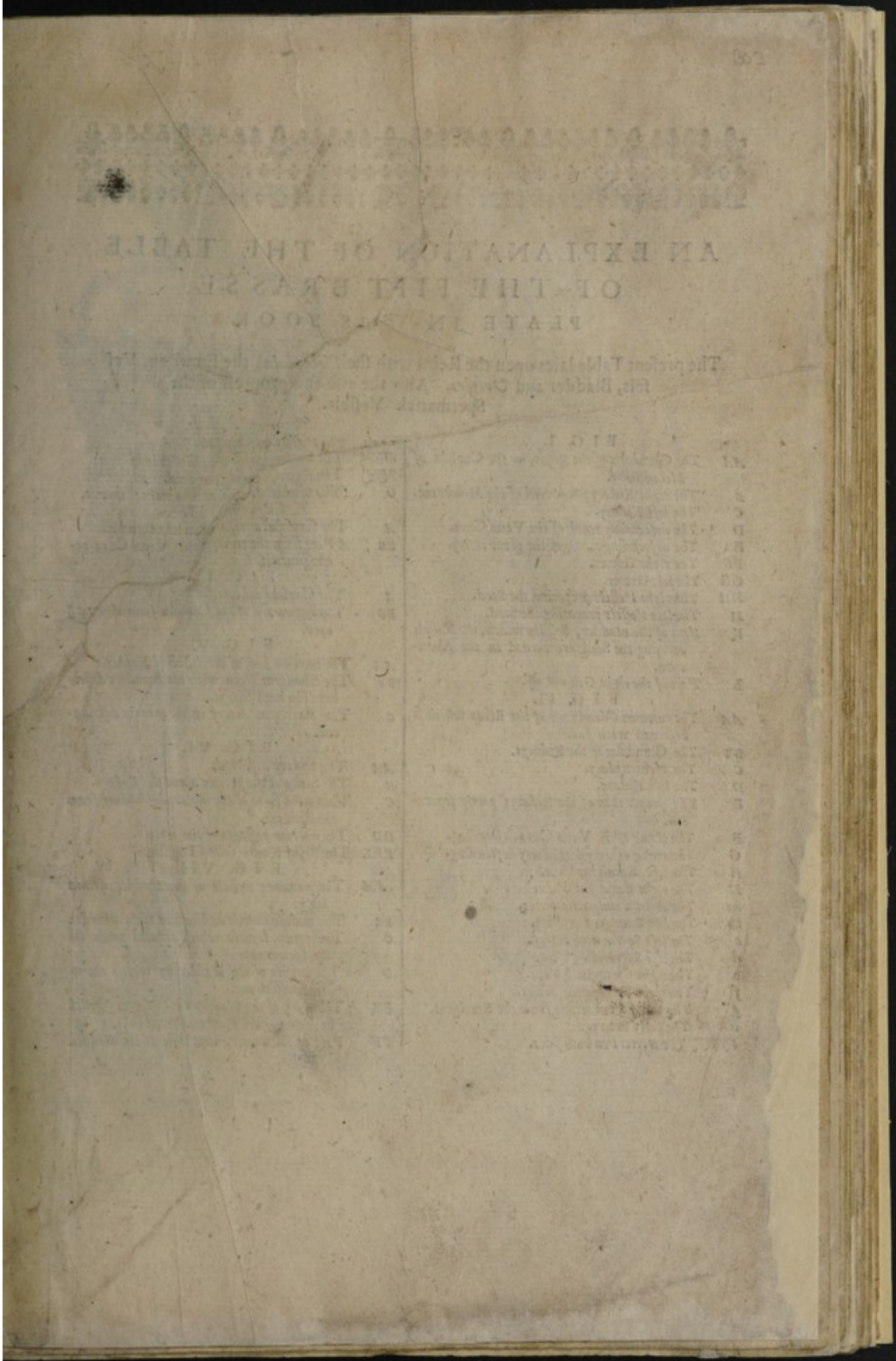


AN EXPLANATION OF THE TABLE OF THE FIFT BRASSE PLATE IN THIS BOOK.

The present Table laies open the Reins with their *Glandulæ*, the Emulgent Vessels, Bladder and *Ureters*. Also the rise and progress of the Spermatick Vessels.

FIG. I.

AA The Glandulæ *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 bespread with fat.*
BB *The* Glandulæ *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.*
LLLL *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 hollowness of the* Capsula *somewhat laid open.*

FIG. V.

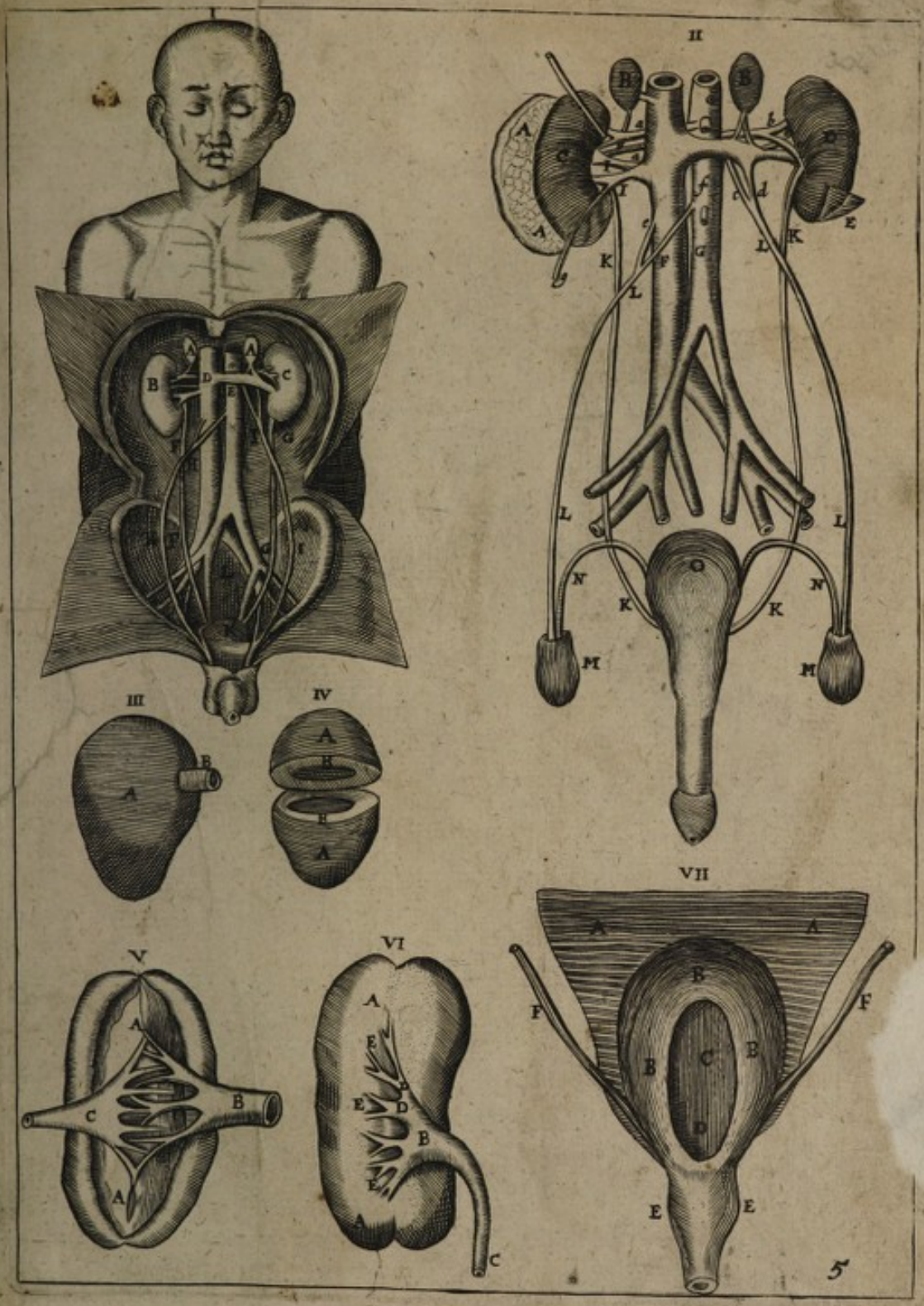
AA *The internal face of the dissected Kidney.*
BB *The Emulgent Vein with his branches distributed in the Kidney.*
C *The Emulgent artery in like manner distributed.*

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 passeth out.*
EE *The Neck of the Bladder which seems swelled by reason of the* Prostatæ *joyned to it.*
FF *Part of the ureters that come to the Bladder.*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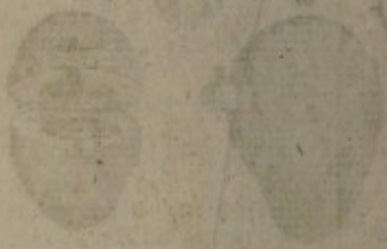
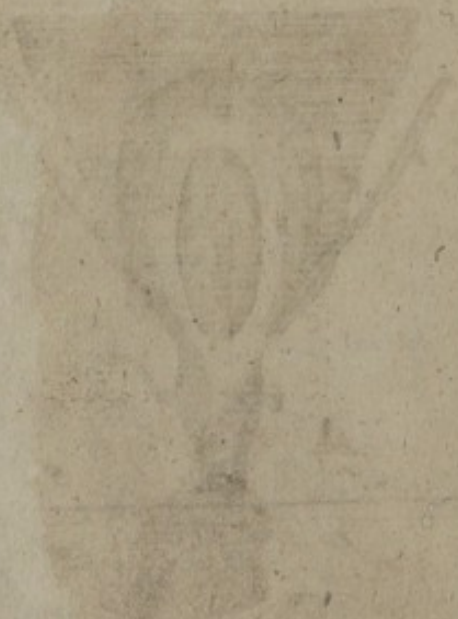
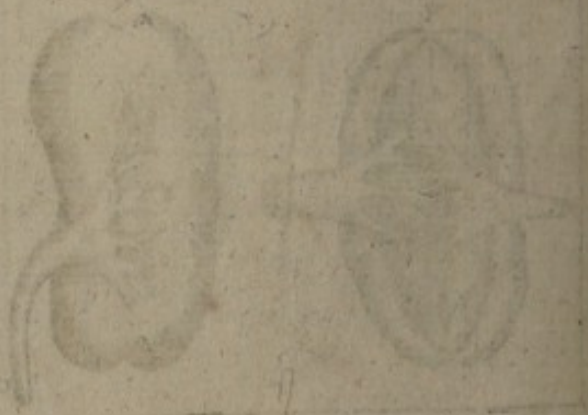






AN EXPLICATION OF THE TABLE OF THE SIXT BRASSE PLATE IN THIS BOOK.

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 Spermatical 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 Spermatical 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 Spermatical artery.
Q The left Spermatical 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.
VV 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 joyned to the testicle.
G The Glandulous substance of the testicle.
H The Vessel called Pampiniforme or Pyramidale.
II Epididymis.
K The Parastate.

FIG. III.

æ 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 Epydidymis.
CC Parastate.
DD A portion of the Vasa deferentia.

FIG. V.

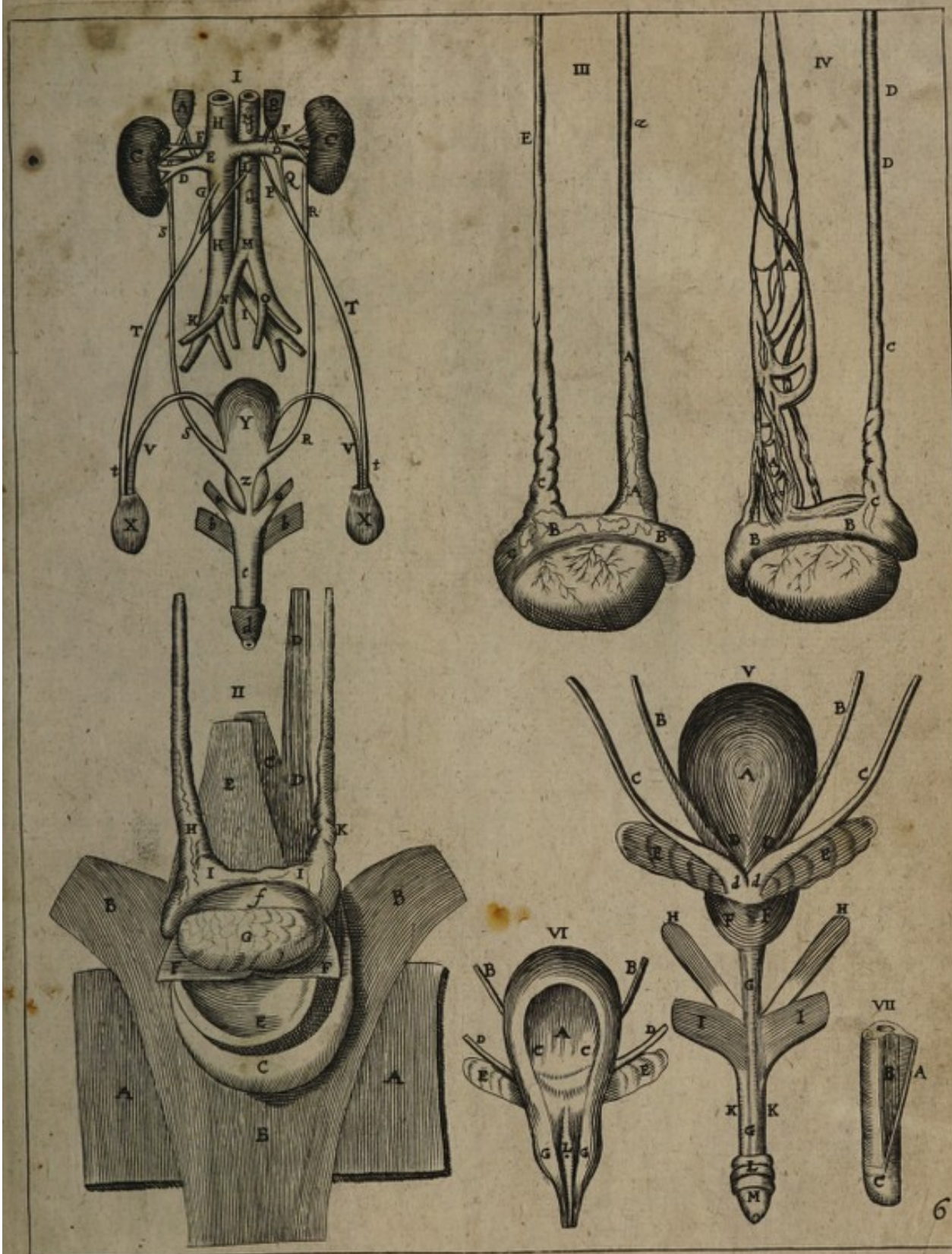
A The Bladder laid bare from its outward tunicle.
BB A portion of the ureters.
CC A portion of the Vasa deferentia.
DD The Capsulæ.
dd The end of the Capsulæ.
EE The Seminal Bladders.
FF The Glandulæ Prostatæ.
GG The Urethra.
HH The Muscles which erect the Yard.
II The Muscles which dilate the Urethra.
KK The two Nervous bodies of the Yard.
L The Preputium drawn back.
M The Glans with its Bridle.

FIG. VI.

A The internal tunicle of the Bladder being open.
BB Part of the Vreters.
CC The Orifice of the ureters as they are dilated into the Bladder.
DD The beginning of the Capsulæ.
EE The Seminal Bladders.
GG The Glandulæ Prostatæ divided.
L The hole in the Capsulæ passing into the beginning of the Urethra, which is covered with a shutter.

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.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AN EXPLANATION OF THE TABLE OF THE NINTH BRASSE PLATE IN THIS BOOK.

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 interpenetrated a ſingle vein.

AAA The Diaphragm of the Infant.
B The Cul.
CC The middle Lobe of the Liver.
DD The Gall-bladder.
E
F
GGG The Pancreas of Aſellius diſperſed.
H The Spleen.
II The right Kidney covered with the common Membrane.
K The left Kidney in its natural poſture.
LLL The Ureters.
MMM The Cava or the Aſcendent Trunk.
NNN Certain Lacteal Veins, diverted from the Sweetbread.
OOO The Aorta, or Trunk of the Great Artery, ſhooting forth the Emulgent Veins.
PPP Branches of the Aorta.

FIG. II.

A The right Emulgent.
B
C The left Emulgent.
D
E
F
GG The Branches of the Vena Cava.

FIG. III.

a The Lacteal Veins diſcharged on both ſides.
b The Ductus ad Cor.
c The Trunk of the great Artery coming from the Heart.
d A portion of the Aorta paſſing downwards.
e The Vena Arteriola ſprouting from the Heart.
ee The Branches from the Vena Arteriola and the great Artery.
f The Diſtribution of the right Subclavian Artery.
g The beginning of the right Carotides.
h The beginning of the left Subclavian Carotides.

