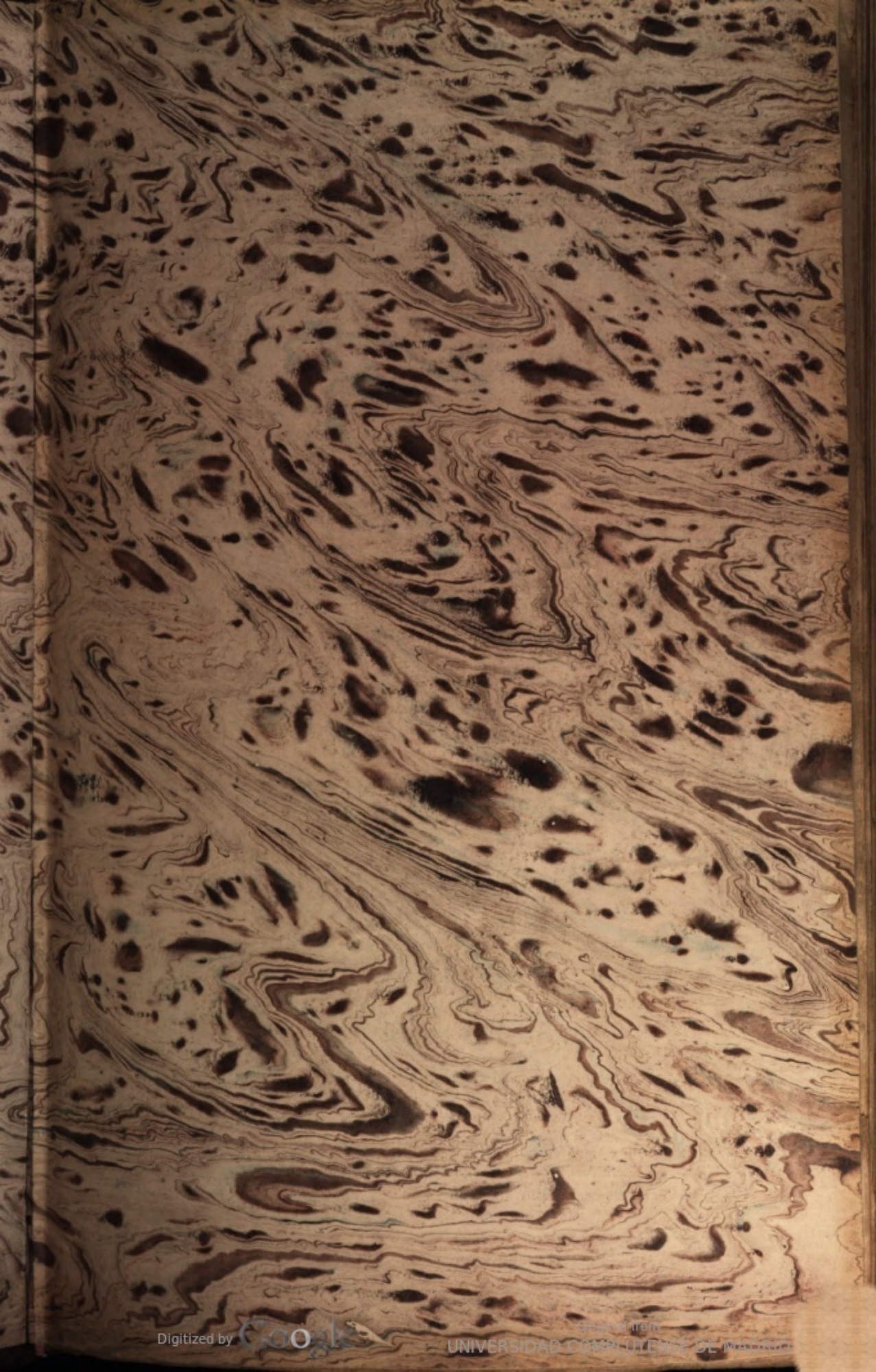


THE WORKES of that famous Chirurgion Ambrose Parey

Translated out of Latine and compared with the French.

by Tho: Johnson.

Whereunto are added three Tractates out of Adrianus Spigelius *of the* Veines, Arteries, & Nerves, *with large* Figures.

Also a Table of the Bookes and Chapters.

London.
Printed by Richard Cotes, *and* Willi: Du-gard, *and are to be sold by* John Clarke, *entring into Mercers Chappell.* 1649.

TO

THE RIGHT HONOVRABLE

EDVVARD LORD HERBERT OF *Cherbury* and *Caſtle Iſland*, and one of his Majeſties moſt Honorable Counſell of War.

My Lord,

IT is not the far-fetcht pedegree of noble Anceſtors, nor thoſe Honours your Lordſhip deſervedly poſſeſſes, that make mee crave your Patronage to this my Labour; but it is that Heroick mind, enriched with the choice endowments of Nature and Art, and that earneſt affection wherewith your Honour entertains all Sciences, Arts, and Artiſts, with that exquiſite Iudgment which ſees into the inner man, which embolden and incite me to ſue for your Honors aſſiſtance, in protecting the fame of him, who by your many favours is made yours. I know the ſeeming and ſelf-pleaſing Wiſdom of our times, conſiſts much in cavilling and unjuſtly carping at all things that ſee light, and that there are many who earneſtly hunt after the publike fame of Learning and Judgment, by this eaſily trod, and deſpicable path, which notwithſtanding they tread with as much confidence as folly; for that oft-times which they vainly and unjuſtly brand with opprobrie, outlives their *Fate*, and flouriſhes when it is forgot that ever any ſuch as they had being.

I know your Lordſhips diſpoſition to be far diſſenting from theſe men, and that you rather endeavour to build up the fame of your Learning and Judgement upon a ſtrong laid foundation of your own, than *Heroſtratus* like, by pulling down any howſoever fair built fabrick of another. I heartily wiſh that your Honour

could propagate this good, and that all Detractors might be turned into Actors, and then I know it would much mitigate their rigour in cenſuring others, when as they themſelves were alſo expoſed unto the ſame Hazzard.

I think it impertinent to acquaint your Honour with the Nature of the Work, my Pains in tranſlating, or the Benefit that may enſue thereon, for that I know your Honour ignorant of nothing in this kind; neither doubt I of your favourable acceptance of the good will of him, that thinks himſelf much honoured by being

Yours,

THOMAS JOHNSON.

TO

To the Reader.

I Have here for the publike good taken pains to subject my self to common censure, the which I doubt not but to find as various as the faces of the Censurers; but I expect no thanks, nor hunt after other praise, than that I have laboured for my Countries good, if that deserve any. I fear not Calumniation (though sure to hear of it) and therefore I will not Apologize, but inform thee of some things concerning the Author his work, and the reason that induced me to the translation thereof, with some few things besides. For the Author, who was principall Surgeon to two or three Kings of *France*, he was a man well versed in the writings of the Antient and modern Physitians, and Surgeons, as you may evidently find by sundry places alledged in his works. For his experience, or practise (the chief help to attain the highest perfection in this Art) it was wonderfull great, as you may collect by his voyages recorded in the last part of this work; as also by that which *James Guillemau*, Surgeon to the *French* King, a man both learned and judicious in his profession, avers, speaking of his own education and progresse in the Art of Surgery. I so laid (* saith he) the first foundation of this Art in the Hospitall of *Paris*, being as it were, an ample Theater of wounds and diseases of all kindes, that for two whole years, during which time I was there conversant, nothing was consulted of, nothing performed, the Physitians, and Surgeons being present, whereof I was not an Auditor or Actor. There flourished at these times, and yet doth, *Ambrose Parey*, principall Surgeon to the most Christian King, the Author of this great work, most renowned for the most gracious favour of Kings, Princes and Nobles towards him, for his Authority amongst his equals, for his Chirurgicall operations amongst all men. Therefore I earnestly endeavoured to be received into his family, as unto another *Machaon*, or *Podalirius*: once admitted, I so by all dutifulnesse and due respect acquired his favour, that he, unlesse I were present and assisting, did nothing (such is his naturall gentlenesse and curtesie to all such as are studious of the Art) at home or abroad, in the field, in the tents, or lastly in this famous City of *Paris*, about the bodies of Dukes, Noblemen, or Citizens, in whose cure, he by the ardent desire of them all, had still the prime place.

* In his Epistle prefixed before the Latin edition of this Author.

Now for this work, hear what this same man in the same place affirmeth further: I not content with these means, which may seem sufficient, and too much, as desirous to satisfie my long thirst, determined to try whether I could draw, or borrow any thing from strangers, which our men wanted, to the fuller knowledge of Surgery. To this purpose I travailed over *Germany*, and then for four years space I followed the *Spanish* Army in the Low-countries; whereas I did not only carefully cure the wounded Souldier, but also heedfully and curiously observe what way of curing the renowned *Italian*, *Germane*, and *Spanish* Surgeons observed, who together with me were imployed in the Hospitall, for the healing of the wounded and sick. I observed them all to take no other course than that which is here delivered by *Parey*. Such as did not understand *French*, got some pieces of this work for large rewards, turned into Latin, or such Languages as they understood, which they kept charily, and made great store of; and they esteemed, and admired, and embraced this work alone, above all other works of Surgery, &c. Our Author also himself, not out of a vain-glorious ostentation, but a mind conscious of the truth of his assertion, affirms thus much of this his work. I have (saith he) so certainly toucht the mark whereat I aimed, that Antiquity may seem to have nothing wherein it may exceed us, besides the glory of invention, nor posterity any thing left, but a certain small hope to add some things, as it is easie to add to former inventions. Thus much concerning our Author, and the excellency of his work.

Now come I to my translation, the which, as desiring more a publike good, than private praise, I have performed plainly and honestly, labouring to fit it to the capacity of the meanest Artist; for these are they to whom I chiefly commend this work, and from whom I expect acceptation. I being by the earnest perswasions of some of this profession, chiefly, and almost wholly perswaded and incited to take this pains, who knowing the disability of understanding this Author in Latin or *French*, in many of the weaker members of the large body of their profession, dispersed over this Kingdome, and the rest of his Majesties Dominions, whose good, and encrease in knowledge may be wisht, that so they may be the better inabled to do good to such as shall implore their aid in their profession.

There are ſome (I know) will blame me for Engliſhing this work, as laying open the myſteries of a worthy Art, to the unworthy view of the vulgar. To ſuch I could anſwer as * *Ariſtotle* did to *Alexander*: but for the preſent I will give them theſe, which I think may ſatisfie any but the purpoſely malicious: the firſt is drawn from the goodneſſe of the thing, as intended for thoſe that want ſuch guides to direct them in their Art; for it is commonly granted, that, *Bonum quo communius eo melius.* Secondly, it hath been the cuſtome of moſt Writers in all Ages and Countries thus to do: *Hippocrates*, *Galen*, and the other Greeks, writ in their mother tongue the myſteries of their Art: thus did *Celſus*, *Serenus*, and others in Latin: *Meſue*, *Avicen*, *Serapio*, and others, in Arabick; as alſo, to go no further, our Author writ this work in his native *French*, and learned men have done the like in this, and all other Arts. And it is a great hinderance to us in theſe dayes, that we muſt be forced to learn to underſtand two or three tongues, before we can learn any ſcience, whereas the Ancients learned and taught theirs in their mother tongue: ſo that they ſpent a great deal leſſe time about words, and more upon the ſtudy of that Art or Science they intended to learn and follow. Thirdly, I muſt tell you, that, *Ex libris nemo evaſit Artifex*, No man becomes a workman by book: ſo that unleſſe they have had ſome inſight in the Art, and be in ſome ſort acquainted both with the tearms of Art; as alſo with the knowledge and uſe of the inſtruments thereto belonging, if by reading this, or any other book of the like nature they becomes Surgeons, I muſt needs liken them (as *Galen* doth another ſort of men *) to Pilots by book only: to whoſe care, I think none of us would commit his ſafety at Sea, nor any if wiſe, will commit themſelves to theſe at land, or Sea either, unleſſe wholly deſtitute of other.

Vide Aul. Gel. l. 20. c. 4.

Gal. de ſimp. l. 6. Τὸ ἐν βιβλίοις Κυβερνήτης.

The other things whereof I muſt alſo give you notice, are theſe. The figures in the Anatomy are not the ſame uſed by my Author (whoſe were according to thoſe of *Veſalius*) but according to thoſe of *Bauline*, which were uſed in the work of Dr. *Crooke*; and theſe indeed are the better and more compleat. Alſo pag. 528. I thought it better to give the true figure of the Helmet floured Aconite, mentioned out of *Pliny*, than to reſerve the faigned picture of *Matthiolus*, which in our Author was encreaſed with the further fiction of a Helmet. I have in ſome few places in the margent, which you ſhall find marked with a ſtar, put ſhort annotations, for the better illuſtration of that which is obſcure, &c. I have alſo in the Text to the ſame purpoſe, here and there put two or three words, contained in theſe limits [ ], which I find here and there turned into a plain Parentheſis, eſpecially toward the latter end of the book, but the matter is not great. Further I muſt acquaint you that the Apologie and Voiages, being the laſt part of this work, and not in the Latin, but *French* editions, were tranſlated into *Engliſh* out of *French* by *George Baker*, a Surgeon of this City, ſince that time, as I hear, dead beyond the Seas.