FIG. IV.

i The Lungs ſwelled.
k The Heart and beneath the right Auricle.
l The Vena Cava aſcending from the Heart.
m Anaſtomoſis between the Vena Cava and Arteria Venoſa.
n The Baſis of the Anaſtomoſis.

FIG. V.

o The Cæcum and Appendix ſprouted from the Ileum.

AN EXPLANATION OF THE TABLE OF THE NINTH BRASSE PLATE IN THIS BOOK.

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 umbilicar vein bowed upward.
DD The Stomach turned upwards.
E Its lower Orifice tyed with a string.
F A portion of the Jejunum cut off neer 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.
dd &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 Cava.
HHH The great artery with its external Iliack branches.
II The internal branches of the great artery.
KK &c. Both Umbilicar arteries bent downwards.
L The bottom of the womb compressed.
M The neck of the womb.
N The bladder turned downwards.
O The Urachos.
P The node of the Navil 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 Tubæ of the womb bowed down.
rr The round Ligaments of the womb cut off below.
ff Portions of the Ureters cut off.

FIG. III.

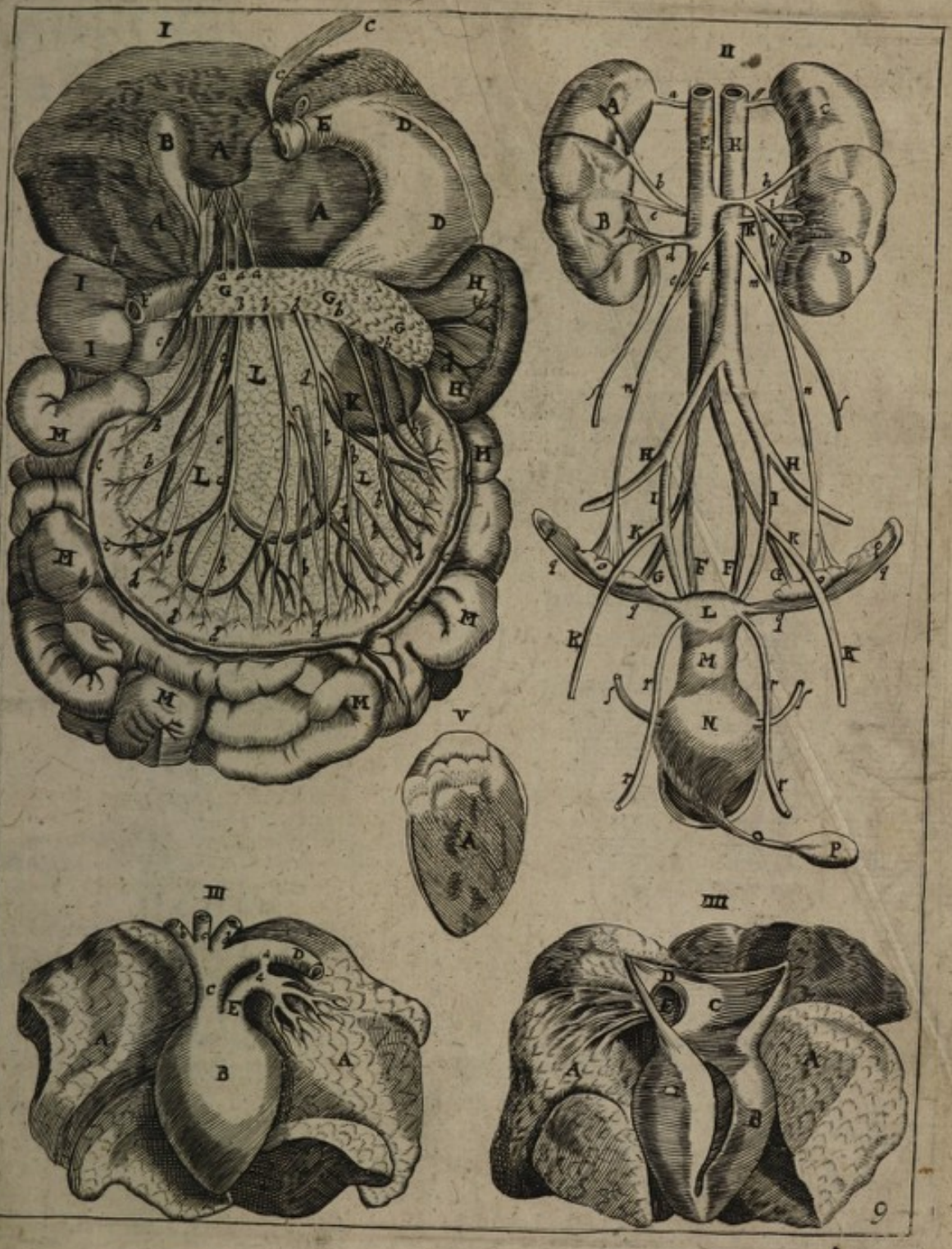
AA The Lungues diducted on both sides.
B The Heart whol.
C The trunk of the great artery coming from the Heart.
D A portion of the same artery passing downwards.
E The Vena Arteriosa stretched from the Heart.
aa The channel between the Vena Arteriosa and the great Artery.
b The beginning of the right subclavian artery.
c The beginning of the right Carotides.
d The beginning of the left Artery Carotides.

FIG. IV.

AA The Lungues diducted.
B The Heart cut towards the right Ventricle.
C The Vena Cava opened neer 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.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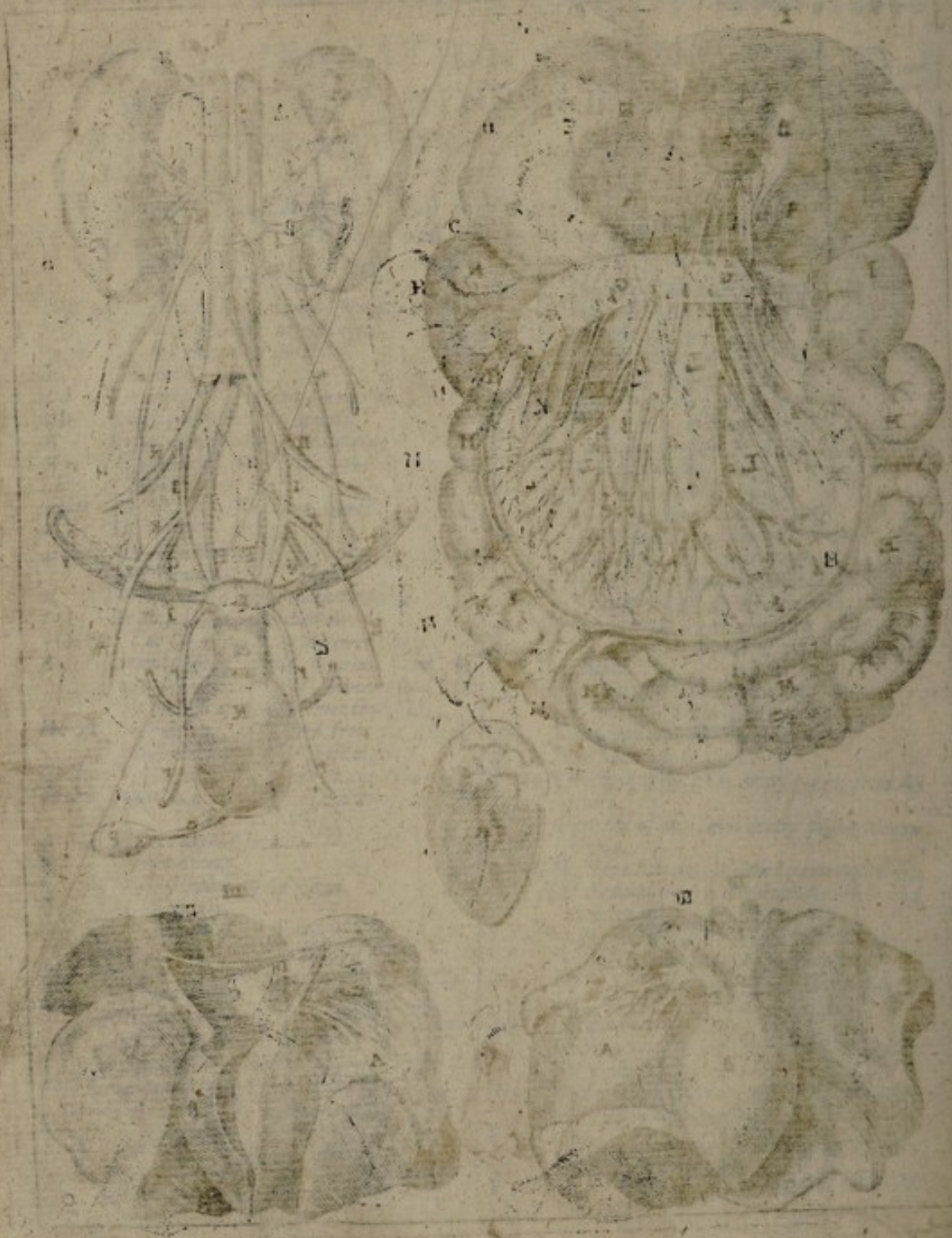


AN EXPLANATION OF THE TABLE OF THE TENTH BRASSE PLATE IN THIS BOOK

This Table represents the Muscles and Bones of the Breast, its Membranes and Diaphragma.

FIG. I.

A	The Pectoral Muscle in its first situation.
B	The same Muscle cut off in its former place.
C	Serratus major or anticus in its former situation.
D	The Liver a little removed out of it.
E	Serratus anticus minor partly in its former situation.
F	The Abdominal Muscle in its former situation.
f	The Clavicula bored through under the pectoral Muscle.
EE	Diaphragma upholden in the neck with three strings.
GG &c.	The external intercostal muscles in their first situation.
HH &c.	The internal intercostal muscles in their first situation.
II	A portion of the Diaphragma in its former situation.
K	Part of the great artery descending.
L	The hole for the Gula perforating the Diaphragma.
M.	The hole for the Vena Cava descending.
MM	The square muscles of the lower part of the Diaphragma, of which Chap. 12.
OO	The muscles called Psoas in their former situation, of which Chap. 19.

FIG. II.

Shews the bones of the breast as they are to be seen towards.

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 A ne Ribs.
8.9.10.11.12.	The false Ribs.

FIG. III.

Shews the Ribs, Arteries and muscles on the back part.

FIG. IV.

The [illegible] ground, on which [illegible] Ribs, [illegible] distillation distributed [illegible] Sternum. [illegible] of the Lungs.

FIG. V.

[illegible] of the Heart drawn in any Life Form, the Ribs. The Right Heart Form for Veins. The Right Heart Form with the Veins.

FIG. VI.

Shews the Diaphragma seen from the Ribs and Arteries.

AAA	The Right part of the Diaphragma covered with its Membrane.
BB	The Thoracal Artery.
CC	The Descending Artery.
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 Right portion of the diaphragma covering of the great artery.

FIG. VII.

A	The left nerve of the Diaphragma.
B	The right nerve of the same.
C	The former membrane of the Diaphragma spread.
D	The Right side of the Diaphragma.
E	The hole for the Gula.
F	The hole for the Vena Cava.
GGG	The Membranous part.
HHH	The Right part covered with the great membrane.

AN EXPLANATION OF THE TABLE OF THE TENTH BRASSE PLATE IN THIS BOOK.

This Table represents the Muscles and bones of the Breast, its Membranes and *Diaphragma*.

FIG. I.

A The Pectoral *Muscle in his scituation.*
B The *same Muscle out of his scituation.*
C Serratus major anticus *in its scituation.*
D The *same a little removed out of it.*
E Serratus anticus minor *totally in its scituation.*
F The *subclavian Muscle in its scituation.*
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 scituation.*
HH &c. The *internal intercostal muscles in their scituation.*
II *A portion of the* Diaphragma *in its scituation.*
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 müscles of the loyns in their scituation, of which Chap.* 12.
OO The *muscles called* Psoas *in their scituation, 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, *Vertebræ* and processes on the back part.

FIG. IV.

The Breast opened, in which
AA The Mediastinum *drawn to the side.*
BB The *tunicle of the* Mediastinum *deducted under the* Sternum.
C The *right lobe of the Lungues.*

FIG. V.

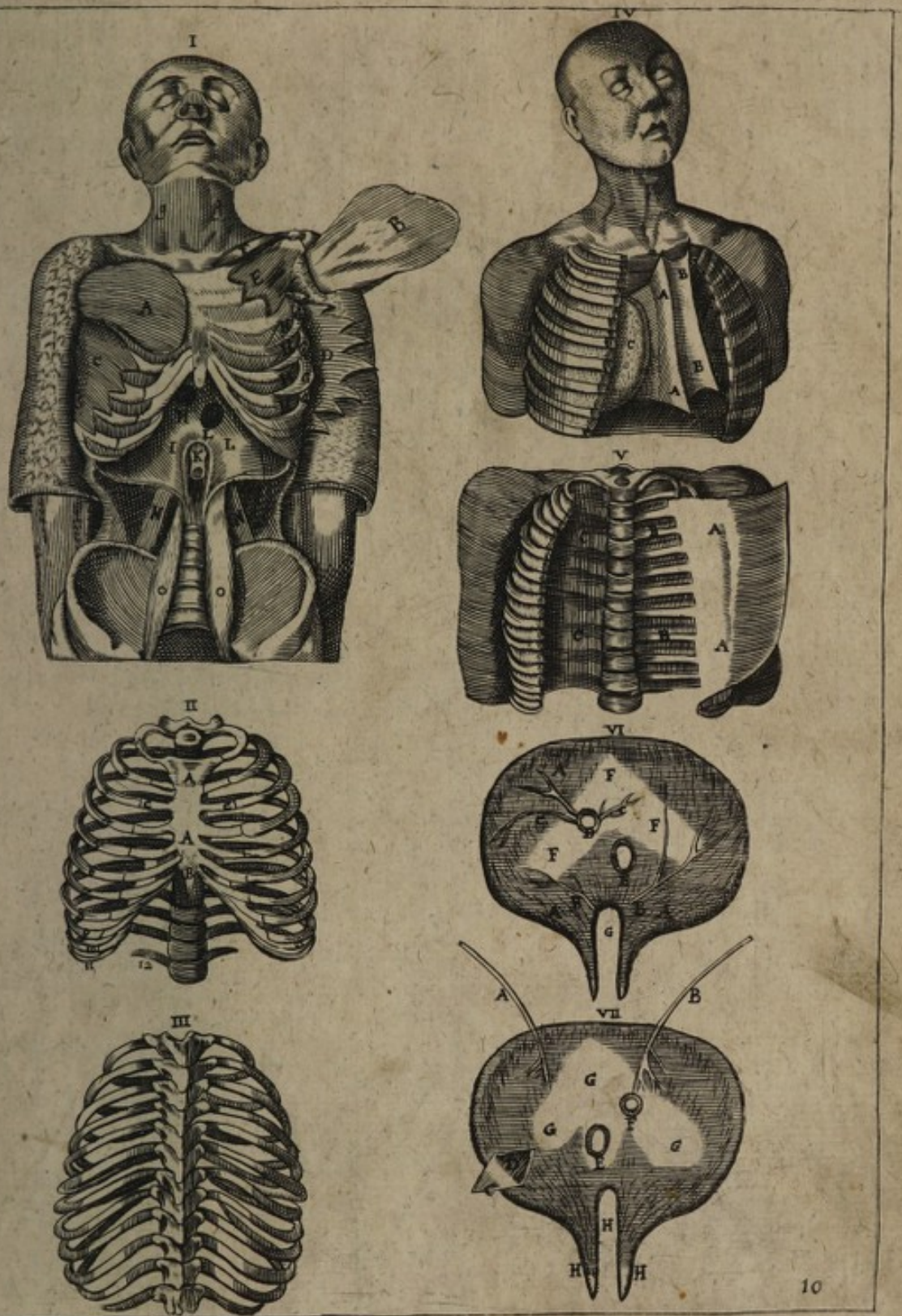
AA Part *of the* Pleura *drawn at one side from the Ribs.*
BB The *Ribs laid bare from the* Pleura.
CC The *Ribs cloathed with the* Pleura.

FIG. VI.