This is all, Courteous Reader, that I have thought neceſſary to acquaint thee withall concerning this, which I would deſire thee to take with the ſame mind that it is preſented to thee, by him that wiſheth thee all happpineſſe.

THOMAS JOHNSON.

THE AUTHORS EPISTLE DEDICATORIE

To Henry the third, the most Christian King of *France* and *Poland*.

EVen as (most Christian King) we see the members of mans body by a friendly consent are alwayes busied, and stand ready to perform those functions for which they are appointed by nature, for the preservation of the whole, of which they are parts; so it is convenient that we, which are, as it were, Citizens of this earthly Common-weal should be diligent in the following of that calling which (by Gods appointment) we have once taken upon us: and content with our present estate, not carried away with rashnesse and envy, desire different and divers things whereof we have no knowledg. He which doth otherwise, perverts & defiles with hated confusion the order and beauty, on which this Univers consists. Wherefore when I considered with my self, that I was a member of this great Mundane body, and that not altogether unprofitable; I endeavoured earnestly, that all men should be acquainted with my duty, and that it might be known how much I could profit every man. For God is my witnesse, and all good men known that I have now laboured fifty years with all care and pains in the illustration and amplification of Chirurgery; and that I have so certainly touched the mark whereat I aimed, that Antiquity may seem to have nothing wherein it may exceed us, beside the glory of invention; nor posterity any thing left but a certain small hope to add some things, as it is easie to add to former inventions. In performance whereof, I have been so prodigall of my self, my watchings, faculties and means, that I spared neither time, labour, nor cost, whereby I might satisfie and accomplish my own desires, this my great work, add the desires of the studious. Neither may we doubt but their studies would at length wax cold, if they only furnished with the Theorick and Precepts in Schools and that with much labour, should see no manuall operation, nor manifest way of performing the Art. For which cause I seeking the praise and profit of the French *Nation, even with the*

hinderance of my particular estate, have endeavoured to illustrate and increase Chirurgery, hitherto obscure either by the infelicity of the former ages, or the envy of the Professors; and not only with precepts and rules, but being a lover of carved works I beautified it with 300. forms, or graven figures, and apt delineations, in which whosoever shall attentively look shall find five hundred anatomicall or organicall figures belonging to the Art, (if they be reckoned particularly). To every of these I have given their names and shewed their use, lest they should seem to have been put in vainly for ostentation or delight. But although there be few men of this profession which can bring so much authority to their writings either with reason, or experience as I can; notwithstanding I have not been so arrogant, but intending to publish my work, I first communicated it with men the most excellent in the Art of Physick, who gave me greater incouragement to perfect and publish it, that it might be in common use: professing they wished nothing more, than that it might be turned into Latin, (so by which means it should bee known to forain Nations, that there is no kind of Learning which is not delivered with great dexterity of wit in this Kingdom over which you rule. And thus much I dare boldly affirm, that there is scarse any, be he never so stately or supercilious, but that he may here find some thing which may delight him, and by which he may better his knowledg. Therefore I doubted not to consecrate this book unto your Majesty both as a Pattern and treasury of my labours, aswell in respect of my duty, who am yours by nature and education, as that I might manifest to all, your Highnesse exceeding bounty towards me, in placing me, (having heretofore injoyed the office of principall Chirurgeon under three Kings your Majesties Predecessors) in the same dignity, and that of your own accord. And moreover I did conjecture that it would fall out, as now it doth, that this my work carried through the world by the fame of your Majesties name, should neither fear the face nor view of any, supported by the favour and Majesty of a most invincible Monarch *and most excellent and renowned Prince.* Neither did King Charles *the ninth of happy memory, incited by the relation of the most gracious Queen his Mother, refuse to read it, being he understood it proceeded from him, who having happily passed all his time in private and publike imployments, and conversed with all men of all sorts, was judged most worthy to obtain this favour, as to have the front of this work adorned and beautified with the splendor of his prefixed name. I encouraged by this hope, desired that my request should passe as by a certain continuation and succession from a most powerfull, to a most Invincible King; and do wholly consecrate these my labours taken for my Countries good unto your sacred Majesty. God grant that your Majesty may have happy successe of all your enterprises aboundantly added to* Nestors *years.*

Patis, 8. Feb: Anno Dom. 1579.

Your most Christian Majesties
faithfull Servant

Ambrose Parey.

The Preface.

MOst men derive the Originall of Phyſick from heaven; for thoſe who hold the beſt opinion of the Creation of the world, affirm, the Elements being created and ſeparated each from other, man being not as yet made; incontinently by the divine decree, all herbes and plants with infinite variety of flowers, endued with various ſents, taſtes, colours, and forms, grew and ſprung forth of the bowels of the Earth, enriched with ſo many and great vertues, that it may be thought a great offence to attribute to any other than the deity, the benefit of ſo great a bleſſing ſo neceſſary for ſo many uſes. Neither could Mans Capacity ever have attained to the knowledg of thoſe things without the guidance of the Divine power. For God the great Creator and faſhioner of the World, when firſt he inſpired *Adam* by the breath of his mouth into a living and breathing man, he taught him the nature, the proper operations, faculties and vertues of all things contained in the circuit of this Univerſe. So that if there be any who would aſcribe the glory of this invention to man, he is condemned of ingratitude even by the judgment of *Pliny*. But this knowledg was not buryed in oblivion with *Adam*: but by the ſame gift of God was given to thoſe whom he had choſen and ordained for Phyſick, to put their helping hands to others that ſtood in need thereof. Which opinion was not only received in the common manner and by the tacite conſent of all Nations, but confirmed by *Moſes* in the Scripture. Which thing *Jeſus* the ſon of *Sirach* the wiſeſt amongſt the Jews, hath confirmed ſaying; *Honor the Phyſitian with the honor due unto him, for the moſt High hath created him becauſe of neceſſity: and of the Lord cometh the gift of healing. The Lord hath created Medicins of the Earth, and he that is wiſe will not abhor them. Give place and honour to the Phyſitian, for God hath created him, let him not go from thee, for thou haſt need of him.* The *Græcians* who firſt ſeem more fully and with greater fame to have profeſſed the Art of Phyſick, do in a manner conſent with this opinion, in acknowledging *Apollo* to have been the inventer thereof, neither did they it without a reaſonable cauſe. For whether by *Apollo* they may underſtand the Sun who by its gentle and vitall heat doth bring forth, temper and cheriſh all things; or elſe ſome

Geneſ. 1. *Eccleſ.* 38. 1.

Heros,

Heros, who incited by an excellent and almoſt divine underſtanding firſt taught and put in practiſe the Medicinall vertues of Herbs; in which ſenſe *Ovid* brings him in ſpeaking thus:

Herbes are of mine invention, and throngh all
The world, they me the firſt Phyſitian call.

The originall of Phyſick ariſing from thoſe beginnings ſhall alwayes be celebrated, as celeſtiall, and was increaſed principally after this manner. After *Apollo*, *Æſculapius* his ſon inſtructed by his father reduced this Art being as yet rude and vulgar into a little better and more exquiſite form, for which cauſe he was reputed worthy to be accounted as one of the Gods. At the ſame time flouriſhed *Chiron* the *Centaure*, who for that he excelled in knowledg of Plants, and taught *Æſculapius* (as many report) their faculties, is thought by *Pliny* and ſome others to have been the inventor of Phyſick. *Æſculapius* had two ſons, *Podalirius* and *Machaon*, who following their fathers ſteps and profeſſing Phyſick, did principally beautifie and practiſe that part thereof which is called Chirurgery, and for that cauſe were accounted the Inventers thereof. After thoſe *Aſclepiades* left this Art much inlarged as hereditary to his poſterity; by whoſe ſtudy and diligence, that part of the Art was invented and annexed, which by a more curious skill ſearcheth and cureth thoſe diſeaſes which lye hid within the body. *Hippocrates* the *Coan* the ſon of *Heraclidas*, born of the noble race of *Aſclepiades*, Prince of the Phyſitians that were before him, perfected Phyſick and reduced it into an Art and wrote divers Books thereof in Greek. *Galen* ſucceeded him ſix hundred years after, who was a man moſt famous not only for his knowledg in Phyſick, but alſo in all other ſciences, who faithfully interpreting every thing that was obſcure and difficult in the writings of *Hippocrates*, enlarged the ſcience with many volumes. Thus therefore was the beginning, thus the increaſe and perfecting the Art of Phyſick, as much as can be hoped for from mans induſtry. Although indeed we cannot deny but that Experience hath much profited this Art, as it hath and doth many other. For as men perceived that ſome things were profitable, ſome unprofitable for this or that diſeaſe, they ſet it down, and ſo by diligent obſervation and marking of ſingularities, they eſtabliſhed univerſall and certain precepts and ſo brought it into an Art. For ſo we find it recorded in ancient Hiſtories, before the invention of Phyſick, that the *Babylonians* and *Aſſyrians* had a cuſtom amongſt them to lay their ſick and diſeaſed perſons in the porches and entries of their houſes, or to carry them into the ſtreets and market places, that ſuch as paſſed by and ſaw them, might give them counſel to take thoſe things to cure their diſeaſes, which they had formerly found profitable in themſelves or any other in the like affects, neither might any paſſe by a ſick man in ſilence.

Plin. l. 7. c. 2.

lenee. Alſo *Strabo* writes that it was a cuſtom in *Greece* that thoſe which were ſick ſhould reſort to *Æſculapius* his Temple in *Epidaurum*, that there as they ſlept, by their dreams they might be admoniſhed by the God what means they ſhould uſe to be cured; and when they were freed from their diſeaſes, they writ the manner of their infirmities and the means by which they were cured in tables and faſtened them to the pillars of the Temple, not only for the glory of the God, but alſo for the profit of ſuch, as ſhould afterwards be affected with the like maladies. All which tables (as fame reports) *Hippocrates* tranſcribed, and ſo from thoſe drew the Art of Phyſick. Beaſts alſo have added much to this Art. For one man was not only inſtructed by another, but learned alſo much from brute beaſts, for they by the only inſtinct of nature have found out divers herbs, and remedies, by which they freed and preſerved themſelves from infirmities, which might preſently be transferred to mans uſe. Wherefore conſidering that ſuch and ſo many have concurred to bring this Art to perfection, who hereafter dare call in queſtion the excellency thereof? chiefly if he reſpect the ſubject thereof, Mans body, a thing more noble than all other Mundane things, and for which the reſt were created. Which thing moved *Herophilus* in times paſt to call Phyſitians *The hands of the Gods*. For as we by putting forth our hand, do help any man out of the water or mud into which he is fallen: even ſo we do ſuſtain thoſe that are thrown down from the top of health to the gates of death by violence of diſeaſes, with happy medicins, and as it were by ſome ſpeciall and divine gift deliver them out of the jaws of death. *Homer* the Prince of Greek Poets affirms that one Phyſitian is far more worthy than many other men. All Antiquity gave Phyſitians ſuch honour, that they worſhipped them with great veneration as Gods, or the ſons of their Gods. For who is it which is not much delighted with the divine force of healthful medicins, with which (we ſee by dayly experience) Phyſitians, as armed with *Mercuries* rod, do bring back thoſe languiſhing ſouls which are even entring the gates of death? Hence it cometh to paſſe that the divine Poets of ancient times, as *Orpheus*, and *Muſæus*, and *Heſiod*, and the moſt renowned Philoſophers, *Pythagoras*, *Plato*, *Ariſtotle*, *Theophraſtus*, *Chryſippus*, *Cato Cenſorius*, and *Varro*, eſteemed nothing more excellent than to excell in the knowledg of Medicins, and to teſtifie the ſame by written monuments to Poſterity. For what can be more noble and worthy of a generous diſpoſition than to attain to that by the benefit of Phyſick, that adorned with the ornaments of dignity thou mayeſt have power over other men, and favoured of Princes, Kings, and Emperours, mayeſt appoint and preſcribe to them thoſe things which are profitable to preſerve health, and cure their diſeaſes? But if you look for benefit by ſciences;

ences;then know that the professors hereof have beside sufficient gain,acquired much honour and many friends. *Hippocrates* coming to *Abdera* to cure *Democritus* of his madness, not only the men of the City,but also the women,children, and people of every age, sexe and rank, went forth to meet him, giving him with a common consent and loud voice the title of a *Tutelary* Deity and father of their Country. But the *Athenians*, for freeing their country from the plague,with triumphant pompe celebrated playes to his honour, and bountifully set upon his head as if he had been a King, a Crown of gold weighing a 1000. pieces of their golden coin,and erected his statue,for a perpetuall monument of his piety and learning. *Erasistratus* the Nephew of *Aristotle* by his daughter, received, freely given him by *Ptolomy* King of *Egypt*,for the cure of his son,100. Talents of Gold. The Emperour *Augustus* honoured *Antonius Musa* with a golden statue. *Quintus Stertinius* yearly received out of the Emperours Treasury 12000.500. pieces of gold. In the time of our Grandfathers *Petrus Aponensis* called *Conciliator* was so famous through all *Italy* for his knowledg in Physick, that he could scarse be intreated to come to any man of fashion that was sick,unless he gave him 50. crowns, for every day he was absent from home: but when hee went to cure *Honorius* the Bishop of *Rome*, he received 400. crowns for every day he was absent. Our *French* Chronicles relate in what credit & estimation *James Cotterius* the Physitian was with *Lewis* the 11. King of *France*; for they report he gave him monethly out of his Treasury 10000. crowns. Physick in times past hath been in such esteem with many famous and noble personages,that divers Kings and Princes delighted with the study thereof,and desirous to attain glory and credit thereby, called sundry herbs after their own names. For so *Gentian* took its name of *Gentius* King of *Illyria*; the herb *Lysimachia* of *Lysimachus*, the King of *Macedon*,the *Mithridatick* herb or *Scordium*, of *Mithridates* the King of *Pontus* & *Bithinia*, *Achilla* of *Achylles*,*Centorie* of *Chiron* the *Centaure*; *Artemisia* of *Artemisia* the Queen of *Caria*. *Attalus* King of *Pergamus*,*Salomon* of *Judea*, *Evax* of *Arabia*, and *Iuba* the King *Mauritania*,were not only inflamed with a desire of the knowledg of Plants; but either they have written books of it, or for the great commodity of posterity,invented by their skil many choise antidotes compounded of divers simples;neither the desire of learning this noble science is yet altogether extinct. As may appear by that *Indian* plant *Tobaco*,called by some the noble herb, *Catherines* herb and *Medices* herb,but commonly the Queens herb, because *Catherine Medices* the mother of our Kings,by her singular study and industry made manifest the excellent vertue it hath in curing malign ulcers and wounds, which before was unknown to the *French*. For these worthy men understood that their glory, thus

In what esteem Physitians have formerly been.

Names given to Plants.

thus faſtened and ingraffed into the deep, and as it were ever living roots of plants, would never decay; but ſhould be propagated to all poſterity in many ſucceeding ages, growing up with their ſprouting and budding ſhouts, ſtalks, flowers and fruits. Neither did theſe famous men whil'ſt they adorned this part of Phyſick ſuffer the other, which treats of the diſſection of mans body, be buried in oblivion, and without their knowledg; as inſtructed with the precepts and learning of the wiſeſt men, how artificiall and unimitable by mortall hand this fabrick of our body is. Neither is it probable that *Apis*, *Oſiris* and *Ptolomy* Kings of *Egypt*, *Solomon*, *Alexander* the great, *Mithridates*, *Attalus*, ſeeing they dedicated themſelves wholly to the contemplation of naturall things; neglected the uſe of Anatomy, and being men moſt deſirous to know themſelves, to have been ignorant of the ſtructure of their own bodies being the habitations of their ſouls immortal and made to the Image of God: ſeeing they obſerved with certain judgment the different lights of the Sun, Moon and Stars; and paſſed over ſo many lands, ſo many ſeas, ſo many regions, ſo far remote one from another, by wayes ſo terrible by reaſon of cold, uncouthneſs, darkneſs, by rocks, by fire and ſword, with great labour, charge and danger of life, only that they might ſatisfie their minds thurſting after the knowledg of things; and to have left untouched a thing truly noble, admirable, and moſt worthy of knowledg, eaſie to be attained by any and to be acquired without any danger of life, or fortunes.

Phyſick is divided into three parts.

Seeing there be three parts of that Phyſick which at this time we profeſſe, *Chirurgery* which by the uſe of the hand, *Diet* which with a convenient manner of feeding and ordering the body, and *Pharmacy* that by medicins attempt to expell diſeaſes, and preſerve health; The prime Phyſitians do not without reaſon contend w^ch^ of theſe may be accounted the chief. Certainly *Herophilus* had *Pharmacy* in ſuch eſteem, that he thought medicins were firſt mixed and adminiſtred to the ſick by *Apollo* (whom Antiquity thought a great Deity.) And *Pliny* had ſo good an opinion of Diet, that he exclaims; The true remedies and Antidotes againſt diſeaſes are put into the pot and eaten every day by the poor people. Verily all learned men confeſſe that the manner of curing which is performed by diet, is much more facile & proſperous, than that which is done by medicins; as thoſe things which ſought with much labor and coſt are taken with much loathing, and taken are ſcarce retained, but retained they oft work with much labour and pain: Which things long ago moved *Aſclepiades* to exclude the uſe of medicins, as hurtfull to the ſtomach. Yet if we will beleeve *Celſus*, neither of theſe parts merit the preheminence, but both of them give place to Chirurgery. For ſeeing that fortune is very powerfull in diſeaſes, and the ſame Meats and Medicins are often good and often vain, truly

truly it is hard to say, whether the health is recovered by the benefit of Diet and *Pharmacy*, or by the strength of the body. Moreover in those cases, in which we most prevail with medicins, although the profit be more manifest, yet it is evident that health is often sought in vain even by these things, and often recovered without them. As it may be perceived by some troubled with sore eyes, and others with Quartain feavers, who having been long troubled by Physitians are sometimes healed without them. But the effect of Chirurgery as it is very necessary, so it is the most evident amongst all the parts of physick. For who without Chirurgery can hope to cure broken, or luxated parts, who wounds and ulcers, who the falling of the matrix, the stone in the bladder, a member infested with a Gangrene or Sphacele? Besides, this part also is the most ancient; for *Podalirius* and *Machaon* following their Generall *Agamemnon* to the *Trojane* wars, yeelded no small comfort to their fellow Souldiers. Whom notwithstanding *Homer* affirms not to have given any help in the Pestilence, nor in divers other diseases, but only were accustomed to heal wounds by instruments and medicins.

The excellency of Chirurgery.

And if the difficulty of learning it argue the excellency of the Art, who can doubt but Chirurgery must be the most excellent, seeing that none ought to be accounted a Chirurgeon or which can perform his duty, without the knowledg of Diet and *Pharmacy*? But both the other can perform their parts without Chirurgery if we may beleeve *Galen*. But if we consider the matter more neerly according to truth; we shall understand those three parts have a certain common bond and are very near of kindred, so that the one implores the aid of the other; neither can the Physitian do any thing praise-worthy without the conspiracy and joint consent of these three; therefore in ancient times there was but one performer and user of all the three parts. But the multitude of men daily increasing, and on the contrary mans life decreasing, so that it did not seem able to suffice for to learn and exercise all the three, the workmen divided themselves. Wherefore that which happens to any man either by lot, or counsell, that let him follow, maintain and only use, as mindfull how short his life is, and how long the Art.

THE

A Table of the Books and Chapters.

IV. Of

L. Ox

The nineteenth Book. of the Lues venerea.

IX. How

XVIII. Of

A Table of the Books and Chapters.

Of Diſtillation, the ſeven and twentieth Book.

How to make reports, and to embalm the dead, the eight and twentieth Book.

The nine and twentieth Book, A Treatiſe containing divers voyages.

A Table of the Chapters of the three Tracts.

The ſecond Treatiſe concerning the Arteries.

The third Treatiſe concerning the Nerves.

AN

AN INTRODVCTION OR *COMPENDIOVS WAY* TO CHIRURGERY.

CHAP. I.

What Chirurgery is.

CHIRURGERY is an Art, which teacheth the way by reason, how by the operation of the hand we may cure, prevent, and mitigate diseases, which accidentally happen unto us. Others have thought good to describe it otherwise; as that, It is that part of Physick which undertaketh the cure of Diseases by the sole industry of the Hand: as, by cutting, burning, sawing off, uniting fractures, restoring dislocations, and performing other works, of which we shall hereafter treat. Chirurgery also is thus defined by the Author of the *Medicinall Definitions*; The quick motion of an intrepid hand joyned with experience; or, an artificiall action by the hand used in Physick, for some convenient intent. Yet none must think to attain to any great perfection in this Art, without the help of the other two parts of Physick; I say, of Diet and Pharmacie, and the divers applications of proper Medicines, respecting the condition of the Causes, Diseases, Symptomes, and the like circumstances, which comprehended under the names of things naturall, not naturall, and besides nature, (as they commonly call them) we intend to describe in their proper place. But if any reply, that there be many which do the works of Chirurgery, without any knowledg of such like things, who notwithstanding have cured desperate Diseases with happy success: Let them take this for an answer, That such things happen rather by chance, than by the industry of the Art; and that they are not provident that commit themselves to such. Because that for some one happy chance, a thousand dangerous errors happen afterwards, as *Galen* (in divers places of his Method) speaks against the Empericks. Wherefore seeing we have set down Chirurgery to be a diligent operation of the hands, strengthened by the assistance of Diet and Pharmacy, we will now shew what, and of what nature the operations of it are.

The definition of Chirurgery.

What necessary for a Chirurgeon.

CHAP. II.

Of Chirurgicall Operations.

FIve things are proper to the duty of a Chirurgeon; To take away that which is superfluous; to restore to their places such things as are displaced; to separate those things which are joyned together; to joyn those which are separated; and to supply the defects of nature. Thou shalt far more easily and happily attain to the knowledg of these things by long use and much exercise, than by much reading of Books, or daily hearing of Teachers. For speech, how perspicuous and elegant soever it be, cannot so vively express any thing, as that which is subjected to the faithfull eyes and hands.

The nature of a Chirurgeon.

Experience more necessary for a Chirurgeon, than Art.

Examples of taking away that which is superfluous.

We have examples of taking away that which abounds in the Amputation or cutting off a finger, if any have six on one hand, or any other monstrous member that may grow out: in the lopping off a putrefied part inwardly corrupted; in the extraction of a dead child, the secondine, mole, or such like bodies out of a womans womb: In taking down of all Tumors, as Wens, Warts, Polypus, Cancers, and fleshy excrescences of the like nature; in the pulling forth of bullets, of pieces of maile, of darts, arrows, shells, splinters, and of all kind of weapons in what part of the body soever they be. And he taketh away that which redounds, which plucks away the hairs of the ey-lids which trouble the ey by their turning in towards it: who cuts away the web, possessing all the * *Adneta*, and part of the * *Cornea*: who letteth forth suppurated matter: who taketh out stones in what part soever of the body they grow; who puls out a rotten or otherwise hurtfull tooth; or cuts a nail that runs into the flesh: who cuts away part of the *Uvula*, or hairs that grow on the ey-lids: who taketh off a Cataract; who cuts the navill or foreskin of a childe newly born; or the skinny caruncles of womens privities.

* Two tunicles of the eys.

Examples of replacing.

Examples of placing those things which are out of their naturall site, are manifest in restoring dislocated bones; in re-placing of the guts and kall fallen into the cods, or out of the navill or belly by a wound; or of the falling down of the womb, fundament, or great gut, or the eye hanging out of its circle, or proper place.

Example of separating things joined together.

But we may take examples of disjoyning those things which are continued; from the fingers growing together, either by some chance, as burning; or by the imbecillity of the forming faculty: by the disjunction of the membrane called *Hymen*, or any other trouling the neck of the womb; by dissection of the ligament of the tongue, which hinders children from sucking and speaking, and of that which hinders the *Glans* from being uncovered of the foreskin; by the division of a varicous vein, or of a half cut nerve or tendon, causing convulsion; by the division of the membrane stopping the auditory passage, the nose, mouth, or fundament, or the stubborn sticking together of the hairs of the ey-lids. Refer to this place all the works done by Caustick, the Saw, Trepan, Lancet, Cupping-glasses, Incision-knife, Leeches, either for evacuation, derivation, or revulsion sake.

Examples of uniting things disjoined.

The Chirurgeon draws together things separated, which healeth wounds by stitching them, by bolstering, binding, giving rest to, and fit placing the part: which repairs fractures; restoring luxated parts: who by binding the vessel, stayeth the violent effusion of blood: who cicatriceth cloven lips, commonly called Hare-lips: who reduceth to equality the cavities of Ulcers and Fistula's.

Examples of supplying defects.

But he repairs those things which are defective either from the infancy, or afterwards by accident, as much as Art and Nature will suffer; who sets on an ear, an ey, a nose, one or more teeth; who fils the hollowness of the palat eaten by the Pox, with a thin plate of gold or silver, or such like; who supplies the defect of the tongue in part cut off, by some new addition; who fastens to a hand, an arm, or leg with fit ligaments, workmanlike: who fits a doublet, bumbasted, or made with iron plates to make the body streight; who fils a shoo too big with cork, or fastens a stocking or sock to a lame mans girdle to help his gate. We will treat more fully of all these in our following Work. But in performing those things with the hands, we cannot but cause pain: (for who can without pain cut off an arm, or leg, divide and tear asunder the neck of the bladder, restore bones put out of their places, open Ulcers, bind up wounds, and apply cauteries, and do such like?) notwithstanding the matter often comes to that pass, that unless we use a judicious hand, we must either die, or lead the remnant of our lives in perpetuall misery. Who therefore can justly abhor a Chirurgeon for this, or accuse him of cruelty? or desire they may be served, as in ancient times the Romans served *Archagatus*, who at the first made him free of the City; but presently after, because he did somewhat too cruelly burn, cut, and perform the other works of a good Chirurgeon, they drew him from his house into the *Campus Martius*, and there stoned him to death, as we read it recorded by *Sextus Cheroneus*, *Plutarch*'s nephew by his Daughter. Truly it was an inhumane kind of ingratitude, so cruelly to murder a man intent to the works of so necessary an Art. But the Senate could not approve the act, wherefore to expiate the crime as well as then they could, they made his Statue in Gold, placed it in *Æsculapius* his Temple, and dedicated it to his perpetuall memory. For my part, I very well like that saying of *Celsus*: A Chirurgeon must have a strong, stable, and intrepid hand, and a mind resolute and mercilesse; so that to heal him he taketh in hand, he be not moved to make more haste than the thing requires; or to cut less than is needfull; but which doth all things as if he were nothing affected with their cries; not giving heed to the judgment of the vain common people, who speak ill of Chirurgeons because of their ignorance.