Shews the *Diaphragma* separated from the Ribs and *Vertebræ.*
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 with the great artery descends.*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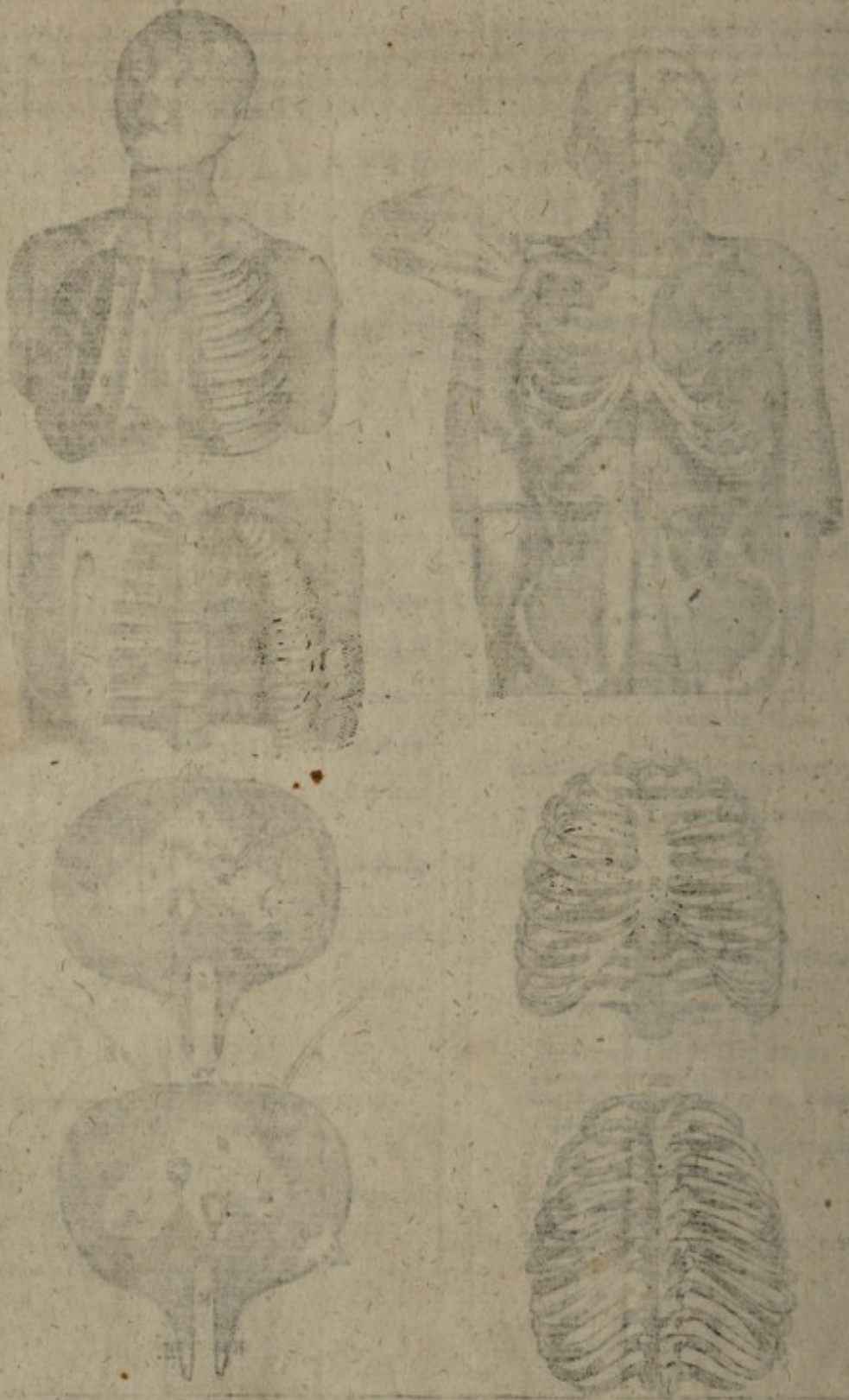


AN EXPLANATION OF THE TABLE OF THE ELEVENTH BRASSE PLATE IN THIS BOOK.

This Table chiefly represents the Heart, its Membranes, Vessels, Ventricles and shutters, then the Lungues and the *Aspera Arteria* separated from them.

FIG. I.

A The Pericardium *compassing the Heart.*
EB *The Lungues embracing the Heart in their Natural Scituation.*
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 sixt pair descending to the Lungues.*
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 sixt 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 Lungues.*
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 Lungues about the Heart.*
L *The proper tunicle of the Lungues separated.*

FIG. ♃.

The Heart of an Infant whol.

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. ✳

A *Part of the Heart transversly cut.*
B *The left ventricle.*
CC *The right ventricle conspicuous.*
DD *The* Septum *of the Heart.*

FIG. III.

Shews the *Vena Cava* dissected with the right Ventricle.

A *The Orifice of the coronal Vein.*
B *The* Anastomosis *between 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 arterious vein dissected in the right ventricle.*
BBB *The shutters called* Sigmoides *in the arterious vein.*
CCC *The right Ventricle of the Heart opened.*

FIG. V.

A *The great Artery dissected neer 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 mitral shutters.*
DD *The left Ventricle of the Heart opened.*

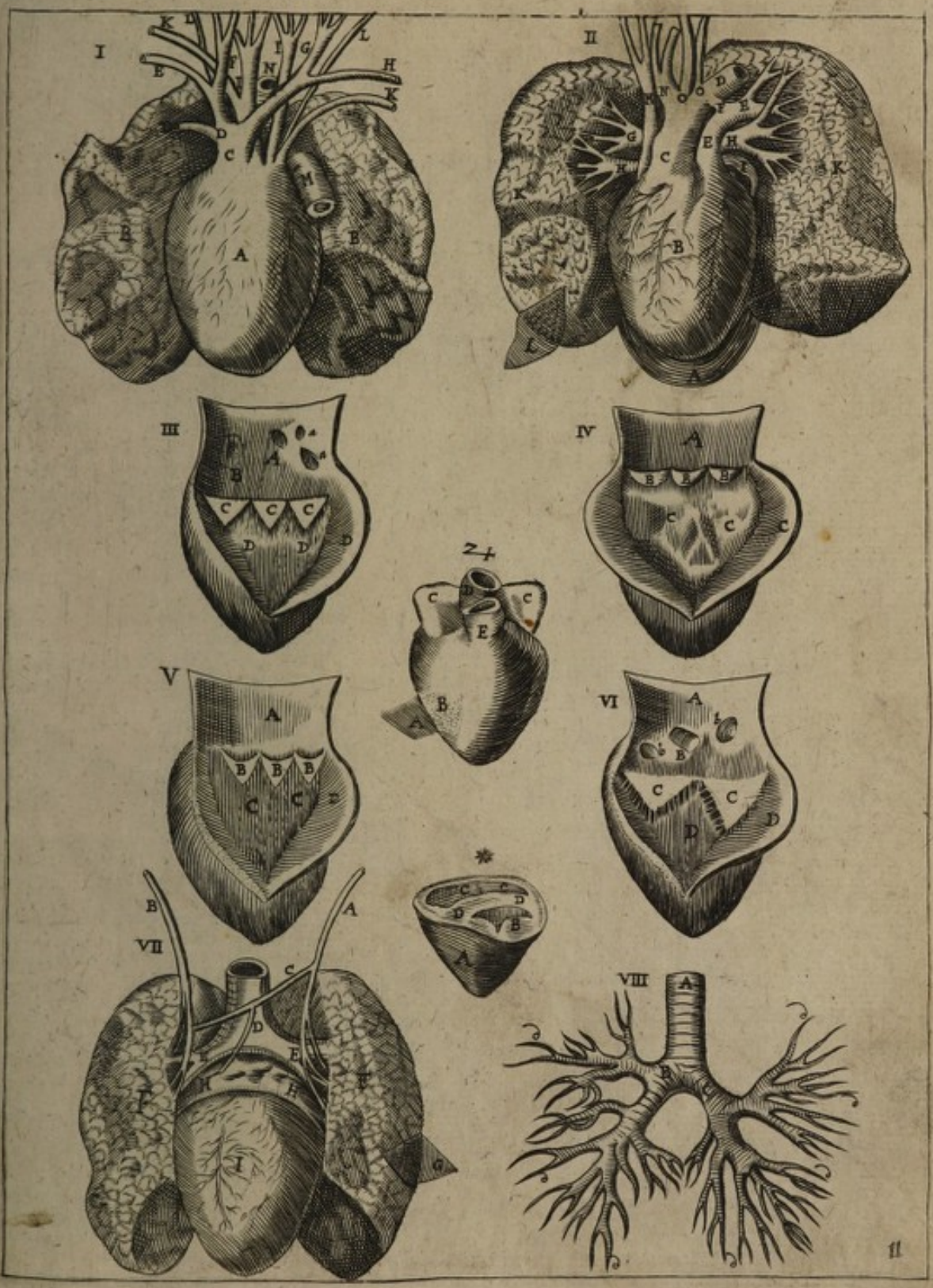
FIG. VII.

Shews the backward part of the Lungues and windpipe, as they are joyned to the Heart.

A *The right Nerve of the sixt pair which comes to the Lungues.*
B *The left Nerve of the same.*
C *The middle branch between each Nerve.*
D *The branch which is carried to the* Pericardium.
EE *The two greater branches of the windpipe which are Membranous behind.*
FF *The hinder part of the Lungues.*
G *The proper Membrane of the Lungues.*
HH *A portion of the* Pericardium *left.*
I *The heart left in his Scituation.*

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.*
ddd &c. *The extremity of the branches ending in membranous channels.*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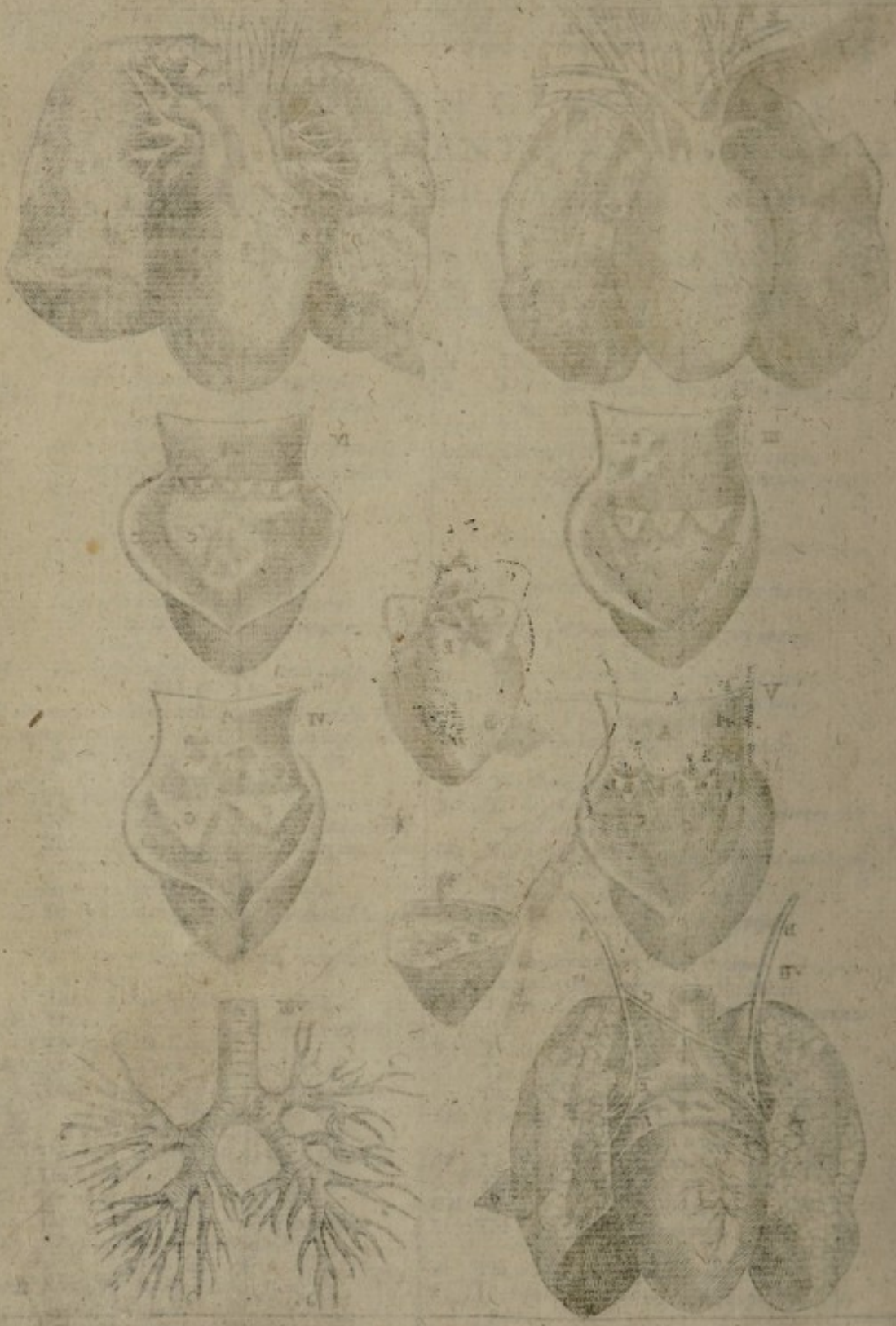

AN EXPLANATION OF THE TABLE OF THE TWELFTH BRASS PLATE IN THIS BOOK.

AN EXPLANATION OF THE TABLE OF THE TWELFTH BRASSE PLATE IN THIS BOOK.

FIG. I.

Shews 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 Azygus distributed to the Ribs.
bb The superior intercostal.
cc The internal mammary.
* The Mediastina.
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 Subcutaneus 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 carried to the Muscle Deltois.
ll The superior Breast-vein.
m m The Cephalick vein cut off.
n n The basilick vein cut off.
o o The inferior Breast-vein.
p The left phrenical vein.
q The right phrenical vein.
rr A famous branch distributed in the Liver.
ss tt &c. The sprigs thereof distributed in the right and left side thereof.
u u The Venæ musculæ, or superior Lumbals.
y y The veins of the Renal Glandulæ.
x x The right and left emulgent.
ϰϰ The right and left spermatical.
αα The beginning of the Lumbals.
ββ The Vena musculæ of the inferior Lumbal.
ϒϒ The Vena sacra.
ΔΔ The external Iliack branch.
EE The Epigastrick vein.
♂♂ The internal Iliack branch.
♀♀ Vena Glutea.
ζζ The Hypogastrick veins.
nn The veins of the Privities.
ϑϑ The inguinal veins.
KK &c. The branch of the crural vein.
iii The Saphena.
λλ The vein Ischias.

FIG. II.

Particularly describes the coronal vein of the heart.

FIG. III.

Shew 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 Lungues.
CC Its branches which pass to the left.

FIG. IV.

Shews 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 skull.
dd The vertebral artery in like manner cut off.
♂♂ The cervical musculæ.
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.
l m The arteries distributed to the muscles of the Shoulder.
n n The inferior intercostals.
o o The phrenical arteries.
p The famous artery called Cœliaca.
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 Cœliacal.
s The right Gastrical artery.
t The splenical artery divided in smal branches to the spleen.
u The artery called Epiploica.
ur The Gastroepiploica.
x The artery carried to the Renal Glandula.
yyy &c. The superior Mesenterical artery distributed into branches.
ϰϰ The emulgent arteries.
αα The rise of the Lumbal arteries.
ββ The spermatical arteries.
ϒϒ The inferior Mesenterical artery derived into many branches.
♁ The Arteria sacra.
ΔΔ The external Iliack artery.
♂♂ The internal Iliack.
mm Arteria Glutæa.
ζζ The Hypogastrick artery distributed to the right Gut and Privities.
♀♀ The Hypogastrick artery distributed to the womb distinguished from the former.
ss The umbilicar artery.
EE The Epigastrick artery.
ϑϑ The Arteria Pudenda.
ii The Ischias.
kk The inferior Arteria Musçula.
λλ The artery which goes to the internal Iliack muscle.

FIG. V.

Shews the Coronal Artery of the Heart.

FIG. VI.

Shews the Venal Artery arising from the left Ventricle of the Heart.

A Its Orifice.
BB Its branches distributed to the right side of the Lungues.
CC Its branches distributed to the left.