Archagatus the Chirurgeon.

In præfat. lib. 7.

The properties of a good Chirurgeon.

CHAP.

CHAP. III.

Of things Naturall.

That the Chirurgeon may rightly, and according to Art perform the foresaid works, he must set before his eys certain Indications of working: Otherwise he is like to become an Emperick, whom no Art, no certain reason, but only a blind temerity of fortune moves to boldness and action. These Indications of actions are drawn from things (as they call them) naturall, not naturall, and besides nature, and their adjuncts, as it is singularly delivered of the Ancients, being men of an excellent understanding. Wherefore we will prosecute according to that order, all the speculation of this Art of ours. First therefore things Naturall are so termed, because they constitute and contain the nature of mans body, which wholly depends of the mixture and temperament of the four first bodies, as it is shewed by *Hippocrates* in his book *de Natura humana*: wherefore the consideration thereof belongs to that part of Physick, which is named *Physiologia*; as the examination of things not naturall to *Dietetice*, or Diet, because by the use of such things it endevours to retain and keep health: but *Therapeutice*, or the part which cures the Diseases, and all the affects besides nature, challenges the contemplation of those things which are not agreeable to nature. But the things which are called Naturall, may be reduced to seven heads: besides which there comes into their fellowship, those which we term annexed.

From whence we must draw Indications.

What things are called naturall.

To what part of physick things not naturall pertain.

To what things besides nature.

The seven principall heads of things Naturall; are: *Elements*, *Temperaments*, *Humors*, *Parts or members*, *Faculties*, *Actions*, *Spirits*.

To these are annexed, and somewhat near; *Age*, *Sex*, *Colour*, *Compositure*, *Time or season*, *Region*, *Vocation of life*.

CHAP. IIII.

Of Elements.

What an Element is.

An Element (by the definition which is commonly received amongst Physitians) is the least and most simple portion of that thing which it composeth: or that my speech may be the more plain: the four first and simple bodies are called Elements; Fire, Air, Water, and Earth; which accommodate and subject themselves as matter to the promiscuous generation of all things which the Heavens engirt, whether you understand things perfectly, or unperfectly mixed. Such Elements are only to be conceived in your mind, being it is not granted to any externall sense to handle them in their pure and absolute nature. Which was the cause that *Hippocrates* expressed them not by the names of substances, but of proper qualities, saying, Hot, Cold, Moist, Dry; because some one of these qualities is inherent in every Element, as his proper and essentiall form, not only according to the excess of latitude, but also of the active faculty; to which is adjoined another simple quality, and by that reason principall, but which notwithstanding attains not to the highest degree of his kind, as you may understand by *Galen* in his first book of Elements. So, for example sake, in the Air we observe two qualities, Heat and Moisture, both principall, and not remitted by the commixture of any contrary quality, for otherwise they were not simple. Therefore thou maist say, What hinders that the principall effects of heat shew not themselves as well in the Air, as in the Fire? because, as we said before, although the Air have as great a heat according to his nature, extent, and degree, no otherwise than Fire hath, yet it is not so great in its active quality. The reason is, because that the calfactory force in the Air is hindered, and dulled by society of his companion and adjoyned quality, that is, Humidity which abateth the force of heat, as on the contrary, driness quickneth it. The Elements therefore are endewed with these qualities.

Elements are understood by reason, not by sense.

Why *Hipp.* expressed the Elements by these names of qualities.

Two principal qualities are in each Element.

Why the Air heats not so vehemently, as the Fire.

Names of the substances: *Fire*, *Air*, *Water*, *Earth* — is — *Hot and dry*, *Moist and hot*, *Cold and moist*, *Cold and dry*. — Names of the qualities.

These four Elements in the composition of naturall bodies, retain the qualities they formerly had, but that by their mixture and meeting together of contraries, they are somewhat tempered and abated. But the Elements are so mutually mixed one with another, and all with all, that no simple part may be found; no more than in a mass of the Emplaister *Diacalcitheos* you can shew any *Axungia* oil, or Litharge by it self; all things are so confused and

How the Elements may be understood to be mixed in compound bodies.

and united by the power of heat, mixing the ſmalleſt particulars with the ſmalleſt, and the whole with the whole, in all parts. You may know and perceive this concretion of the four Elementary ſubſtances in one compound body, by the power of mixture, in their diſſolution by burning a pile or heap of green wood: For the flame expreſſes the Fire; the ſmoke, the Air; the moiſture that ſweats out at the ends, the Water; and the aſhes, the Earth: You may eaſily perceive by this example ſo familiar and obvious to the ſenſes, what diſſolution is, which is ſucceeded by the decay of the compound body; on the contrary, you may know that the coagmentation, or uniting and joyning into one of the firſt mixed bodies is ſuch, that there is no part ſincere or without mixture. For if the heat which is predominant in the fire, ſhould remain in the mixture in its perfect vigor, it would conſume the reſt by its pernicious neighborhood; the like may be ſaid of Coldneſs, Moiſture, and Drineſs; although of theſe qualities, two have the title of Active, that is, Heat and Coldneſs, becauſe they are the more powerfull; the other two Paſſive, becauſe they may ſeem more dull and ſlow, being compared to the former. The temperaments of all ſublunary bodies ariſe from the commixture of theſe ſubſtances and elementary qualities, which hath been the principall cauſe that moved me to treat of the Elements. But I leave the force and effects of the Elementary qualities to ſome higher contemplation, content to have noted this, that of theſe firſt qualities, (ſo called, becauſe they are primarily and naturally in the four firſt bodies) others ariſe and proceed, which are therefore called the ſecond qualities: as of many, theſe, Heavineſs, Lightneſs, variouſly diſtributed by the four Elements, as the Heat or Coldneſs, Moiſtneſs or Drineſs have more power over them. For of the Elements, two are called light, becauſe they naturally affect to move upwards: the other two heavie, by reaſon they are carryed downward by their own weight. So we think the fire the lighteſt, becauſe it holds the higheſt place of this lower world; the Air, which is next to it in ſite, we account light; for the water which lies next to the Air, we judg heavie; and the earth the center of the reſt we judg to be the heavieſt of them all. Hereupon it is, that light bodies, and the light parts in bodies, have moſt of the lighter Elements; as on the contrary heavie bodies have more of the heavier. This is a brief deſcription of the Elements of this frail world, which are only to be diſcerned by the underſtanding, to which I think good to adjoin another deſcription of other Elements, as it were ariſing or flowing from the commixture of the firſt: For beſides theſe, there are ſaid to be Elements of generation, and Elements of mans body. Which as they are more corporall, ſo alſo are they more manifeſt to the ſenſe. By which reaſon *Hippocrates* being moved, in his Book *de Natura humana*, after he had deſcribed the nature of Hot, Cold, Moiſt, and Dry, he comes to take notice of theſe by the order of compoſition. Wherefore the Elements of our generation, as alſo of all creatures which have blood, are ſeed and menſtruous blood. But the Elements of our bodies, are the ſolid and ſimilar parts ariſing from thoſe Elements of generation. Of this kind are bones, membranes, ligaments, veins, arteries, and many others manifeſt to the eys, which we will deſcribe at large in our Treatiſe of Anatomie.

Why of the firſt qualities, two are active, and two paſſive.

Why the firſt qualities are ſo called.

What the ſecond qualities are.

What Elements light, what heavy.

What the Elements of generation are.

What the Elements of mixt bodies.

CHAP. V.

of Temperaments.

What a Temperament is.

AS Temperament is defined, a proportionable mixture of hot, cold, moiſt, and dry; or, it is a concord of the firſt diſagreeing faculties. That harmony ſprings from the mixture of the four firſt bodies of the world. This whether Temperament or Concord is given to Plants and brute Beaſts for the beginning of their life, and ſo conſequently for their life and form. But as Plants are inferior in order and dignity to beaſts, ſo their † life is more baſe and infirm, for they have only a growing faculty, by which they may draw an Alimentary juice from the earth, as from their mothers breaſts, to preſerve them and their life, by which they may grow to a certain bigneſs; and laſtly, by which they may bring forth their like for the perpetuall continuance of their kind. But the * life of beaſts, have to the three former, the gift of ſenſe annexed: by benefit whereof, as by a certain inward knowledg they ſhun thoſe things that are hurtfull, and follow thoſe which profit them; and by the power of their will, they move themſelves whither they pleaſe. But the ſoul of man far more perfect and noble than the reſt, ariſeth not from that earthly mixture and temper of the Elements, but acknowledgeth and hath a far more divine off-ſpring; as we ſhall teach hereafter.

† *Anima.* What the life performs in Plants.

* *Anima.* What in beaſts. Mans ſoule comes from above.

They divide a Temperament at the firſt diviſion, into two kinds; as one a temperate, another an untemperate. The untemperate is of two ſorts: The one wholly vicious, which hath altogether exceeded the bounds of mediocrity: The other, which hath ſomewhat ſtrayed from the mediocrity of temper, but notwithſtanding is yet contained within the limits of health: as that which brings no ſuch evident harm to the actions, but that it ſomewhat hinders them, ſo that they cannot ſo well and perfectly perform their duties. But the vicious Temperament doth three manner of wayes corrupt the functions, either by weak-

The manifold diviſion of a Temperament.

A Temperament, *ad Pondus.*

weakning, depraving, or aboliſhing them. For ſo ſtupor, or aſtoniſhment, diminiſheth and ſloweth the quickneſs of motion; convulſion depraves it; the Palſie aboliſheth it, and taketh it away. The temperate Temperament is alſo divided into two kinds; which is either to equality of weight or juſtice. It is called a Temperature to weight which ariſeth from the equall force of exactly concurring qualities, and as placed in a perfect ballance, draws down neither to this nor that part. They think the example of this Temperament to appear in the inner skin of the fingers ends of a man tempered to Juſtice. For ſeeing the moſt exquiſite touch reſides there, they ought to be free from all exceſs of contrariety; for otherwiſe being corrupted by too much heat or cold, moiſture or drineſs, they could give no certain judgment of the tangible qualities. For which thing nature hath excellently provided in the fabrick and coagmentation of the parts, of which the skin conſiſts. For it is compoſed of hot and moiſt fleſh, and therefore ſoft, and of a tendon and nerve cold and dry, and therefore hard; which are not only equally fitted and conjoyned, but wholly confuſed and mixed together, by which it comes, that removed from all extremes of oppoſition, it is placed in the midſt, as a rule to judg of all the exceſſes that happen to the touch. So it was fit the eye, which was to be the inſtrument of ſight, ſhould be tinctured with no certain colour, that it might be the leſs deceived in the judgment of colours. So it was convenient the hearing ſhould not be troubled with any diſtinct ſound, whereby it might more certainly judg of equall and unequall ſounds, not diſtinguiſhed by a ratable proportion; neither was it fit the tongue ſhould have any certain taſte, leſt the acceſs of that taſte ſhould deceive it in knowing and judging of ſo many different taſtes. The Temperature tempered to juſtice, is that, which although it is a little abſent from the exact and ſevere parility of mixed qualities, yet hath that equality which doth fully and abundantly ſuffice for to perform all the functions fitly and perfectly, which nature doth require, wherefore we can judg no otherwiſe of it than by the integrity of the Actions. For hence it took its name; for as diſtributive Juſtice equally gives to every one rewards, or puniſhment according to their deſerts; ſo Nature, having regard to all the parts of the body, gives them all that temper which may ſuffice to perform thoſe duties, for which they are ordained. Let us for an example conſider a Bone; no man doubts, but that, like as the other ſimilar parts of the body, proceeds from the mixture of the four Elements: but nevertheleſs nature weighing the uſe of it, and ordaining it to ſupport the reſt of the body, would have more of the terrene and dry Element infuſed into it, that it might be the ſtronger and firmer to ſuſtain weight. But a Ligament, ſeeing it was made for other uſes, hath leſs of that earthly drineſs than the bone, but more than the fleſh, altogether fitted to its nature. So it hath ſeemed good to nature to endue all the parts of the body, not only with an equall portion, but alſo proportion of Elements and qualities; we call that a Temperament to juſtice: and we ſay, that it is in Plants, brute Beaſts, and all naturall bodies, which enjoy that temper and mediocrity, which may be agreeable to their nature. Hereupon by compariſon ariſe eight kinds of intemperate tempers: As

Ad pondus, vel ad juſtitiam.

A Temperament ad juſtitiam.

The temperament of a bone.

The kindes of untemperate tempers.