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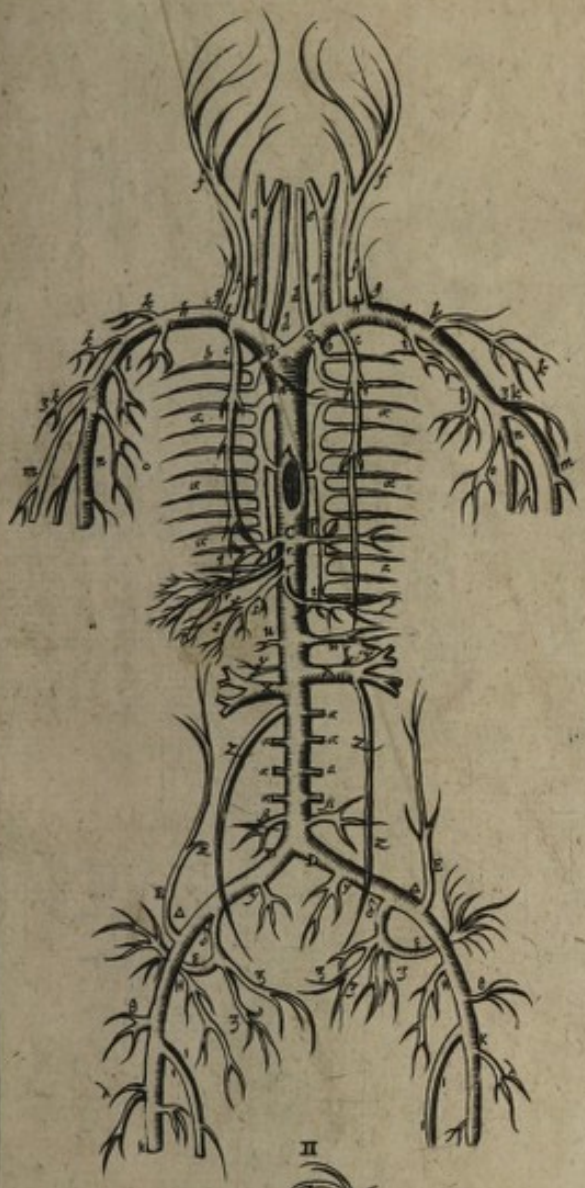

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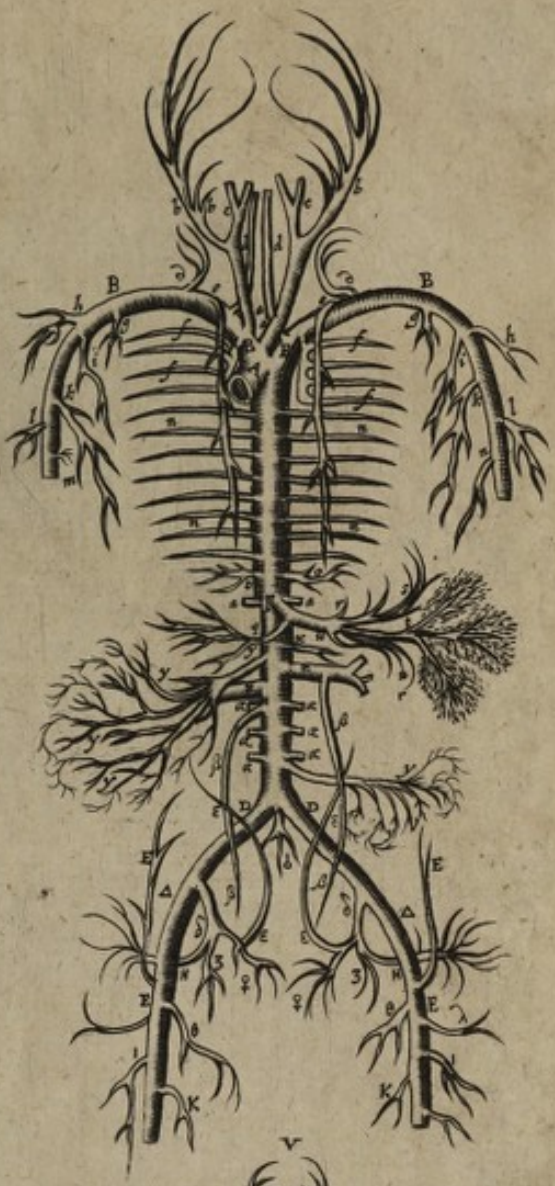

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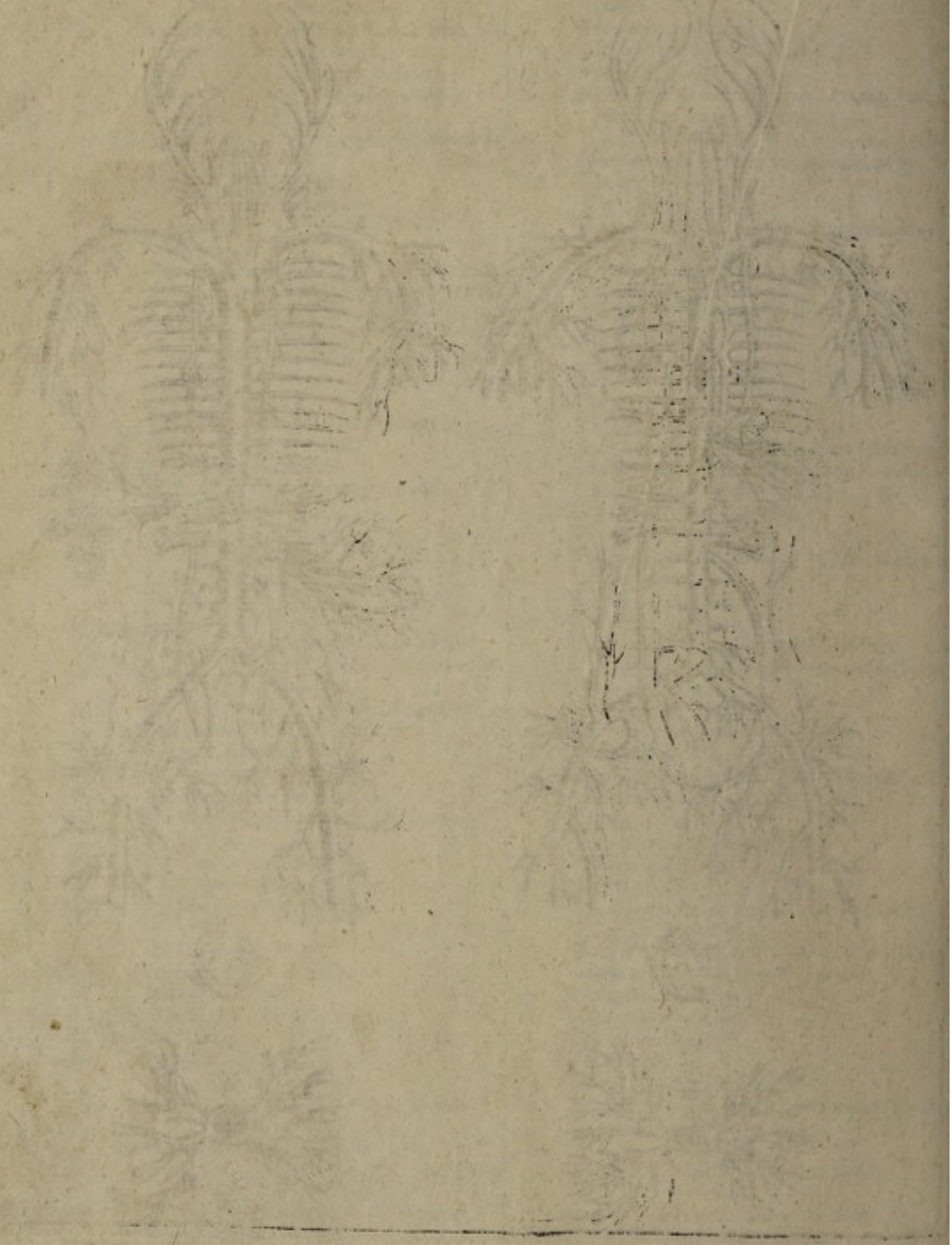


AN EXPLANATION OF THE TABLE OF THE THIRTEENTH BRASSE PLATE IN THIS BOOK.

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 *Vertebræ* 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* Cricothiroides.

FIG. IX.

A The *external part of the* Epiglottis *joyned 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 looſed.*
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* Styloceratohyoides.
FFF The *Muſcles* Coracohyoides.
ſſ The *middle tendinous part.*

FIG. XIV.

A The *inferior part of the top of the Tongue.*
BBBB The *muſcles* Baſiogloſſi.
ßß 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 tendon which paſſeth the chink.*
CC The *internal pair of muſcles ſomething compreſſed.*
D *Part of the Pallat from which the* Uvula *hangs.*

FIG. XVI, and XVII.

Shews the *Glandulæ* called *Tonſillæ.*

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.

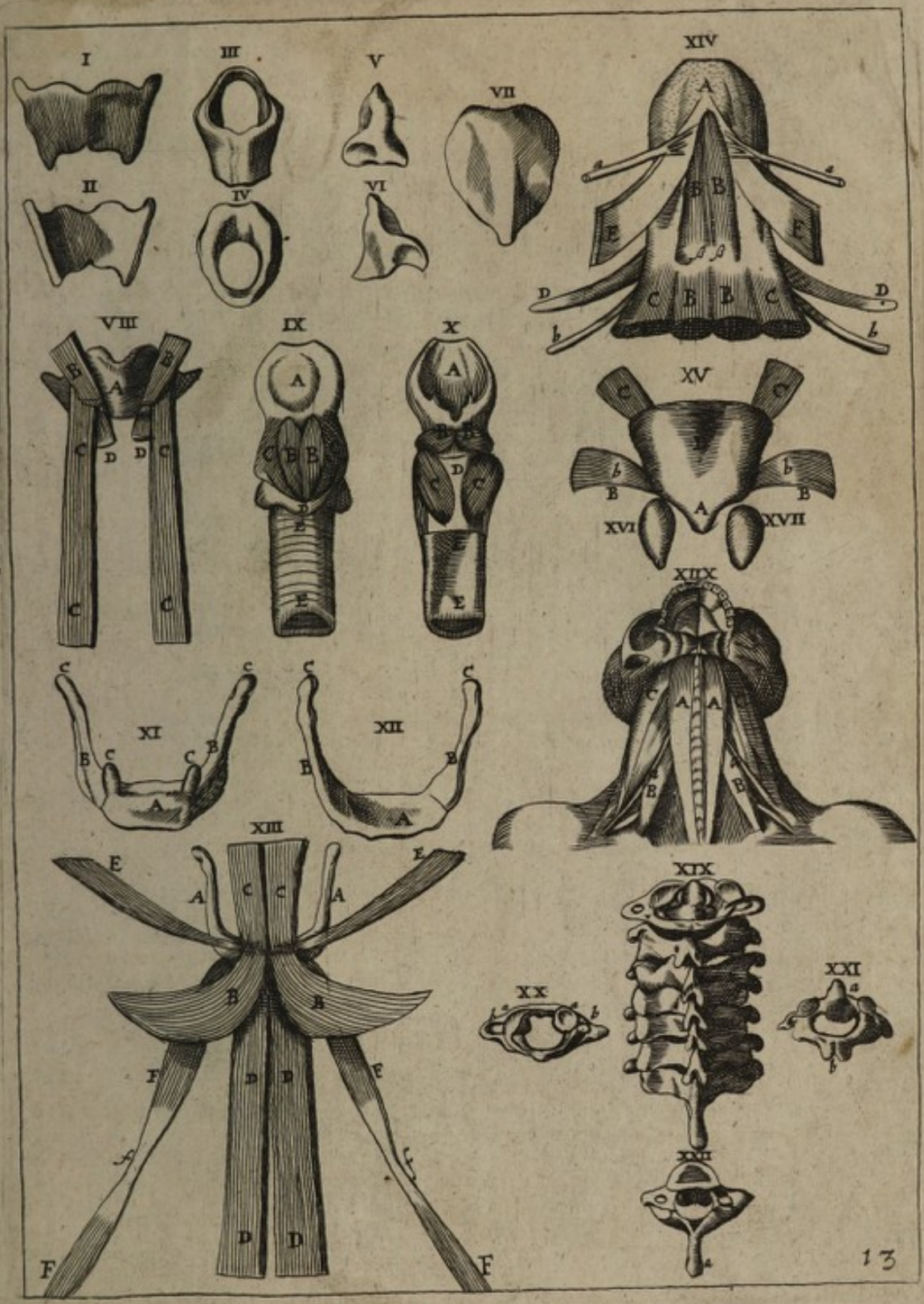
The firſt joynt of the Neck, in which
aa The *two holes holding the hinder part of the Head.*
bb The *holes on the ſides which gives paſſage to the arteries to aſcend.*

FIG. XXI.

The ſecond *Vertebra* of the Neck.
a The *tooth-like proceſs.*
b The Spina Biſidia.

FIG XXII.

a The *Spine; the reſt is like the other joynts.*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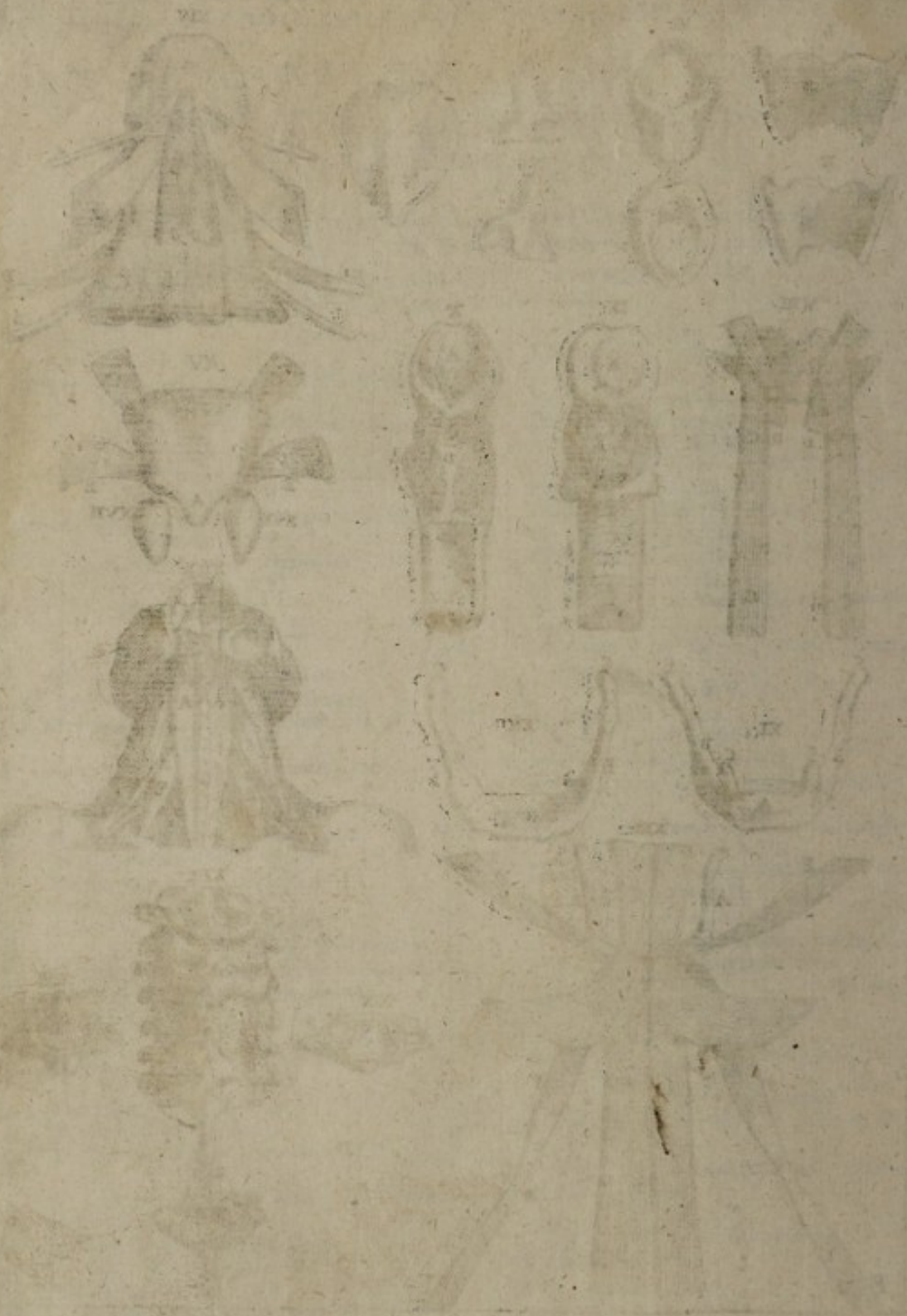


AN EXPLANATION OF THE TABLE OF THE FOURTEENTH BRASSE PLATE IN THIS BOOK.

It contains the Muscles which are common about the Shoulders, Breast, Loyns, and Neck: the Clavicle being turned over upon the Shell.

FIG. I.

AA The Trapezii or Cowls.
BB The Rhomboides or Shells.
CCDD The Serrati majores.
EE Their Digitations.
DD Their insertions at the Ribs.

FIG. II.

AA The Cowls pulled off their Insertions.
BB The Rhomboides or Shells.
C The Serrati majores at their insertions at the Ribs.
DD The Serrati minores posteriores.
E Serratus posticus minor in the Neck.
F Serratus posticus major in the Back.
G The Muscles of the Scapula.
HH The great Pectoral Muscles.
II A portion of the Pectoral cut off.
KK The Muscles of the Scapula exposed.
LL The Scapulæ or Shoulder-blades.
MM The Insertions of the Serrati majores.
NN The Insertions of the Serrati minores.
OO The Muscles of the Scapula.

FIG. III.

AA The Origination of the Muscles of the Scapula.
BBBB The Scapulæ exposed.
CCCC The large Muscles of the Back.

FIG. IV.

AA The Muscles of the Scapula pulled off their places, that they may be beheld in their order: they are described in the Figure.
BB The Muscles of the Loyns called Serrati in their place.
CC The Muscles of the Loyns in their place.
DD The Muscles of the Neck in their place.
EE The Muscles of the Back in their place.
FF The Muscles of the Head from the Scapulæ.
GG The Muscles of the Head in their places.
HH The Muscles of the Head in their places.
II The Muscles of the Head in their places.
KK The Muscles of the Head in their places.
LL The Muscles of the Head in their places.

AN EXPLANATION OF THE TABLE OF THE FOURTEENTH BRASSE PLATE IN THIS BOOK.

It contains the Muſcles which are conſpicuous about the Shoulders, Back, Loyns, and Neck, the Carkaſs being turned over upon the Belly.

FIG. I.

AA The *muſcles* Trapezii *in their ſcituation.*
EE The Rhomboides *laid a little to view.*
CC DD *The broadeſt muſcle of the back, in which*
CC *Shews its fleſhy part.*
DD *Its membranous beginning.*

FIG. II.

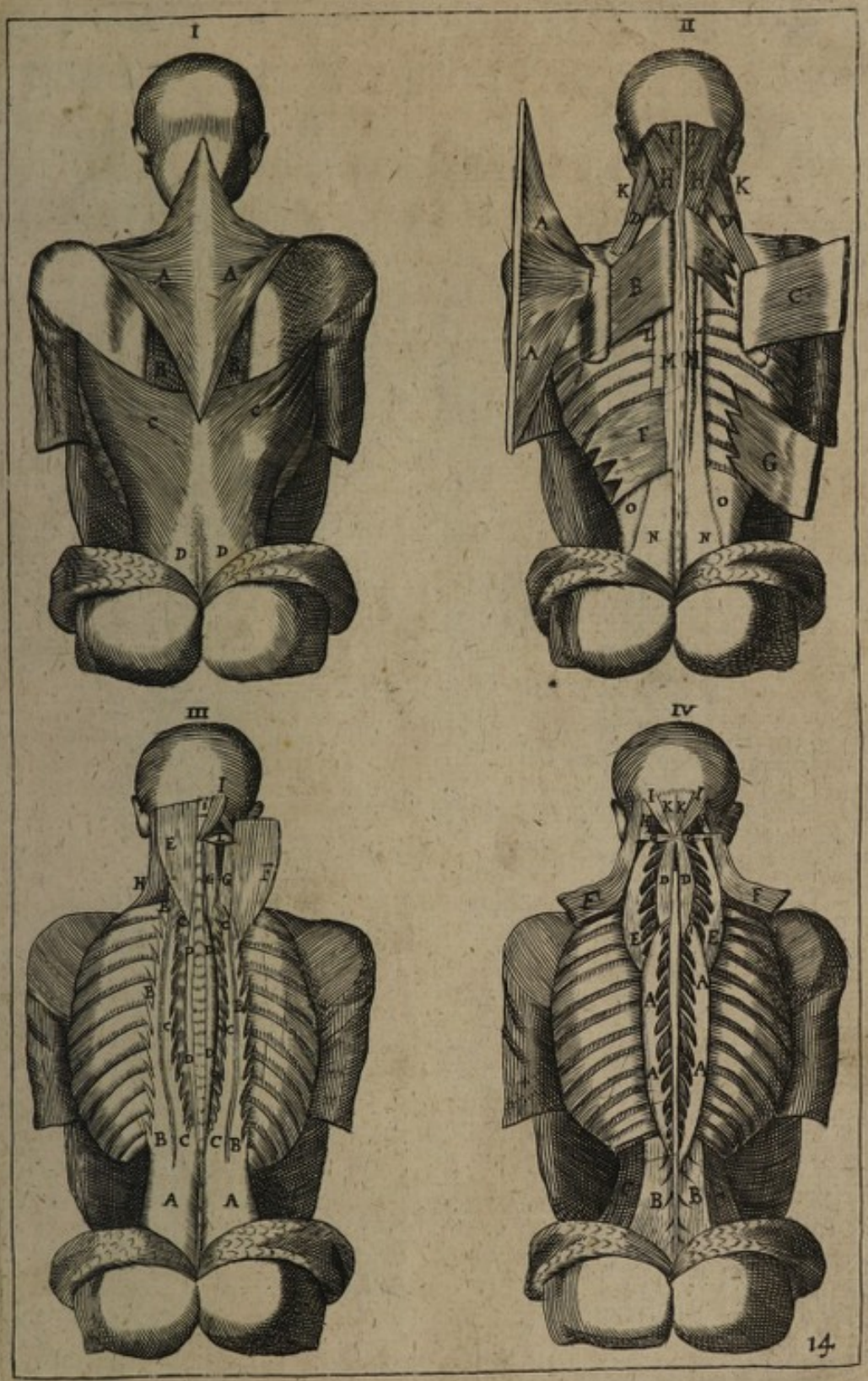
AA Trapezius *pulled out of its ſcituation.*
BB The Rhomboides *laid open in its ſcituation.*
C *The ſame drawn out of his ſcituation, as yet joyned to the baſis of the* Scapula.
DD *Both the Levators of the* Scapula.
E Serratus poſticus minor *in his ſcituation.*
F Serratus poſticus major *in his ſcituation.*
G *The ſame muſcle out of his ſcituation.*
HH *The greateſt part of the* Muſculi Splenii *conſpicuous in their ſcituation.*
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 removed, and diſtinguiſhed into their tendons.*
DD *The* Muſculi Spinati *not ſeparated.*
E *The Muſcle* Complexus *in its ſcituation.*
F *The ſame ſeparated from the Head, that ſo the reſt may come to view.*
GG *The Muſcles extending the neck in their ſcituation.*
H *The fore part of the* Maſtoides *looſed.*
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 Loyns called* Sacer *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 ſomething drawn aſide.*
KK *The leſſer right muſcles of the head in their place.*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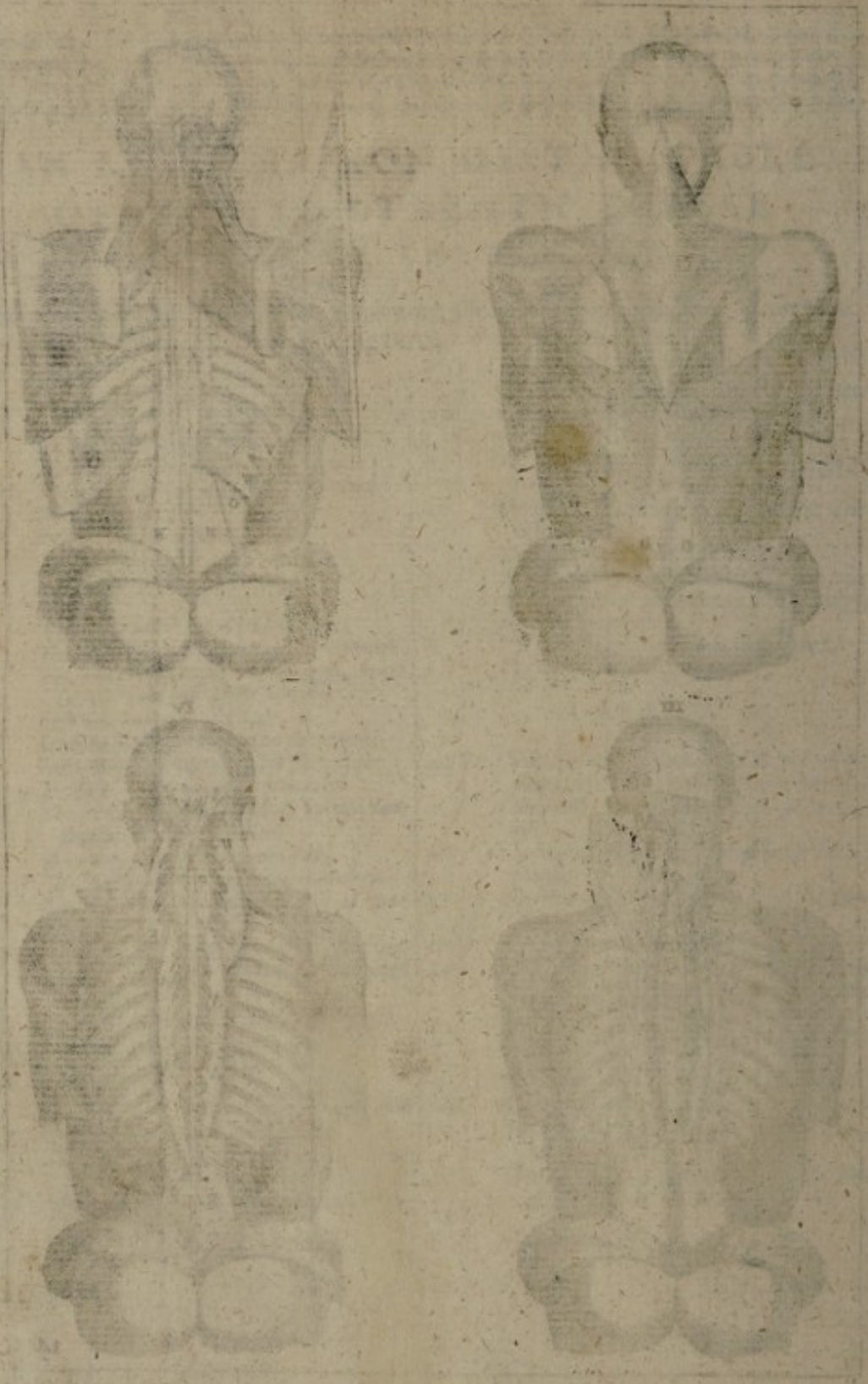

AN EXPLANATION OF THE TABLE OF THE FIFTEENTH BRASSE

The Table comprises the Northern Hemisphere; also the boreas of the Mariner's Compass.

AN EXPLANATION OF THE TABLE OF THE FIFTEENTH BRASSE PLATE IN THIS BOOK.

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 detracted.
BB The fleſhy Pannicle ſeparated.
CC The Pericranium detracted.
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 Lip 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 diſſected.
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 muſculous Expanſion 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 hid with the ſhadow 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 fift 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.
Φ A portion of the bone 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 Cerebellum 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 wedglike bone.
aa The ſecond hole.
bb The third hole.
cc The ſixt hole.
*** The ſeventh hole.
dd The fift 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 fift 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 Wedglike bone.
GH GH The winglike proceſſes.
I The bone which diſtinguiſheth the Noſtrils.
KK The ſixt 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.
mm The two dog teeth.
oo The reſt of the Teeth called Grinders.

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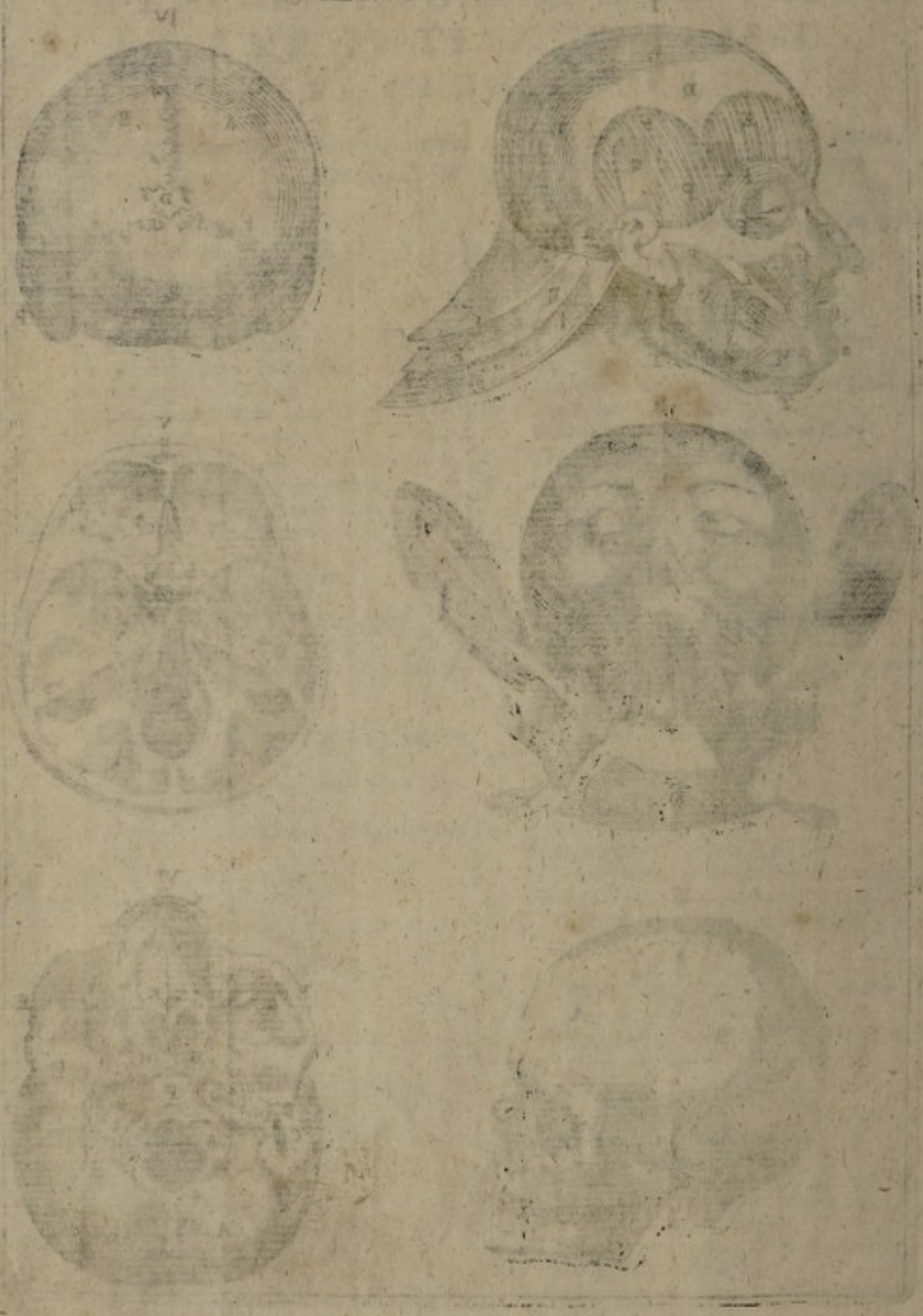

AN EXPLANATION OF THE TABLE OF THE SIXTEENTH BRASSE PLATE IN THIS BOOK.

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 distributed 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* Falx, *turned out of its Scituation.*
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 *brain deduced a little to the sides.*
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 *booklike 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 *detracted on each side.*

FIG. IV.

AA The *brain explained by equal Section.*
a The Fornix *taken up and bowed downwards.*
CC The *superior part of the right 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 likned 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 *detracted.*
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 booklike proceß.*
e The *fourth cavity of the* Dura Mater.

FIG. VI.

AA BB CC ff *signifie the same they did in the fist 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 rowled downwards.*

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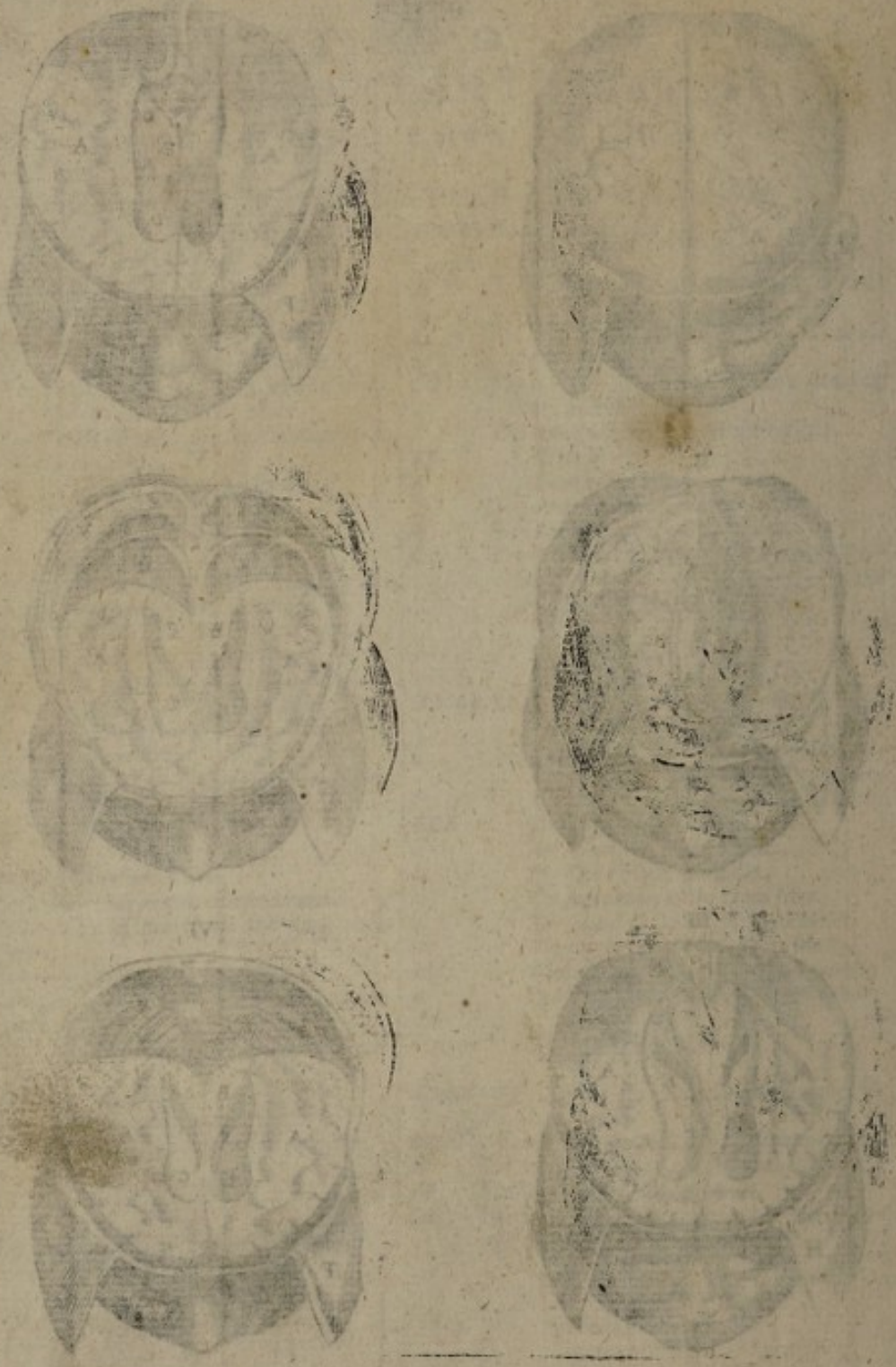


AN EXPLANATION OF THE TABLE OF THE SEVENTEENTH BRASSE PLATE IN THIS BOOK.