Four ſimple { *Hot* / *Cold* } temperate in { *Drineſſe* and *Moiſture.* }
Four ſimple { *Moiſt* / *Dry* } temperate in { *Heat* and *Cold.* }

Four compounds { *Hot* and *Moiſt*; *Hot* and *Dry*; *Cold* and *Moiſt*; *Cold* and *Dry.* }

But theſe Temperaments are either of the whole Body, or of ſome part thereof;

And that either { Principal, as { the *Brain*, the *Heart*, the *Liver*, the *Stones.* Or } Of the reſt of the parts compoſed of other which have no principality in the body. }

Again, ſuch Temperaments are either healthfull, which ſuffice perfectly to perform their actions; or unhealthfull, which manifeſtly hurt them, the ſignes whereof may be read deſcribed by *Galen.* And you muſt obſerve that when we ſay the body, or any part of it is hot, we underſtand more hot than is fit for one of that kinde which is tempered to juſtice; as when we ſay a man hath a hot liver, we mean his liver is hotter, than a man juſtly tempered ſhould have; for all other tempers, whether of the whole body, or any of the parts thereof, are to be referred to this; and in the cure of diſeaſes we muſt look upon it, as the mark, and labour to preſerve it by the uſe of convenient things, as much as lies in our power. Wherefore, becauſe it is very neceſſary to know the diſtinction of Temperaments, I have

Lib. 2. de Temper. & in Art. medica.

thought good in this place, briefly to handle the Temperaments of the parts of the body, ages, ſeaſons of the year, humors, and medicines. Therefore the temperaments of the parts of our body are of this nature, not only by the judgment of the touch of a mans hand, which is juſtly tempered, (who is often deceived by flowing heat, which ſpread from the heart into all the body, imparts a certain kind of heat to all the parts) but alſo by the rule of their reaſon, compoſure and ſubſtance, as

What the temperaments of mans body are.

A Bone is the moſt dry and cold.

A Griſle leſs than it.

A Ligament leſs than a Griſle.

A Tendon is ſo much dryer and colder than the membrane, by how much it in the ſame temper exceeds a Vein and Artery. Then follow the harder Veins, for the ſofter are in a middle temper of dryneſs and moiſture, like as the skin; although all, both ſoft and hard, are of a cold temper. Wherefore all theſe parts of their own nature are cold and without blood: although the Veins and Arteries wax hot, by reaſon of the heat of the blood they contain, which notwithſtanding alſo borroweth that heat from the heart, as a part moſt hot, and ſofter than the skin; the liver next followeth the heart, in the order of the hotter parts, which is far ſofter than the skin it ſelf: for if, according to *Galens* opinion, the heart is ſomewhat leſs hard than the skin, and that is far harder than the liver, as appears by touching them, it muſt neceſſarily follow that the liver much exceeds the skin in ſoftneſs; I underſtand the skin ſimple, and ſeparated from the fleſh lying under it, to which it firmly cleaves. The fleſh is more moiſt and hot than the skin, by reaſon of the blood diſperſed in it. The ſpinall marrow is colder and moiſter than the skin; but the brain ſo much exceeds it in moiſture, as it is exceeded by the fat. The lungs are not ſo moiſt as the fat; and the ſpleen, and kidneys are of the like nature, and nevertheleſs they are all moiſter than the skin.

Ad finem, lib. de temper.

The temperaments of ages.

According to the diverſities of ages, the temperaments both of the whole body, and all its parts, undergo great mutations; for the bones are far harder in old men than in children, becauſe our life is, as it were, a certain progreſs to dryneſs; which when it comes to the height, conſequently cauſeth death. Wherefore in this place we muſt ſpeak of the Temperaments of ages, when firſt we ſhall have defined what an age is. Therefore an age is defined, A ſpace of life in which the conſtitution of the body of its ſelf and own accord, undergoeth manifeſt changes. The whole courſe of life hath four ſuch Ages. The firſt is Childhood, which extends from the birth to the eighteenth year of age, and hath a hot and moiſt temper, becauſe it is next to the hot and moiſt beginnings of life, ſeed, and blood. Youth followeth this, which is prolonged from the eighteenth to the twenty fifth year, and is temperate, and in the midſt of all exceſſes. Mans eſtate ſucceedeth youth, which they deny to extend beyond the thirty fifth year of age, in its proper temper it is hot and dry; whereby it cometh to paſs that then the heat is felt more acride and biting, which in childhood ſeemed milde; becauſe the progreſs of the life to dryneſs, hath much waſted the native humidity.

What an age is.

Old-age divided into two parts.

Then ſucceeds Old-age, ever divided into two parts; the firſt whereof extends from the thirty fifth, to the forty ninth year; thoſe of this age are called Old-men, (**but we commonly call them middle-ag'd men.*) The latter is, as it were, divided by *Galen* into three degrees; the firſt whereof are thoſe, who having their ſtrength ſound and firm, undergo civil affairs and buſineſſes: which things thoſe which are in the ſecond degree of Old-age cannot do, becauſe of the debility of their now decaying ſtrength: but thoſe which are in the laſt degree, are afflicted with moſt extreme weakneſs and miſery, and are as much deprived of their ſenſes and underſtanding, as of the ſtrength of their bodies; whereof aroſe this Proverb, *Old men, twice children.* Thoſe Old men of the firſt rank are pleaſant and curteous; and thoſe we ſay, are beginning to grow Old, or in their green Old-age; thoſe of the ſecond ſort delight in nothing but the boord and bed; but old decrepit men of the laſt order, think of nothing elſe, than their graves and monuments. Their firm and ſolid parts are of a cold and dry temperature, by reaſon of the decay of the radicall moiſture, which the inbred heat cauſeth in the continuance of ſo many years. Which thing may happen in a ſhort ſpace, by the vehement flame of the ſame naturall heat, turned by fevers into a fiery heat. But if any to prove Old men moiſt, will object, That they cough up, and ſpit much, I will anſwer him, as an old Doctor once ſaid; That a pitcher filled with water, may pour forth much moiſture; yet no man will deny but that ſuch a veſſel of its own terrene nature and matter is moſt dry; ſo old men may plainly be affirmed to be moiſt, by reaſon of their defect of heat, and abundance of excrements. But this deſcription of ages is not to be taken ſo ſtrictly as alwayes to be meaſured by the ſpaces and diſtances of years, for there are many which by their own miſdemeanor ſeem elder at forty, than others do at fifty.

* Three degrees of the ſecond part of Old-age.

Old men have their ſolid parts dry.

A compariſon of the four ages to the four ſeaſons of the year

Laſtly, the famous Philoſopher *Pythagoras* divided mans life into four ages, and by a certain proportion compared the whole courſe thereof to the four ſeaſons of the year; as Childhood to the Spring, in which all things grow and ſprout out, by reaſon of plenty and abundance of moiſture. And Youth to the Summer, becauſe of the vigor and ſtrength which men enjoy at that age. And mans eſtate, or conſtant age, to Autumn; for that then after

after all the dangers of the fore-paſſed life, the gifts of diſcretion and wit acquire a ſeaſonableneſs or ripeneſs, like as the fruits of the earth enjoy at that ſeaſon. And laſtly, he compares Old-age to the ſterile and fruitleſs Winter, which can eaſe and conſolate its tediouſneſs by no other means, than the uſe of fruits gathered and ſtored up before, which then are of a cold and troubleſome condition. But for extreme Old-age, which extends to eighty or a hundred years, it is ſo cold and dry, that thoſe which arrive at that decrepit age are troubleſome, harſh, touchy, froward, crabby, and often complaining, untill at the length deprived of all their ſenſes, tongue, feet, and underſtanding, they doting, return again to childiſhneſs, as from the ſtaff to the ſtart. And thus much of the Temperaments of ages.

The tempers of the ſeaſons of the year.

But now in like manner we will explain the Temperatures of the ſeaſons of the year, which are four; the Spring, Summer, Autumn, Winter. The Spring continues almoſt from the twelfth or thirteenth day of March to the midſt of May; *Hippocrates* ſeemeth to make it hot and moiſt; which opinion ſeemeth not to have ſprung from the thing it ſelf, but from an inveterate error of the ancient Philoſophers, who would fit the Temperaments of the four ſeaſons of the year, as anſwering in proportion to the temperatures of the four ages. For if the matter come to a juſt tryall, all men will ſay, the Spring is temperate, as that which is in the midſt of the exceſs of heat, cold, moiſture and drineſs; not only by compariſon, becauſe it is hotter than Summer, and colder than Winter; but becauſe it hath that quality of its own proper nature. Wherefore it is ſaid of *Hippocrates*, The Spring is moſt holeſome, and leaſt deadly; if ſo be that it keep its native temper, from which if it decline, or ſucceed a former untemperate ſeaſon, as Autumn or Winter, it will give occaſion to many diſeaſes deſcribed by *Hippocrates*; not that it breeds them, but becauſe it brings them to light, which before lay hid in the body. Summer is comprehended in the ſpace of almoſt four months; it is of a hot and dry temper, a breeder of ſuch diſeaſes as proceed from choler, becauſe that humor at this time is heaped up in many bodies by aduſtion of blood bred in the Spring; but all ſuch diſeaſes do ſpeedily run their courſe. The beginning of Autumn, is from the time the Sun enters into Libra, and endures the like ſpace of time as the Spring. But when it is dry, it hath great inequality of heat and cold, for the mornings and evenings being very cold, the noondays on the contrary are exceeding hot. Wherefore many diſeaſes are in Autumn, and then long and deadly, eſpecially if they incline towards Winter; becauſe all daily and ſodain changes to heat and cold are dangerous. The Winter poſſeſſes the remnant of the year, and is cold and moiſt, it increaſes naturall heat, ſtirs up the appetite, and augments Phlegme. It encreaſes heat by *Antiperiſtaſis*, or contrariety of the encompaſſing air, which being then cold, prohibits the breathing out of heat: whereby it happens that the heat being driven in and hindered from diſſipation, is ſtrengthened by co-uniting its forces. But it augments Phlegme, for that men are more greedy, the Appetite being encreaſed by the ſtrengthened heat: from whence proceeds much crudity, and a large ſtore of diſeaſes, eſpecially Chronick or Long, which ſpread and encreaſe rather in this winter-ſeaſon than in any other part of the year. To this diſcourſe of the temper of the ſeaſons of the years, is to be revoked the variety of tempers which happens every day, which certainly is not to be neglected, that there may be place of election, eſpecially if nothing urge. For hither belongs that ſaying of *Hippocrates*; When in the ſame day it is one while hot, another cold, Autumnall diſeaſes are to be expected. Therefore an Indication taken from hence is of great conſequence to the judgment of diſeaſes; for if it agree with the diſeaſe, the diſeaſe is made more contumacious, and difficult to cure. Whereupon the Patient and Phyſitian will have much trouble; but if on the contrary it reclaim and diſſent, the health of the Patient is ſooner to be expected. Neither is it a thing of leſs conſequence to know the cuſtoms and habits of the places and Countreys in which we live; as alſo the inclination of the Heavens, and temperature of the Air; but let us leave theſe things to be conſidered by Naturall Philoſophers, that we may deliver our judgment of the temperaments of *Humors*. Blood, as that which anſwers to the Air in proportion, is of a hot and moiſt nature, or rather temperate, as *Galen* teſtifies; for, ſaith he, it is certain and ſure, that the Blood is neither hot nor moiſt, but temperate, as in its firſt compoſure none of the four firſt Qualities exceeds other by any manifeſt exceſs, as he repeats it upon the 39th Sentence. Phlegm, as that which is of a wateriſh nature, is cold and moiſt; no otherwiſe than Choler being of a fiery temper, is hot and dry. But Melancholy aſſimilated to earth, is cold and dry. This which we have ſpoken in generall of Phlegm and Melancholy, is not always true in every kind of the ſaid Humors. For ſalt Phlegm is of a hot and dry temperature; as alſo all kinds of Melancholy which have aroſe or ſprung by aduſtion from the native and alimentary, as we will teach in the following Chapter. Now the temperaments of Medicines have not the ſame form of judgment, as thoſe things which we have before ſpoken of; as, not from the Elementary quality, which conquering in the contention and mixture, obtains the dominion; but plainly from the effects, which taken or applyed, they imprint in a temperate body. For ſo we pronounce thoſe things, hot, cold, moiſt, or dry, which produce the effects of Heat, Coldneſs, Moiſture, or Dryneſs. But we will defer the larger explication of theſe things to that place, where we have peculiarly appointed

How the ſpring is temperate.

Aphor. 9 ſect. 3.

Aphor. 20. ſect. 3.

Autumn unequall.

How Winter encreaſes the native heat.

Aphor. 4 ſect. 3.

The temperaments of Humors.

Lib. de natura humana, ad ſent. 36. Sect. 1.

The temperature of the Blood.

From whence we judg of the temperature of Medicines.

appointed to treat of Medicines; where we will not ſimply enquire whether they be hot or cold, but what degree of heat and cold, or the like other quality: in which ſame place we will touch the temperature and all the nature of taſtes, becauſe the certaineſt judgment of Medicines is drawn from their taſtes. Hitherto of Temperaments; now we muſt ſpeak of Humors, whoſe uſe in Phyſicall ſpeculation is no leſs than that of Temperaments.

CHAP. VI.

Of Humors.

The knowledg of the Humor is neceſſary. Lib. *De natura Humana.*

TO know the nature of *Humors*, is a thing not only neceſſary for Phyſitians, but alſo for Chirurgeons, becauſe there is no diſeaſe with matter which ariſeth not from ſome one, or the mixture of more *Humors*. Which thing *Hippocrates* underſtanding, writ, every Creature to be either ſick or well according to the condition of the *Humors* in the body. And certainly all putrid feavers proceed from the putrefaction of *Humors*. Neither do any acknowledg any other originall or diſtinction of the differences of Abſceſſes or Tumors: neither do ulcerated, broken, or otherwiſe wounded members hope for the reſtauration of continuity, from other than from the ſweet falling down of Humors to the wounded part. Which is the cauſe that often in the cure of theſe affects, the Phyſitians are neceſſarily buſied in tempering the Blood, that is, bringing to a mediocrity the four Humors compoſing the maſs of blood, if they at any time offend in quantity, or quality. For whether if any thing abound or digreſs from the wonted temper in any exceſs of heat, cold, viſcoſity, groſneſs, thinneſs, or any ſuch like quality, none of the accuſtomed functions will be well performed. For which cauſe thoſe chief helps to preſerve and reſtore health have been divinely invented: *Phlebotomie*, or blood-letting, which amends the quantity of too much blood; and Purging, which corrects and draws away the vicious quality. But now let us begin to ſpeak of the Humors, taking our beginning from the definition.

The helps of Health.

What an Humor is.

An Humor (is called by Phyſitians) what thing ſo ever is liquid and flowing in the body of living Creatures endued with Blood, and that is either naturall, or againſt nature. The naturall is ſo called becauſe it is fit to defend, preſerve and ſuſtain the life of a Creature. Quite different is the nature and reaſon of that which is againſt nature. Again, the former is either Alimentary or Excrementitious: The Alimentary which is fit to nouriſh the body, is that Humor which is contained in the veins and arteries of a man which is temperate and perfectly well; and which is underſtood by the generall name of Blood, which is let out at the opening of a vein. For Blood otherwiſe taken, is an Humor of a certain kind, diſtinguiſhed by heat and warmneſs from the other Humors comprehended together with it, in the whole maſs of the blood. Which thing, that it may the better be underſtood, I have thought good in this place to declare the generation of Blood by the efficient and materiall cauſes. All things which we eat or drink, are the materials of Blood; which things drawn into the bottom of the Ventricle by its attractive force, and there detained, are turned by the force of concoction implanted in it, into a ſubſtance like to Almond-butter. Which thing, although it appear one and like it ſelf, yet it conſiſts of parts of a different nature, which not only the variety of meats, but one and the ſame meats yeelds of it ſelf. We term this *Chylus*, (when it is perfectly concocted in the ſtomach.) But the * Gate-vein receives it driven from thence into the ſmall Guts, and ſucked in by the Meſeraick-veins, and now having gotten a little rudiment of change in the way, carries it to the Liver, where by the Blood-making faculty, which is proper and naturall to this part, it acquires the abſolute and perfect form of Blood. But with that Blood, at one and the ſame time and action all the Humors are made, whether alimentary or excrementitious. Therefore the Blood, that it may perform its office, that is, the faculty of nutrition, muſt neceſſarily be purged and cleanſed from the two excrementitious Humors: of which the bladder of Gall draws one, which we call yellow Choler; and the Spleen the other, which we term Melancholy. Theſe two Humors are naturall, but not alimentary or nouriſhing, but of another uſe in the body, as afterwards we will ſhew more at large. The Blood freed from theſe two kinds of Excrements, is ſent by the veins and arteries into all parts of the body for their nouriſhment. Which although then it ſeem to be of one ſimple nature, yet notwithſtanding it is truly ſuch, that four different and unlike ſubſtances may be obſerved in it, as, Blood, properly ſo named, Phlegm, Choler, and Melancholy, not only diſtinct in colour, but alſo in taſte, effects, and qualities. For, as *Galen* notes in his book *de Natura humana*, Melancholy is acide or ſour, Choler bitter, Blood ſweet, Phlegm unſavory. But you may know the variety of their effects, both by the different temper of the nouriſhed parts, as alſo by the various condition of the diſeaſes ſpringing from thence. For therefore ſuch ſubſtances ought to be tempered and mixed amongſt themſelves in a certain proportion, which remaining, health remains; but violated, diſeaſes follow. For all acknowledg, that an *Oedema* is cauſed by Phlegmatick; a *Scirrhus*, by Melancholick; an *Eryſipelas*, by Cholerick; and a *Phlegmone*, by

The manifold diviſion of Humors.

The materiall and efficient cauſes of Blood

What the *Chylus* is.

* *Vena porta.*

Where the Blood is perfected.

The receptacles of Choler and Melancholy.

Four unlike Humors in the Blood.

pure

pure and laudable blood. *Galen* teaches by a familiar example of new wine presently taken from the Press, that these 4 substances are contained in that one mass, and mixture of the blood. In which every one observes 4 distinct Essences; for the flower of the wine working up, swims at the top, the dregs fall down to the bottom, but the crude and watery moisture, mixed together with the sweet and vinous liquor, is every where diffused through the body of the wine: the flower of the wine, represents Choler, which bubbling up on the superficies of blood, as it concretes and grows cold, shineth with a golden colour; the dregs, Melancholy, which by reason of its heavinesse ever sinketh downward, as it were, the mud of the blood; the crude and watery portion, Phlegm; for as that crude humor, except it be rebellious in quantity, or stubborn by its quality, there is hope it may be changed into wine, by the naturall heat of the wine; so Phlegm, which is blood half concocted, may by the force of native heat be changed into good and laudable blood. Which is the cause that nature decreed or ordained no peculiar place as to the other 2 Humors, whereby it might be severed from the blood: But the true and perfect liquor of the wine represents the pure blood, which is the more laudable and perfect portion of both the humors of the confused mass. It may easily appear by the following scheme, of what kind they all are, and also what the distinction of these four Humors may be.

A comparison of blood and new wine.

Phlegm is Blood half concocted. Why it hath no proper receptacle.

	NATURE.	CONSISTENCE.	COLOUR.	TASTE.	USE.
Blood is	*Of Nature aery, hot, and moist, or rather temperate.*	*Of indifferent consistence, neither too thick nor too thin.*	*Of Colour red, rosie, or crimson.*	*Of Taste sweet.*	*Of such use, that it chiefly serves for the nourishment of the fleshy parts, and carryed by the vessels, imparts heat to the whole body.*
Phlegm is	*Of Nature watery, cold and moist.*	*Of Consistence, liquid.*	*Of Colour, white.*	*Of Taste, sweet, or rather unsavory, for we commend that water which is unsavory.*	*Fit to nourish the brain, and all the other cold and moist parts, to temper the heat of the blood, and by its slipperinesse to help the motion of the joynts.*
Choler is	*Of Nature fiery, hot and dry.*	*Of Consistence, thin.*	*Of Colour yellow, or pale.*	*Of Taste, bitter.*	*It provoketh the expulsive faculty of the guts, attenuates the Phlegm cleaving to them, but the Alimentary is fit to nourish the parts of like temper with it.*
Melancholy is	*Of Nature earthly, cold, and dry.*	*Of Consistence, grosse and muddy.*	*Of Colour, blackish.*	*Of Taste, acide, sour or biting.*	*Stirs up the Appetite, nourishes the Spleen, and all the parts of like temper to it, as the bones.*

Blood hath its neerest matter from the better portion of the *Chylus*: and being begun to be laboured in the veins, at length gets form and perfection in the Liver; but it hath its remote matter from meats of good digestion and quality, seasonably eaten after moderate exercise; but for that, one age is better than another, and one time of the year more convenient than another. For blood is made more copiously in the Spring, because that season of the year comes neerest to the temper of the blood, by reason of which the blood is rather to be thought temperate, than hot and moist; for that *Galen* makes the Spring temperate; and besides, at that time blood-letting is performed with the best success: Youth is an age very fit for the generation of blood; or by *Galens* opinion, rather that part of life that continues from the 25, to the 35 year of our age. Those in whom this Humor hath the dominion, are beautified with a fresh and rosie colour, gentle, and wel-natured, pleasant, merry, and facetious. The generation of Phlegm, is not by the imbecillity of heat, as some of the Ancients thought; who were perswaded that Choler was caused by a raging, Blood by a moderate, and Phlegm and Melancholy by a remiss heat. But that opinion is full of manifest error: for if it be true that the *Chylus* is laboured and made into blood in the same part, and by the same fire, that is, the Liver; from whence in the same moment of time should proceed that strong and weak heat, seeing the whole mass of the blood different in its four essentiall parts, is perfected and made at the same time, and by the same equall temper of the same part, action, and blood-making faculty; therefore from whence have

Lib. 1. de temp.

One and the same heat is the efficient cause of all humors at the same time.

have we this variety of Humors? From hence, for that those meats by which we are nourished, enjoy the like condition that our bodies do, from the four Elements, and the four first Qualities: for it is certain, and we may often observe, in what kind soever they be united or joined together, they retain a certain hot portion imitating the fire; another cold, the water; another dry, the earth; and lastly, another moist like to the air. Neither can you name any kind of nourishment, how cold soever it be, not Lettuce it self, in which there is not some fiery force of heat. Therefore it is no marvail, if one and the same heat working upon the same matter of *Chylus*, varying with so great dissimilitude of substances, do by its power produce so unlike humors, as from the hot, Choler; from the cold, Phlegm; and of the others, such as their affinity of temper will permit.

The heat of the Sun alone doth melt wax and harden clay.

There is no cause that any one should think that variety of humors to be caused in us, rather by the diversity of the active heat, than wax and a flint placed at the same time, and in the same situation of climat and soil, this to melt by the heat of the Sun, and that scarce to wax warm. Therefore that diversity of effects is not to be attributed to the force of the efficient-cause, that is of heat, which is one, and of one kinde in all of us; but rather to the materiall cause, seeing it is composed of the conflux, or meeting together of various substances, gives the heat leave to work, as it were out of its store, which may make and produce from the hotter part therof Choler, and of the colder and more rebellious Phlegm. Yet I will not deny, but that more Phlegm, or Choler may be bred in one and the same body, according to the quicker, or slower provocation of the heat; yet nevertheless it is not consequent, that the originall of Choler should be from a more acide, and of Phlegm from a more dull heat in the same man. Every one of us naturally have a simple heat, and of one kind, which is the worker of divers operations, not of it self, seeing it is always the same, and like it self, but by the different fitness, pliableness, or resistance of the matter on which it works. Wherefore Phlegm is generated in the same moment of time, in the fire of the same part, by the efficiency of the same heat, with the rest of the blood, of the more cold, liquid, crude, and watery portion of the *Chylus*. Whereby it comes to pass, that it shews an express figure of a certain rude or unperfect blood, for which occasion nature hath made it no peculiar receptacle, but would have it to run friendly with the blood in the same passages of the veins, that any necessity hapning by famin, or indigency, and in defect of better nourishment, it may by a perfecter elaboration quickly assume the form of blood. Cold and rude nourishment make this humor to abound principally in winter, & in those which incline to old-age, by reason of the similitude which Phlegm hath with that season and age. It makes a man drowsie, dul, fat, and swollen up, and hasteneth gray-hairs. Choler is as it were, a certain heat and fury of humors, which generated in the Liver, together with the blood is carried by the veins and arteries through the whole body. That of it which abounds, is sent, partly into the guts, and partly into the bladder of the gall, or is consumed by transpiration, or sweats; It is somewhat probable that the Arteriall blood is made more thin, hot, quick, and pallid, than the blood of the Veins, by the commixture of this Alimentary Choler. This Humor is chiefly bred and expel'd in youth, and acrid and bitter meats give matter to it: but great labours of body and mind give the occasion. It maketh a man nimble, quick, ready for all performance, lean, and quick to anger, and also to concoct meats. The melancholick humor, or Melancholy, being the grosser portion of the blood, is partly sent from the Liver to the Spleen to nourish it, and partly carried by the vessels into the rest of the body, and spent in the nourishment of the parts endued with an earthly drineſs; it is made of meats of gross juice, and by the perturbations of the mind, turned to fear and sadness. It is augmented in Autumn, and in the first and crude Old-age; it makes men sad, harsh, constant, froward, envious and fearfull. All men ought to think, that such Humors are wont to move at set hours of the day, as by a certain peculiar motion or tide, Therefore the blood flows from the ninth hour of the night, to the third hour of the day; then Choler to the ninth of the day; then Melancholy to the third of the night; the rest of the night that remains, is under the dominion of Phlegm. Manifest examples hereof appears in the French-Pox. From the elaborat and absolute mass of the blood, (as we said before) two kinds of Humors, as excrements of the second concoction, are commonly and naturally separated, the one more gross, the other more thin. This is called either absolutely Choler, or with an adjunct, yellow Choler. That is called Melancholy, which drawn by the Spleen in a thinner portion, and elaborate by the heat of the Arteries, which in that part are both many and large, becomes nourishment to the part; the remnant thereof is carried by the veiny Vessel into the orifice of the ventricle, whereby it may not cause but whet the appetite, and by its astriction strengthen the actions thereof. But yellow Choler drawn into the bladder of the gall, remains there so long, till being troublesome, either in quantity or quality, it is excluded into the guts, whereby it may cast forth the excrements residing in them; the expulsive faculty being provoked by its acrimony, and by its bitterness kils the worms that are bred there. This same Humor is accustomed to die the urine of a yellow colour. There is another serous Humor; which truly is not fit to nourish but profitable for many other things, which is not an excrement of the second, but of the first concoction. Therefore nature would that mixed with the *Chylus*, it should come to

The divers condition of the matter alone, is the cause of variety.

The effect of Phlegm.

The effects of Choler.

The effects of Melancholy.

What motions are in each quarter of the body.

The Melancholy Humor doth not cause, but whet the appetite.