This Table presents in larger Figures the Cavities both of the Brain and *Cerebellum*, as they are shewed by the Dissections of the Ancients.

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*.

AAAA The Dura Mater *detracted*.
B The *Proceſs of the sieve-like Bone like a crist*.
CC *Part of the* Os Sphenois, *shewing it self under the membrane, the Brain being taken away*.
DD The *foremost proceſs of the* Os Sphenois, *making the Cavity of the Saddle*.
EEEE *A portion of the Brain left*.
F The *foremost leg of the Vault bowed forewards*.
GG The *hinder legs of the Vault*.
HH The *Sea-horse, or Silk-worms of* Arantius.
IIII The *inferior Cavity of the foremost ventricles*.
K The *extremity of the callous body sticking out like Buttocks*.
L The Glandula Pinealis.
MM The *Protuberances called* Testicles.
NN The *cavity between the Brain and* Cerebellum *commonly called the fourth ventricle*.
0000 *Part of the* Plexus Chorois *bowed backwards, which is carried by the superior cavity of the ventricles*.
PP The *foremost portion of the Basis of the Brain*.
Q The *bottom of the third ventricle in which behind is the hole likned to the Fundament; 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*.
RRRR *A portion of the* Plexus Chorois *turned backwards, which is extended to the fourth inferior cavity*.
SS The *roots of the optick Nerves*.
T The *uniting of the optick Nerves*.
VV The *optick Nerves again severed and passing towards the Eyes*.

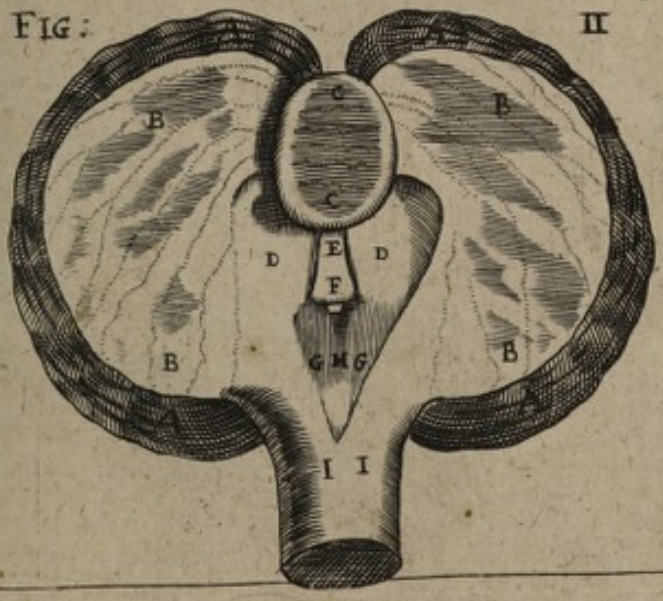
FIG. II.

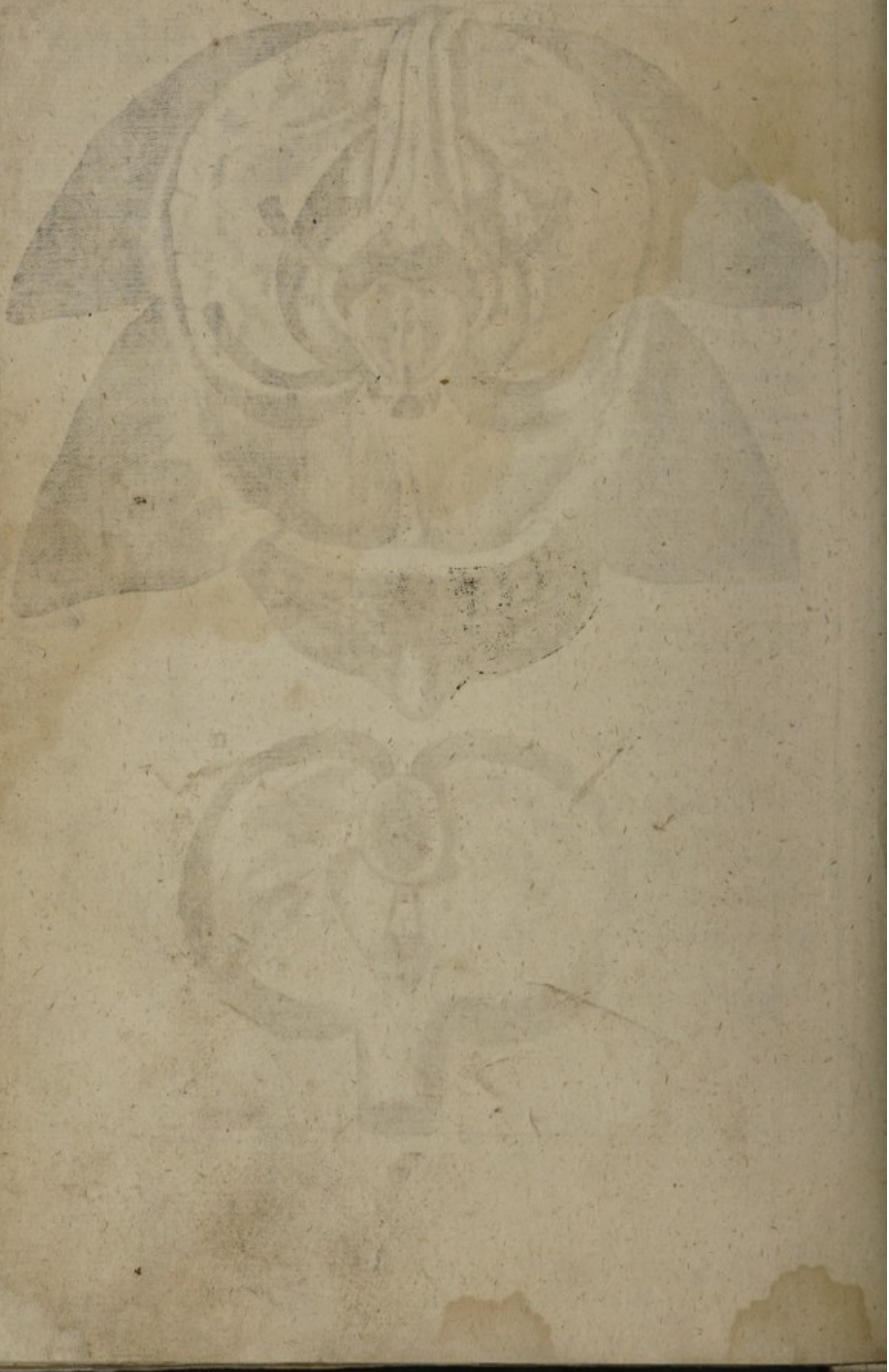
This Figure shews the proper Ventricle of the *Cerebellum*, which the best Anatomists call the fourth Ventricle.

AAAA *Each lobe of the* Cerebellum *whol*.
BBBB The *internal face of the* Cerebellum *laid open by incision*.
CC The *worm-like Proceſs of the* Cerebellum *whose superior and round part is taken away*.
DD The *proper Ventricle of the* Cerebellum, *with its two cavities*.
E The *prominence conspicuous between the two cavities*.
F The *passage from the third ventricle to the marrow of the back*.
G The *Cavity of the marrow of the back like a pen*.
H The *chink in the said cavity*.
II The *descending trunk of the marrow of the back cut off*.

FIG: I.

FIG: II





AN EXPLANATION of the TABLE of the seventeenth Plate in this Book.

This Table represents the external Parts with its Muscles and Cartilages, as also the Organ of Odor or Organ of Hearing, its Cavities, Bones, Passages and Nerves, as they are found out by Dissection of such Bodies as are known.

FIG. I.

FIG. II.

FIG. III.

FIG. IV.

FIG. V.

FIG. VI.

FIG. VII

FIG. VIII.

FIG. IX.

FIG. X.

FIG. XI.

FIG. XII.

AN EXPLANATION of the TABLE of the twenteth brafs Plate in this Book.

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 whol, 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 the Ear right upwards.*
III The *three-fold muscle with his tendon moving the Ear oblickly 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 broken 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 *Timpanum* may be seen.

AA The *beginning of the passage of hearing.*
BB The *membrane of the* Timpanum.
C The *little foot of the* Malleus *transparent 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* Maleolus *outwards.*
B The *membrane of the* Timpanum.
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* Timpanum.
B C The *cavity of the* Timpanum, *in which*
B The *oval hole.*
C The *round hole.*

FIG. VII

Shews the rocky proceß with the smal bones of the *Timpanum* in their scituation.

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 scituation.

A The Malleolus *with its two proceßes, its short and long.*
B The Anvil *applied to the* Malleolus.
C The Stirrep.
D The *small bone joyned to the Ligament of the* stirrop.

FIG. VIII.

Shews the inferior face of the bone of the Temples.

AA The *extremity of a quil thrust through that passage of Hearing which is carried to the pallat.*
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 obumbrated by a black colour: the fist 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 the Centre of the* Cochlea.
C The *proceß between each portion of the Nerve standing up like a bridg.*
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 whol, Table* 8. *figure* 7,8.

FIG. XII.

Contains a portion of the bone of the Temples, in which the *Timpanum* 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* Timpanum, *being thicker about the place it goes out.*
CC A *small Nerve from the fourth pair joyning it self to the harder nerve of Hearing.*

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AN EXPLANATION OF THE TABLE OF THE EIGHTEENTH BRASSE PLATE IN THIS BOOK.

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 Mirable*, 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 proces 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 fist pair.*
GG The *Nerve of the sixt 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 whol, 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 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.

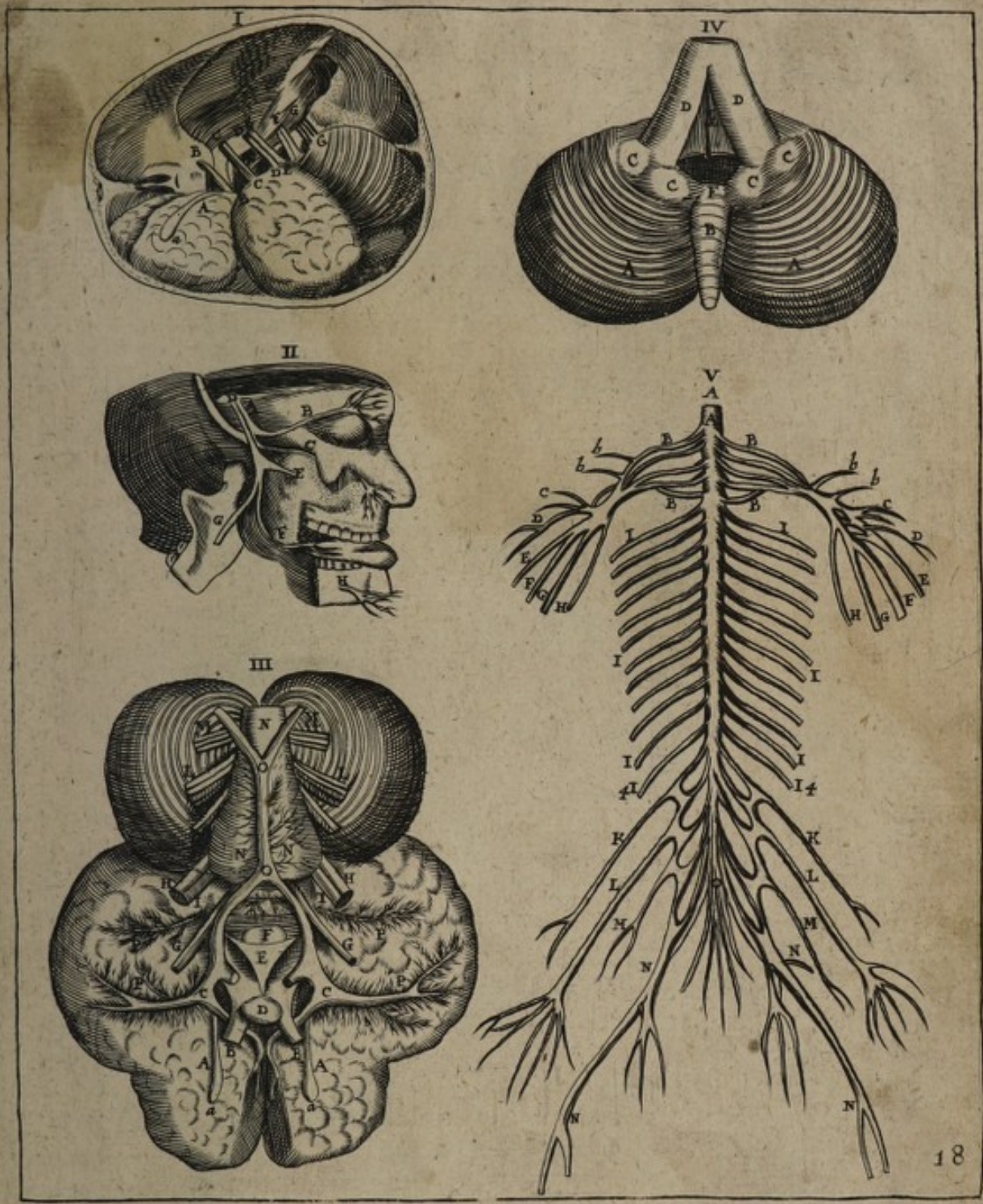
AA The *Nerves of swelling.*
aa *Their Dug-like processes.*
BB The *two legs of the Nerves of the first pair.*
CC The *greater branch of the Artery* Carotis, *the interior being joyned to the Vertebral Artery OO*
D The Glandula Pituataria.
E The *Funnel.*
F The *Protuberances of the Brain, set before the passage which carries the flegm to the Funnel.*
GG The *Nerves of the second pair cut off.*
HH The *beginnings of the Nervs of the third pair.*
II The *beginning of the Nervs of the fourth pair.*
KK The *beginning of the Nerves of the fift pair.*
LL The *beginning of the Nervs of the sixt pair.*
MM The *beginning of the Nervs 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 Wedg-like bone.*
PPPP *Smal branches of Arteries called the* Rete mirabile.

FIG. IV.

AA The Cerebellum *and his globes.*
B The *wormlike proces of the* Cerebellum.
CCCC The *proces 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 *fist pair.*
HH The *sixt pair called* Subcutaneus.
IIII The *pairs of intercostal Nerves, the two lowermost of which pertain to the Loyns.*
K The *first pair which is carried to the Foot.*
LL The *second pair.*
MM The *third pair.*
NN The *fourth and greatest pair.*
O The *smal Nervs of the marrow of the back, which are carried to the bladder and muscles of the Fundament, and to the Genitals of both Sexes.*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AN EXPLANATION OF THE TABLE
of the nineteenth Brass Plate in this Book.

This Table comprehends the Eye-lids with the Muscles called Levators; also the proper Muscles of the Eyes; the Membranes and the Humors included in the Membranes.

FIG. I.

AA The Levator muscle of the (most of Eye-lid.
B Its tendon thinly opened.
CC The Cartilages of the Eye-lids.
DD The Caruncle in the internal angle.
dd The Puncta Lacrymalia.
E The external angle of the Eye-lid.

FIG. II.

AA The Eye 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 a. Small Nerves carrying motion, Juice, 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 muscles, which tracks the Eye only separated from the part of that muscle
H The superior oblique muscle.
G The Trochlea of the same muscle.
H The Sclerotica covering the hinder part of the Eye.
H A portion of the Optick Nerve leaving him the Eye.

FIG. IV.

Shews a Sheeps Eye, and in it the several muscles which Man needs not.

AA B CD The four right muscles.
E The inferior oblique muscle, which tracks the Eye.
F The superior oblique muscle, which turns the Eye.
G The Trochlea of the superior oblique muscle.
H The fourth muscle of Brutes drawing the Eye.
I The under part of the Sclerotica covering the Eye.
K A part of the muscle in the Eye-lid.

FIG. V.

Shews the eye with the Sclerotica, the oblique muscles removed.
AAAA The common tendon called Cornea.
BB The Nictitating Membrane or Cornea.

FIG. VI.

The Membranous Coverts of the Eye.
C The Membranous Coverts.
C part of the optick Nerve.

FIG. VII.

The Membranous Eye.
The hole in the Eye or Pupilla.
The Glandulous Body behind the Humor.
The Membranous Coverts of the Eye.

FIG. VIII.

FIG. IX.

AN EXPLANATION OF THE TABLE of the nineteenth Brass Plate in this Book.

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 opened.*
CC *The Cartilages of the Eye-lids.*
DD *The Caruncle in the internal angle.*
dd The Puncta Lacrymalia.
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, sence, 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 oblick 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.

Shews a Sheeps Eye, and in it the seventh muscle which Man needs not.

ABCD *The four right muscles.*
E *The inferior oblick muscle, which here is large.*
F *The superior oblick muscle which is slender.*
G The Trochlea *of the superior oblick muscle.*
H *The seventh muscle of Brutes drawing the Eye to.*
I *The hinder part of the Eye covered with the tendon 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 oblick muscles being removed.*
aaaa *The common membrane called* Innominata.
bb The Iris *transparent through the* Cornea.

FIG. VI.

AAA The *Membrane* Sclerotes *dissected.*
B *The* Membrana Cornea.
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.*

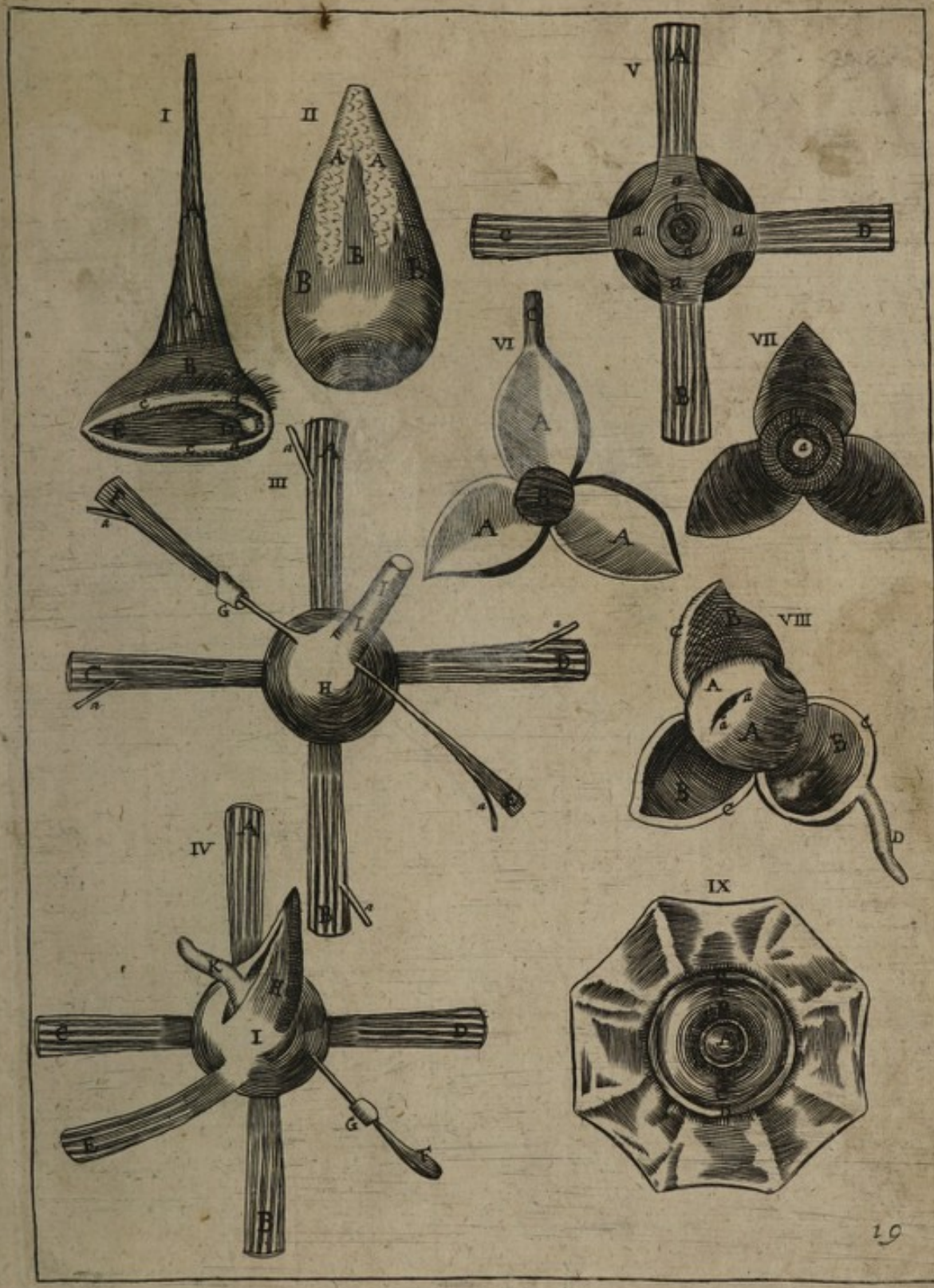
FIG. VIII.

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 aqueal humor, being but little, and placed round about the Vitrial.*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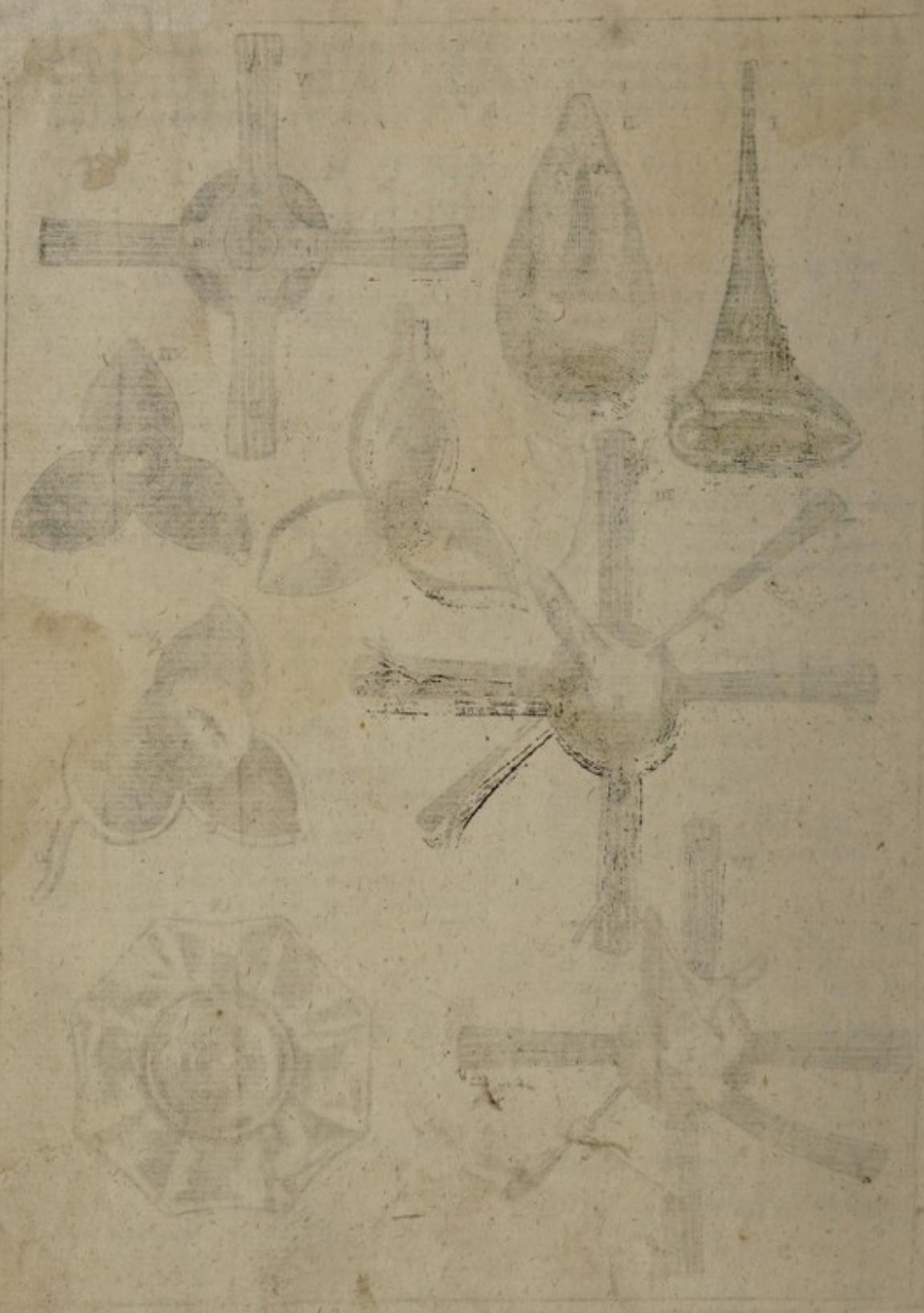


An Explanation of the Table of the one and twentieth Brass Plate in this Book.

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.

Shews the *Sceleton* 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 produduced from the appendix.*
bb *The external bunch 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 Knee-pan.*
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.
hh *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 apiece.*
** *&c. The appendices of the shoulder,* Radius, *Thigh,* 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 sinewous 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 bone 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 wrest.*
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 Wrest expressed largely, that so they might be the better distinguished.

FIG. IV.

Shews the *Os Ischium, Illium,* 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 conspicuius 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.*
ee *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.

Shew the four greater and four lesser bones called *Sesamoides.*

FIG. VII.

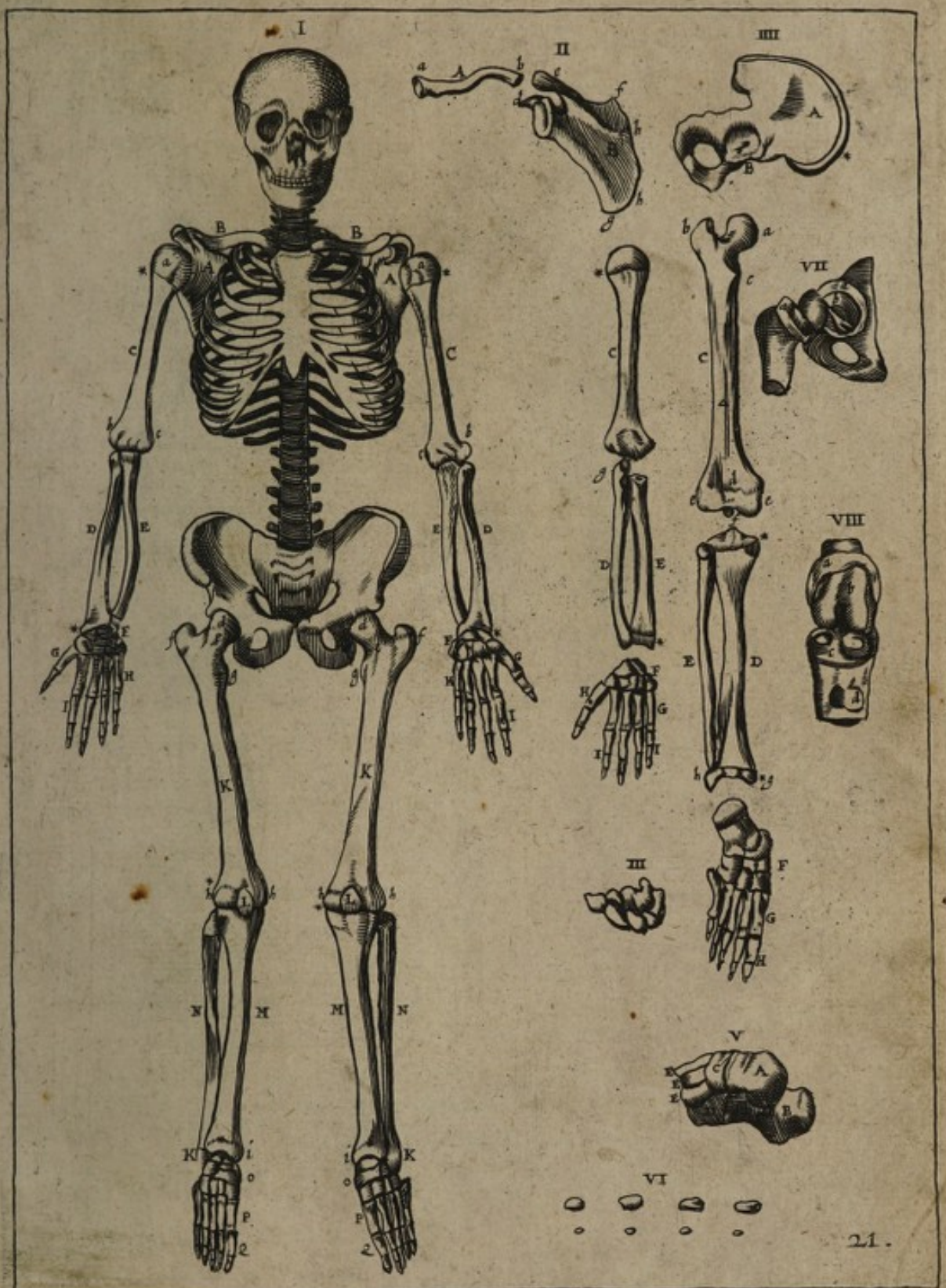
Shews the superior part of the thigh with the *Acetabulum.*

aa *A broad Ligament compassing the joynt of the thigh dissected.*
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 Joynt.*
b *A Ligament produced out of the Sepiment.*
cc *The cavities of the* Tibia *receiving the thigh.*
d *The knee-pan with a portion of the tendon joyned to it.*



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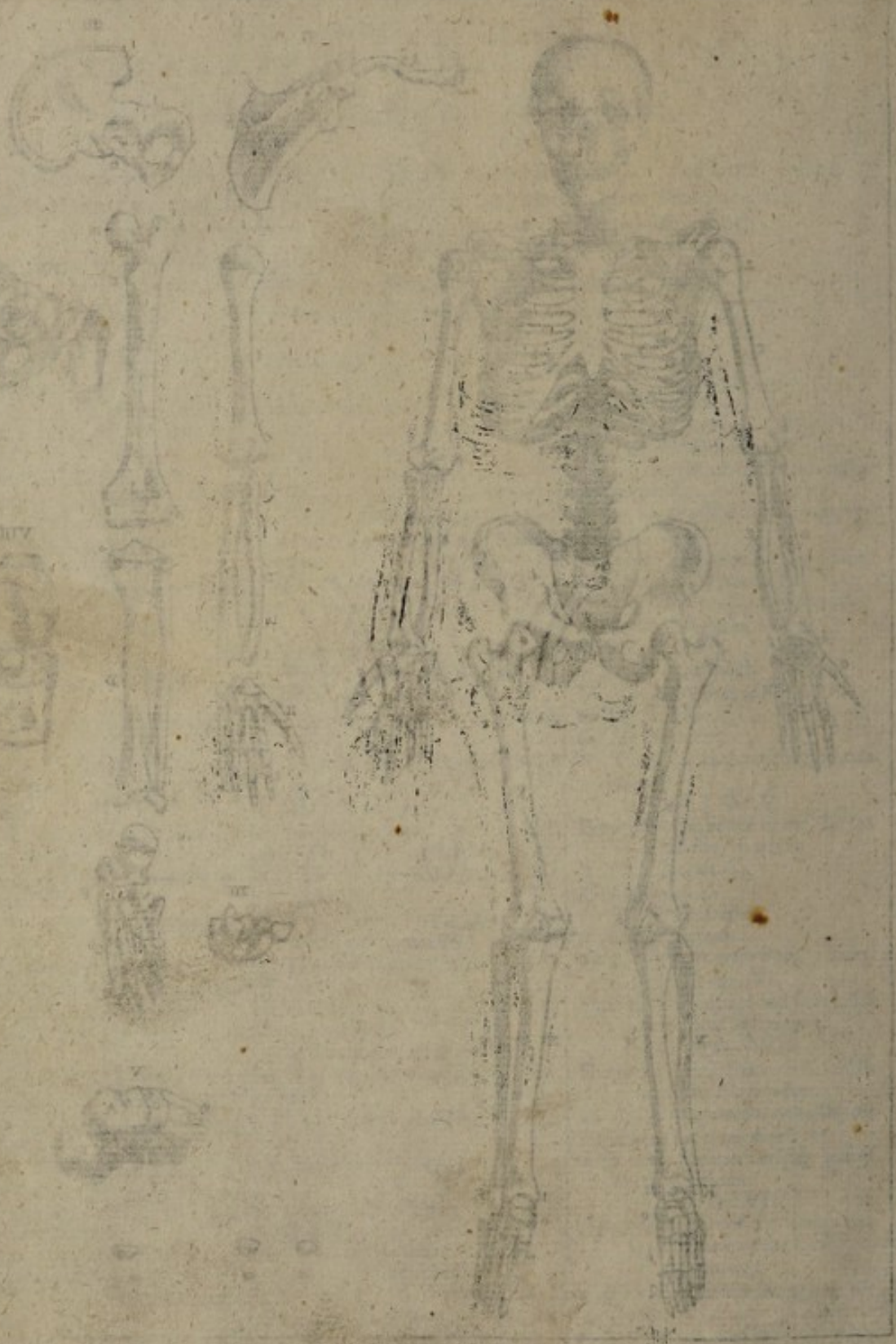


AN EXPLANATION OF THE TABLE of the two and twentieth Brass Plate in this Book.