A serous or wheyish humor

the

the Liver, and not be voided with the excrements, whereby it might allay the grositeſs of the blood, and ſerve it for a vehicle; for otherwiſe the blood could ſcarce paſs through the capillary veins of the Liver, and paſſing the ſimous and gibbous parts thereof, come to the hollow vein. Part of this ſerous humor ſeparated together with the blood which ſerves for the nouriſhment of the Reins, and ſtraight carried into the bladder, is turned into that urine which we daily make; the other part therefore carryed through all the body together with the blood, performing the like duty of tranſportation, is excluded by ſweats into which it degenerates. Beſides the forenamed, the *Arabians* have mentioned four other humors, which they term Alimentary and ſecondary, as being the next matter of nouriſhment, as thoſe four the blood contains, the remote. They have given no name to the firſt kind, but imagin it to be that humor, which hangs ready to fall like to little drops in the utmoſt orifices of the veins. They call the ſecond kind, * Dew; being that humor, which entred already into the ſubſtance of the part, doth moiſten it. The third they call by a barbarous name, *Cambium*, which already put to the part to be nouriſhed, is there faſtned. The fourth named *Gluten*, or Glew, is only the proper and ſubſtance-making humidity of the ſimilar parts, not their ſubſtance. The diſtinction of the degrees of nutrition recited by *Galen* in his books of Naturall faculties, anſwer in proportion to this diſtinction of humors. The firſt is, that the blood flow to the part that requires nouriſhment; then that being there arrived, it may be agglutinated; then laſtly, that having loſt its former form of nouriſhment, it may be aſſimilated.

Secundary Humors.

* Ros.

Thoſe humors are againſt nature, which being corrupted, infect the body and the parts in which they are contained by the contagion of their corruption, retaining the names and titles of the humors, from whoſe perfection and nature they have revolted, they all grow hot by putrefaction, although they were formerly by their own nature cold. And they are corrupted, either in the veins only, or within and without the veins: In the veins Blood and Melancholy; but both without and within the veins, Choler and Phlegm. When Blood is corrupted in its thinner portion, it turns into Choler, when in its thicker, into Melancholy; for the Blood becomes faulty two manner of ways, either by the corruption of its proper ſubſtance by putrefaction, or by admixtion of another ſubſtance by infection. The Melancholy humor which is corrupted in the veins, is of three ſorts: The firſt is of a Melancholy juice putrefying, and by the force of a ſtrange heat, turned, as it were, into aſhes, by which it becomes aduſt, acrid and biting. The other ariſeth from that Choler which reſembles the yolks of eggs, which by aduſtion becomes leek-coloured, then æruginous, or of a blewiſh green, then red, and laſtly black, which is the very worſt kind of Melancholy, hot, malign, eating, and exulcerating, and which is never ſeen or voided with ſafety. The third comes from Phlegm putrefying in the veins, which firſt degenerates into ſalt Phlegm, but ſtraight by the ſtrength of extraneous heat degenerates into Melancholy.

Humors againſt nature.

Into what Humors the blood when it corrupts, doth degenerate.

The Melancholy Humor corrupted, is of three kinds.

Phlegm not naturall is bred, either

- In the Veins, and is either
  - Acide and very crude, as which hath had none or very little impreſſion of heat, but that which it firſt had in the ſtomach.
  - Salt, which is bred by the ſweet, putrefying and aduſt, or mixture of aduſt and ſalt particles.
- Or without the Veins, & is of four ſorts; either
  - Wateriſh, as is that thin moiſture which diſtils from the brain by the noſtrils.
  - Mucous, as when that wateriſh is thickned into filth by the help of ſome accidentall or ſmall heat.
  - Glaſſie, or * Albuminous, reſembling molten glaſs, or rather the white of an egg, and is moſt cold.
  - *Gypſea*, or Plaiſter-like, which is concrete into the hardneſs and form of chalk, as you may ſee in the joints of the fingers in a knotty gout, or in inveterate diſtillations upon the Lungs.

* *Albuminea.*

Choler not naturall is bred, either

- In the Veins, as the * vitelline (like in conſiſtence to the yolk of a raw egg) which the acrimony of ſtrange heat breeds of yellow Choler, which ſame in diſeaſes altogether deadly, degenerates into green, æruginous, & laſtly into a blue, or colour like that which is dried by woad.
- Or in the capacity of the upper belly, as the ventricle, and this is of five kinds:
  - The firſt is called *Porracea*, or leek-coloured, reſembling the juice of a leek in greenneſs.
  - The ſecond *æruginoſa*, or æruginous, like in colour to verdigreaſe.
  - The third blewiſh, or woad-coloured, like the colour died by woad.
  - The fourth red, differing in this from blood, whoſe colour it imitates, that it never cometh into knots, or clods like blood.
  - The fifth very red, generated by the exceſs of the former, which cauſeth burning feavers.

* *Vitellina.*

The

The kinds of ſuch Choler, are often caſt forth by vomit in diſeaſes, the ſtrength of the diſeaſe being paſt; being troubleſome to the parts through which they are evacuated, by their bitterneſs, acrimony, and biting.

The ſignes of a Sanguine perſon.

I Think it manifeſt, becauſe the matter and generation of fleſh is principally from blood, that a man of a fleſhy, denſe, and ſolid habit of body, and full of a ſweet and vaporous juice, is of a Sanguine complexion. And the ſame party hath a flouriſhing and roſie colour in his face, tempered as with an equal mixture of white and red; of white, by reaſon of the skin lying utmoſt; of red, becauſe of the blood ſpread underneath the skin: for always ſuch as the humor is, ſuch is the colour in the face. In manners, he is curteous, gentle, eaſie to be ſpoken to, not altogether eſtranged from the love of women, of a lovely countenance and ſmooth forehead, ſeldom angry, but taking all things in good part; for as the inclination of humors is, ſo alſo is the diſpoſition of manners. But blood is thought the mildeſt of all humors; but the ſtrong heat of the inward parts maketh him to eat and drink freely. Their dreams are pleaſant, they are troubled with diſeaſes ariſing from blood, as frequent Phlegmons, and many ſanguine puſtles breaking through the skin, much bleeding, and menſtruous fluxes. Wherefore they can well endure blood-letting, and delight in the moderate uſe of cold and dry things; and laſtly, are offended by hot and moiſt things. They haye a great and ſtrong Pulſe, and much urine in quantity, but milde of quality, of an indifferent colour add ſubſtance.

Such as the humor is, ſuch is the colour.

The manners and diſeaſes of Sanguine perſons.

The ſignes of a Cholerick perſon.

CHolerick men are of a pale or yellowiſh colour, of a lean, ſlender and rough habit of body, with fair veins and large Arteries, and a ſtrong and quick pulſe: their skin being touched, feels hot, dry, hard, rough and harſh, with a pricking and acrid exhalation which breathes forth of their whole body. They caſt forth much choler by ſtool, vomit and urine. They are of a quick and nimble wit, ſtout, hardy and ſharp vindicators of received injuries, liberall even to prodigality, and ſomwhat too deſirous of glory. Their ſleep is light, and from which they are quickly waked; their dreams are fiery, burning, quick, and full of fury; they are delighted with meats and drinks which are ſomewhat more cold and moiſt, and are ſubject to Tertian and burning feavers, the Phrenſie, Jaundiſe, Inflammations, and other Cholerick puſtles, the Lask, Bloody flux, and bitterneſs of the mouth.

Cholerick are not commonly fat.

The manners and diſeaſes of Cholerick perſons.

The ſignes of a Phlegmatick perſon.

THoſe in whom Phlegm hath the dominion, are of a whitiſh coloured face, and ſometimes livid and ſwollen, with their body fat, ſoft, and cold to touch.

They are moleſted with Phlegmatick diſeaſes, as Oedematous tumors, the Dropſie, Quotidian feavers, falling away of the hairs, and catarrhes falling down upon the Lungs, and the *Aſpera Arteria*, or Weaſon: they are of a ſlow capacity, dull, ſlothfull, drowſie; they do dream of rains, ſnows, floods, ſwimming, and ſuch like, that they often imagin themſelves overwhelmed with waters; they vomit up much watery and Phlegmatick matter, or otherwiſe ſpit and evacuate it, and have a ſoft and moiſt tongue.

The manners and diſeaſes of phlegmatick perſons.

And they are troubled with a dog-like hunger, if at any time it ſhould happen that their inſipid Phlegm become acide; and they are ſlow of digeſtion, by reaſon of which they have great ſtore of cold and Phlegmatick humors; which if they be carried down into the windings of the Colick-gut, they cauſe murmuring and noiſe, and ſometimes the Colick.

From whence noiſe or rumbling in the belly proceeds.

For much wind is eaſily cauſed of ſuch like Phlegmatick excrements wrought upon by a ſmall and weak heat, ſuch as Phlegmatick perſons have, which by its naturall lightneſs is diverſly carried through the turnings of the guts, and diſtends and ſwels them up, and whiles it ſtrives for paſſage out, it cauſeth murmurings and noiſes in the belly, like wind breaking through narrow paſſages.

Signes of a Melancholick perſon.

THe face of Melancholy perſons is ſwart, their countenance cloudy and often cruell, their aſpect is ſad and froward; frequent Scirrhous, or hard ſwellings, tumors of the Spleen, Hæmorroids, *Varices* (or ſwollen Veins) Quartain feavers, whether continuall or intermitting; Quintain, Sextain, and Septimane feavers: and to conclude, all ſuch wandering feavers or agues ſet upon them. But when it happens the Melancholy humor is ſharpned, either by aduſtion, or commixture of Choler, then Tetters, the black Morphew, the Cancer ſimple and ulcerated, the Leprous and filthy ſcab, ſending forth certain ſcaly and branlike excreſcences, (being vulgarly called Saint *Manis* his evil;) and the Leproſie it ſelf invades them: They have ſmall veins and arteries, becauſe coldneſs hath dominion over them; whoſe property is to ſtraiten, as the quality of heat is to dilate. But if at any time their Veins ſeem big, that largeneſs is not by reaſon of the laudable

Diſeaſes familiar to Melancholy perſons.

laudable blood contained in them, but from much windineſs; by occaſion whereof it is ſomewhat difficult to let them blood; not only, becauſe that when the Vein is opened, the blood flows ſlowly forth, by reaſon of the cold ſlowneſs of the humors; but much the rather, for that the vein doth not receive the impreſſion of the Lancet, ſliding this way and that way, by reaſon of the windineſs contained in it, and becauſe that the harſh drineſs of the upper skin, reſiſts the edg of the inſtrument. Their bodies ſeem cold and hard to the touch, and they are troubled with terrible dreams, for they are obſerved to ſeem to ſee in the night Devils, Serpents, dark dens and caves, ſepulchers, dead corpſes, and many other ſuch things full of horror, by reaſon of a black vapor, diverſly moving and diſturbing the brain, which alſo we ſee happens to thoſe, who * fear the water, by reaſon of the biting of a mad dog. You ſhall finde them froward, fraudulent, parſimonious, and covetous even to baſeneſs, ſlow ſpeakers, fearfull, ſad, complainers, carefull, ingenious, lovers of ſolitarineſs, man-haters, obſtinate maintainers of opinions once conceived, ſlow to anger, but angred not to be pacified. But when Melancholy hath exceeded natures and its own bounds, then by reaſon of putrefaction and inflammation all things appear full of extreme fury and madneſs, ſo that they often caſt themſelves headlong down from ſome high place, or are otherwiſe guilty of their own death, with fear of which notwithſtauding they are terrified.

From, or by what their Veins are ſwollen.

Their dreams.

* *Hydrophobi.*

Their manners.

But we muſt note that changes of the native temperament, do often happen in the courſe of a mans life, ſo that he which a while agone was Sanguine, may now be Cholerick, Melancholick, or Phlegmatick; not truly by the changing of the blood into ſuch Humors, but by the mutation of Diet, and the courſe or vocation of life. For none of a Sanguine complexion but will prove Cholerick if he eat hot and dry meats, (as all like things are cheriſhed and preſerved by the uſe of their like, and contraries are deſtroyed by their contraries) and weary his body by violent exerciſes, and continuall labors; and if there be a ſuppreſſion of Cholerick excrements, which before did freely flow, either by nature or art. But whoſoever feeds upon Meats generating groſs blood, as Beef, Veniſon, Hare, old Cheeſe, and all ſalt meats, he without all doubt ſliding from his nature, will fall into a Melancholy temper; eſpecially if to that manner of diet, he ſhall have a vocation full of cares, turmoils, miſeries, ſtrong and much ſtudy, carefull thoughts and fears; and alſo if he ſit much, wanting exerciſe, for ſo the inward heat, as it were, defrauded of its nouriſhment, faints, and grows dull, whereupon groſs and droſſie humors abound in the body. To this alſo the cold and dry condition of the place in which we live, doth conduce, and the ſuppreſſion of the Melancholy humor accuſtomed to be evacuated by the Hæmorrhoids, courſes, and ſtools.

From whence the change of the native temper.

How one may become Cholerick.

How Melancholick.