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 Deltoides *separated from the beginning*
B Infrascapularis *separated.*
C Rotundus minor.
D Rotundus major.
E *The pectoral muscle separated from the breast,* vide *Chap.* IX.
F *The fleshy portion of the broadest muscle of the back,* vide *Chap.* XII.
G Musculus Biceps.
H *The lesser muscle lifting up the shoulder in his Scituation.*
II *The* Brachiæus *under the* Biceps.
K *The muscle* Palmaris *hanging from its original.*
L *A portion of the* Supinator.
M *The external bower of the Wrest.*
N *The internal bower of the Wrest.*
O *The bower of the second* Internodium *of the fingers.*
P *The bower of the third* Internodium *of the fingers.*
Q *The bowers of the first* Internodium *of the thumb in their first scituation.*
R *The bowers of the second* Internodium *of the thumb in their scituation.*
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 Wrest in its scituation.*

FIG. II.

A *The lesser muscle lifting up the shoulder.*
B *The muscle* Brachiæus *whol.*
C *The round* Pronator *of the* Radius.
D *The bower of the third* Internodium *of the thumb out of his scituation.*
E *The square* Pronator *of the* Radius.
F *The bowers of the first* Internodium *of the thumb out of their scituation.*
G *The bowers of the second* Internodium *of the thumb out of their scituation.*
aa *The internal side of the* Scapula.
b Os Humeri.
c Os Radii.
d Os Ulnæ.
ee *The membranous Ligament of the* Ulna *and* Radius.
ffff *The muscles commonly called* Adductors.
b *The* Abductor *of the little finger.*

FIG. III.

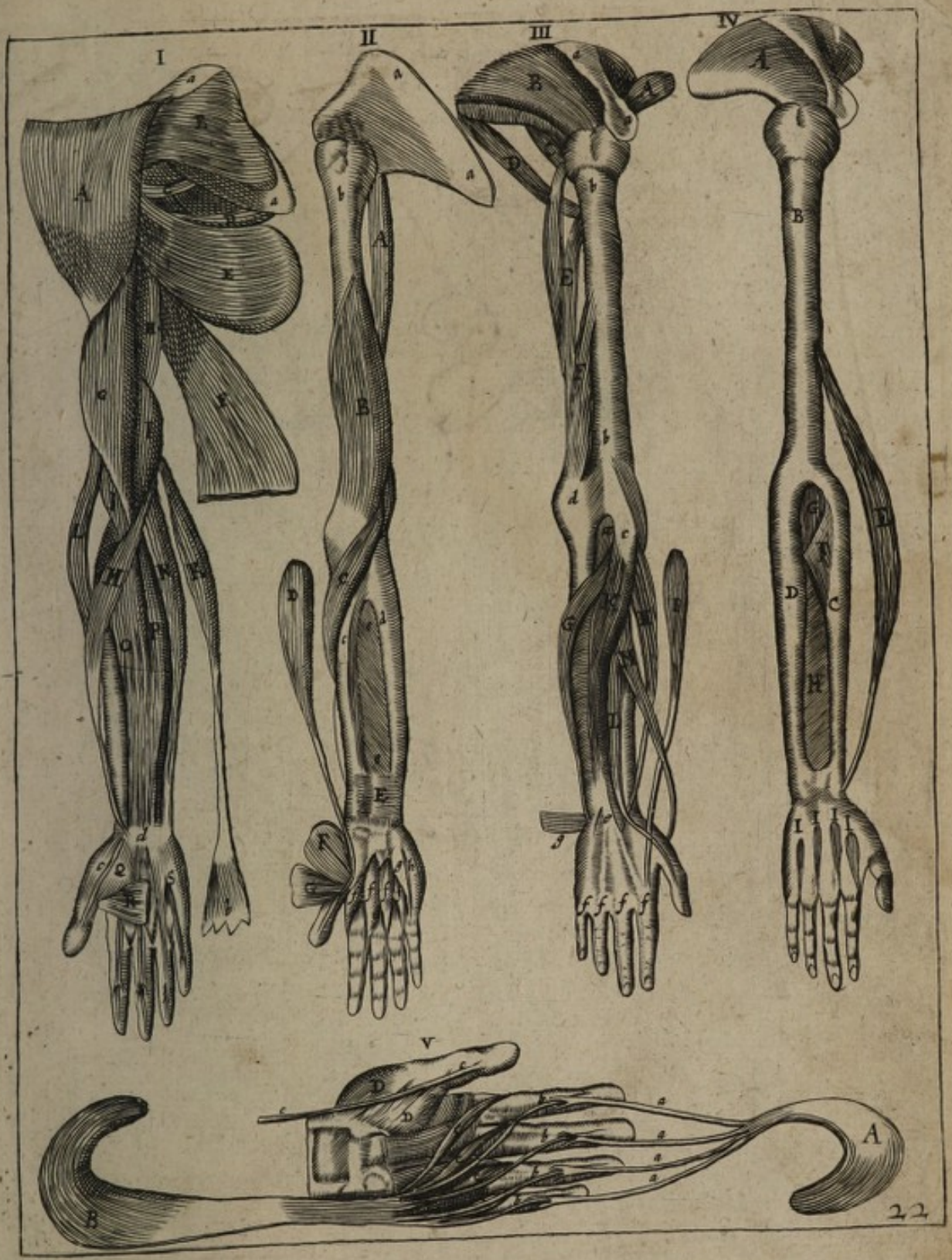
A *The first* Suprascapularis *removed out of his place.*
B *The second* Suprascapularis.
C Rotundus minor.
D Rotundus major.
E *The long muscle extending the Cubit.*
F *The short extender of the Cubit.*
G *The internal extender of the wrest.*
H *The external extender of the wrest, having here but one tendon.*
I *The special* Abductor *of the fore finger with but one tendon.*
K *The extendors of the second and third* Internodij *of the fingers united.*
L *The extendor of the third* Internodium *of the thumb.*
M *The extendor of the first* Internodium *of the thumb, having here but one single body and tendon.*
aa *The proceß of the* Scapula *called* Spiniformis.
æ *The muscle* Anconeus.
bb *The bone 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 wrest loosed.*

FIG. IV.

A *The external face of the* Scapula.
B *The bone of the shoulder covered with the* Perioſtinum.
C Os 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* Anconeus.
H *The membranous Ligament of the* Radius *and* Ulna.
IIII *The three* interoſſeal *muscles with their* 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 clefts of the tendines of the former.*
CCCC *The muscles bowing the first* Internodium, *or* Lumbricals.
DD *The bowers of the thumb in their scituation.*
cc *A portion of the tendon bowing the third* internodium *of the thumb.*



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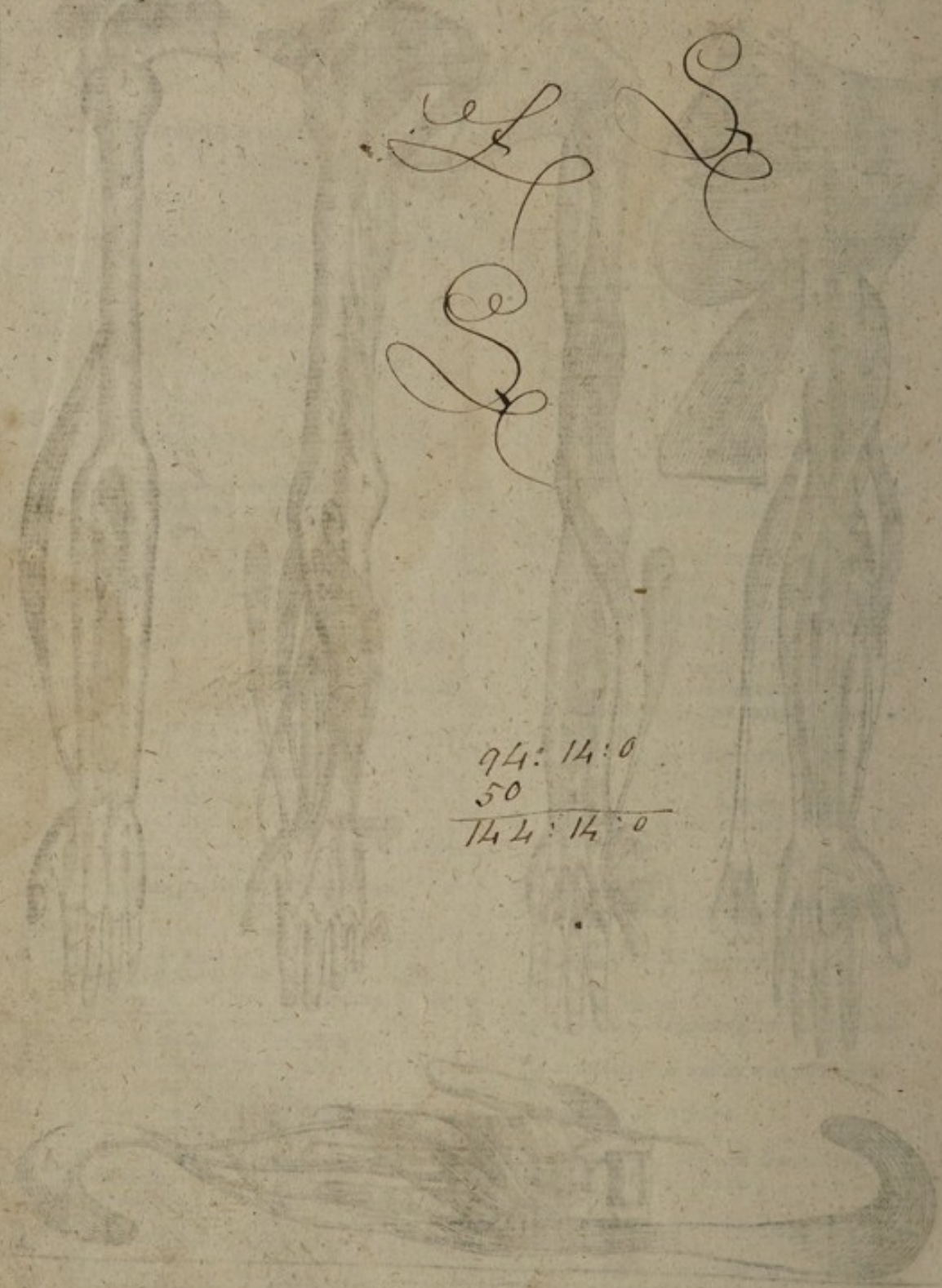

94: 14: 0
50
144: 14: 0

110 : 10 : 9
103 : 11 : 2½
78 : 18 : 8
24 : 13 : 9

317 : 13 : 4½

317 : 13 : 4½
201 : 0 : 0
116 : 13 : 4½

1772
Rec'd

144 : 14 : 0

172 : 19 : 4½
56 : 6

116 : 13 : 4½

AN EXPLANATION OF THE TABLE
of the three and twentieth Brass Plate in this Book.

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 scituation, 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 whol 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.
II Musculus facialis.
K Musculus Tibialis anticus.
LL Musculus Peroneus secundus.
MM The Extendor of the third internodium of the toes.
N The extender of the third internodium of the great toe.
aa The appendix 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 Gasterocnemius hanging out, the leg being depressed: the third Figure shews it hanging out of its scituation under the character KK.
e The membranous Ligament of the Tibia and Fibula.
ffff The tendines 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 Glutæus, which the following figure represents separated from the middle Glutæus.
CCC Musculus Triceps.
DD A portion of the Gasterocnemius and Soleus as yet joyned.
EE Tibialis posticus.
FF Peroneus primus.
G The extender of the second internodium of the toes in its scituation.
aaaa The interosseal muscles.

FIG. III.

A Glutæus major separated and depressed to the side.
B Glutæus medius in his scituation.
C Musculus Pyriformis.
D The fourth muscle moving the thigh about.
E Obturator internus entring the fleshy purse.
FF Musculus gracilis.
GG Musculus Seminervosus.
HH Musculus Semimembranosus elegantly expressed.
III Musculus Biceps.
KK The Gasterocnemius turned backwards, to whose beginnings two small bones called Sasamoides stick.
LL Musculus soleus in his scituation.
M The little muscle called Plantaris.
N The tendon spread abroad from the heel under the soal 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 purse.

FIG. IV.

A The internal face of the Os Ilium.
B Musculus Glutæus minor in his scituation.
C Musculus Glutæus medius out of his scituation.
D Musculus Pyriformis.
E The fourth muscle moving the thigh about.
ε The external Obturator.
F The internal Obturator.
G The fleshy purse.
H Musculus Popliteus.
II Musculus perforans.
K The muscle bowing the third internodium of the great toe.
L Musculus perforatus in his scituation.
M The Abductor of the little toe.
N The Abductor of the great toe in his scituation.

FIG. V.

a The greater Adductor 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 Adductor of the great toe.

FIG. VI.

A The muscle Perforatus which bows the second internodium.
B The bower of the third internodium of the great toe.
C Musculus perforans, or the bower of the third internodium.
DD A portion of the musculous flesh joyned to the beginnings of the lumbrical muscles.
eeee The lumbrical muscles.
ffff The interosseal muscles with the Abductors of the great and little toe.

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AN EXPLANATION OF THE TABLE.

of the four and twenty Birds Eggs in this Book.

AN EXPLANATION OF THE TABLE
of the four and twentieth Brass Plate in this Book.

This last Table shews the Veins, Arteries, and Nerves of the extream Parts, being not 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* Deltois.
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 Median.*
g The *Median vein descending.*
h The Cephalica *of the Hand.*
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.*
nnn The *Basilick branches carried to the Extendors 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.*
r The *internal branch of the same.*
s The Subcutaneus *branch of the* basilica.
tt The *internal branch of the* Subcutaneus *branch, which with the cephalical, procureth the median.*
u Its branch joyning it self to the common vein.
x The *external vein of the* Subcutaneus *branch of the* Basilica.
yy The *greater branch of the external* Subcutaneus.
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.*
efg Branches of the artery distributed to the muscles of the shoulder.
hhh Branches of the artery distributed to the joynt of the Elbow.
B 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 wrest, little, ring and middle finger.
pp Branches carried to the hands from the external branch.
qq 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* Vertebræ *of the Neck.*
1. The *first* Vertbra *of the breast.*
a b c d The *five Nerves proceeding out of the holes of the* Vertebræ.
ff The *first pair of Nerves descending from the plexure* **.
gg The *second pair.*
hh The *third pair.*
i i The *fourth pair bigger than the rest.*
kk The *fift pair.*
ll The *sixt pair which is* subcutaneus.

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.
dd The *internal* Musculæ.
ee The *external* Musculæ.
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* Ischiac.

FIG. V.

Contains the Arteries of the Foot.

AAA The *crural Artery produced from the external Iliack branch of the great Artery.*
a The *artery* Pudenda.
b The *artery carried to the internal Iliack muscle.*
c The *artery* Ischias.
dd The *external Musculæ.*
e The *internal Musculæ.*
ffff 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* Vertebræ *of the Loyns.*
66 The Os Sacrum.
A A pair of Nerves pertaining to the tranverse 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 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.
eeee Branches sent to the bowers of the Thigh.
f A branch sent to the muscle Plantaris *and the extenders 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 sixt 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 smal Nerves like threeds, in gathering together of which, the wonderful power of Nature appears.

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Desmond Shaw Cambridge 1990