But he acquires a Phlegmatick temper, whoſoever uſeth cold and moiſt nouriſhment, much feeding, who before the former meat is gone out of the belly, ſhall ſtuff his paunch with more, who preſently after meat runs into violent exerciſes, who inhabit cold and moiſt places, who lead their life at eaſe in all idleneſs; and laſtly, who ſuffer a ſuppreſſion of the Phlegmatick humor accuſtomly evacuated by vomit, cough, or blowing the noſe, or any other way, either by nature or art. Certainly it is very convenient to know theſe things, that we may diſcern if any at the preſent be Phlegmatick, Melancholick, or of any other temper, whether he be ſuch by nature, or neceſſity. Having declared thoſe things which concern the nature of Temperaments, and deferred the deſcription of the parts of the body to our Anatomy, we will begin to ſpeak of the Faculties governing this our life, when firſt we ſhall have ſhewn by a practicall demonſtration of examples, the uſe and certainty of the aforeſaid rules of Temperaments.

How Phlegmatick.

CHAP. VII.

Of the Practice of the aforeſaid rules of Temperaments.

THat we may draw the Theorick of the Temperaments into practice, it hath ſeemed good for avoyding of confuſion which might make this our Introduction ſeem obſcure, if we would proſecute the differences of the Tempers of all men of all Nations, to take thoſe limits which Nature hath placed in the world; as South, North, Eaſt, and Weſt, and, as it were, the Center of thoſe bounds, that the deſcribed variety of Tempers, in colour, habit, manners, ſtudies, actions, and form of life of men that inhabit thoſe Regions ſituated ſo far diſtant one from another, may be as a ſure rule, by which we may certainly judg of every mans temperature in particular, as he ſhall appear to be nearer or further off from this or that Region. Thoſe which inhabit the South, as the *Africans*, *Æthiopians*, *Arabians*, and *Egyptians*, are for the moſt part deformed, lean, duskie coloured, and pale, with black eys and great lips, curled hair, and a ſmall and ſhrill voice. Thoſe which inhabit the Northern parts, as the *Scythians*, *Muſcovites*, *Polonians*, and *Germanes*, have their faces of colour white, mixed with a convenient quantity of blood, their skin ſoft and delicate, their hair long, hanging

Four bounds or Regions of the world.

The forces of temperatures in particulars.

The temperature of the Southern people.

Of the Northern.

down and ſpreading abroad, and of a yellowiſh, or reddiſh colour; of ſtature they are commonly tall, and of a well proportioned, fat and compact habit of body, their eyes gray, their voice ſtrong, loud and big. But thoſe who are ſituated between theſe two former, as the *Italians* and *French*, have their faces ſomewhat ſwart, are well favoured, nimble, ſtrong, hairy, ſlender, well in fleſh, with their eyes reſembling the colour of Goats-eyes, and often hollow eyed, having a cleer, ſhrill and pleaſing voyce.

The Southern people prevail in wit, the Northern in ſtrength.

The Southern people are exceeded ſo much by the Northern in ſtrength and ability of body, as they ſurpaſs them in wit and faculties of the mind. Hence is it you may read in Hiſtories, that the *Scythians*, *Goths* and *Vandals* vexed *Africk* and *Spain* with infinite incurſions, and moſt large and famous Empires have been founded from the North to South; but few or none from the South to the North. Therefore the Northern people thinking all right and law to conſiſt in Arms, did by Duell only determine all cauſes and controverſies ariſing amongſt the Inhabitants, as we may gather by the ancient laws, and cuſtomes of the *Lumbards*, *Engliſh*, *Burgonians*, *Danes* and *Germans*; and we may ſee in *Saxo* the *Grammarian* that ſuch a law was once made by *Fronto* King of *Denmark*. The which cuſtome at this day is every where in force amongſt the *Muſkovites*. But the Southern people have alwayes much abhorred that faſhion, and have thought it more agreeable to Beaſts than Men. Wherefore we never heard of any ſuch thing uſed by the *Aſſyrians*, *Ægyptians*, *Perſians* or *Jews*. But moved by the goodneſs of their wit, they erected Kingdomes and Empires by the onely help of Learning and hidden ſciences. For ſeeing by nature they are Melancholik, by reaſon of the dryneſs of their temperature, they willingly addict themſelves to ſolitarineſs and contemplation, being endued with a ſingular ſharpneſs of wit. Wherefore the *Æthiopians*, *Egyptians*, *Africans*, *Jews*, *Phœnicians*, *Perſians*, *Aſſyrians*, and *Indians*, have invented many curious ſciences, revealed the Myſteries and ſecrets of Nature, digeſted the Mathematiques into order, obſerved the motions of the heavens, and firſt brought in the worſhip and religious ſacrifices of the gods: Even ſo far that the *Arabians* who live only by ſtealth, and have only a Waggon for their houſe, do boaſt that they have many things diligently and accurately obſerved in Aſtrology by their Anceſtors, which every day made more accurate and copious, they, as by an hereditary right, commend to poſterity, as it is recorded by *Leo* the *African*. But the Northern people, as the *Germans*, by reaſon of the aboundance of humors and blood, by which the mind is as it were oppreſt, apply themſelves to works obvious to the ſenſes, and which may be done by the hand. For their minds oppreſt with the earhtly maſs of their bodies, are eaſily drawn from heaven and the contemplation of Celeſtiall things, to theſe inferior things, as to find out Mines by digging, to buy and caſt metalls, to draw and hammer out works of Iron, ſteel and braſs. In which things they have proved ſo excellent, that the glory of the Invention of Guns and Printing belongs to them.

The Southern people learned and religious.

The Northern famous Warriours, and Artificers.

The endowments of ſuch as inhabit between them.

The people who inhabit the middle regions between theſe, are neither naturally fit for the more abſtruſe ſciences, as the Southern people are, nor for Mechanick works, as the Northern, but intermeddle with civil affairs, commerce and Merchandizing. But are endued with ſuch ſtrength of body as may ſuffice to avoid and delude the crafts and arts of the Southern Inhabitants; and with ſuch wiſdom as may be ſufficient to reſtrain the fury and violence of the Northern. How true this is, any one may underſtand by the example of the *Carthaginians* and *Africans*, who when they had held *Italy* for ſome years by their ſubtile counſels, crafty ſleights and devices; yet could not eſcape, but at the length their Arts being deluded, and they ſpoiled of all their fortunes, were brought in ſubjection to the *Romans*. The *Gothes*, *Hunnes* and other Northern people have ſpoiled and overrun the *Romane* Empire by many incurſions and inroads, but deſtitute of counſell and providence, they could not keep thoſe things which they had gotten by Armes and valour. Therefore the opinion of all Hiſtorians is agreeing in this, that good laws, the form of governing a Common-wealth, all politick ordinances, the Arts of diſputing and ſpeaking, have had their beginnings from the *Greeks*, *Romans* and *French*. And from hence in times paſt and at this day a greater number of Writers, Lawyers and Counſellors of State have ſprung up, than in all the whole world beſides. Therefore that we may attribute their gifts to each Region, we affirm that, The Southern people are born and fit for the Studies of learning, the Northern for warres, and thoſe which be between them both for Empire and rule. The *Italian* is naturally wiſe, the *Spaniard* grave and conſtant; the *French* quick and diligent, for you would ſay hee runs when he goes, being compared to the ſlow and womaniſh pace of the *Spaniard*, which is the cauſe that *Spaniards* are delighted with *French* ſervants for their quick agility in diſpatching buſineſs. The Eaſtern people are ſpecially indued with a good, firm and well tempered wit, not keeping their counſels ſecret and hid. For the haſte is of the nature of the Sun, and that part of the day which is next to the riſing of the Sun is counted the right ſide and ſtronger; and verily in all things living the right ſide is alwayes the more ſtrong and vigorous. But the Weſtern people are more tender and effeminate, and more cloſe in their carriage and mind,

The Northern know how to overcome, but not how to uſe the victory.

The aboundance of counſellors and Lawyers from *France* and *Italy*.

The manners of the Eaſtern people.

not

not easily making any one partaker of their secrets. For the West is as it were subject to the Moon, because at the change it alwayes inclines to the West, whereby it happens, that it is reputed as nocturnall, sinister and opposite to the East; and the West is less temperate and wholsome. Therefore of the winds none is more wholsome then the East wind which blows from the West with a most fresh and healthfull gale, yet it seldome blows, and but only at Sun-set.

The East wind healthfull.

The Northern people are good eaters, but much better drinkers, witty when they are a little moistened with wine, and talkers of things both to be spoken and concealed, not very constant in their promises and agreements, but principal keepers and preservers of shamefastness and chastity, far different from the inhabitants of the South, who are wonderfull sparing, sober, secret and subtle, and much addicted to all sorts of wicked Lust. *Aristotle* in his Problemes saith that those nations are barbarous and cruell, both which are burnt with immoderate heat, and which are oppresst with excessive cold, because a soft temper of the Heavens, softens the manners and the mind. Wherefore both, as well the Northern, as Scythians and Germans; and the Southern, as Africans, are cruell; but these have this of a certain naturall stoutness, and souldierlike boldness, and rather of anger then a wilfull desire of revenge; because they cannot restrain by the power of reason the first violent motions of their anger by reason of the heat of their blood. But those of a certain inbred and inhumane pravity of manners, wilfully and willingly premeditating they perform the works of cruelty, because they are of a sad and melancholy nature. You may have an example of the Northern cruelty from the Transilvanians against their seditious Captain *George*, whom they gave to be torne in pieces alive and devoured by his Souldiers, (being kept fasting for three dayes before for that purpose) who was then unbowelled, and rosted, and so by them eaten up. The cruelty of *Hannibal* the Captain of the Carthaginians may suffice for an instance of the Southern cruelty. He left the Roman Captives wearied with burdens and the length of the way, with the soles of their feet cut off; But those he brought into his tents, joyning brethren and kinsmen together he caused to fight, neither was satisfied with blood before he brought all the victors to one man. Also we may see the cruell nature of the Southern Americans, who dip their children in the blood of their slain enemies, then suck their blood, and banquet with their broken and squeased Limbs.

The North. people great eaters and drinkers.

Who are to be counted Barbarous.

The Northern and Southern have each their Cruelties.

Valer. Max. lib. 9. cap. 2.

And as the Inhabitants of the South are free from divers Plethorick diseases, which are caused by aboundance of blood, to which the Northern people are subject, as Feavers, Defluxions, Tumors, Madness with laughter which causeth those which have it to leap and dance, (the people commonly tearm it *S. vittus his evill*) which admits of no remedy but Musick: so they are often molested with the Frensie invading with madness and fury; by the heat whereof they are often so ravished and carried beside themselves that they foretell things to come; they are terrified with horrible dreams, and in their fits they speak in strange and forain tongues, but they are so subject to the scurfe and all kind of scabs and to the Leprosie as their homebred disease, that no houses are so frequently met withall by such as travell through either of the Mauritania's, as Hospitalls provided for the Lodging of Leapers.

The diseases of the Southern people.

Those who inhabit rough and Mountainous places, are more brutish, tough and able to indure labour: but such as dwell in Plains, especially if they be moorish, or fennish, are of a tender body, and sweat much with a little labour; the truth of which is confirmed by the Hollanders and Frizlanders. But if the Plain be such as is scorched by the heat of the Sun, and blown upon by much contrariety of winds, it breeds men who are turbulent, not to be tamed, desirous of sedition and novelty, stubborn, impatient of servitude, as may be perceived by the sole example of the Inhabitants of *Narbon* a province of *France*.

Mountainers.

Those who dwell in poor and barren places are commonly more witty and diligent and most patient of labours; the truth of which the famous wits of the *Athenians*, *Ligurians* and *Romans*, and the plain country of the *Baotians* in *Greece*, of the *Campanians* in *Italy*, and of the rest of the Inhabiters adjoining to the *Ligurian* Sea, approves.

CHAP. VIII.

Of the Faculties.

A Faculty is a certain power, and efficient cause, proceeding from the temperament of the part, and the performer of some actions of the body. There are three principall Faculties governing mans body as long as it enjoyes its integrity; the Animall, Vital and Natural. The Animall is seated in the proper temperament of the Brain, from whence it is distributed by the Nerves into all parts of the body wch have sense & motion. This is of three kinds, for one is Moving, another sensitive, the third principall. The sensitive consists in the five external senses, sight, hearing, taste, smel & touch. The moving principally remains in the Muscles & nerves as the fit instruments

What a faculty is.

3. Faculties.

of voluntary motion. The Principall comprehends the Reasoning faculty, the Memory and Fantasie. *Galen* would have the common or inward sense to be comprehended within the compass of the Fantasie, although *Aristotle* distinguish between them.

The Vitall abides in the Heart, from whence heat and life is distributed by the Arteries to the whole body: this is principally hindered in the diseases of the Breast; as the Principall is, when any disease assails the Brain; the prime action of the vitall faculty is Pulsation, and that continued agitation of the Heart and Arteries, which is of threefold use to the body: for by the dilatation of the Heart and Arteries the vitall spirit is cherished by the benefit of the Air which is drawn in; by the contraction thereof the vapours of it are purged and sent forth, and the native heat of the whole body is tempered by them both.

The triple use of the Pulse.

The last is the Naturall faculty which hath chosen its principall seat in the Liver, it spreads or carries the nourishment over the whole body; but it is distinguished into 3. other faculties; The Generative, which serves for the generation and forming of the Issue in the wombe; the Growing or increasing faculty, which flourisheth from the time the Issue is formed, untill the perfect growth of the solid parts into their full dimensions of length, height and bredth. The nourishing faculty, which as servant to both the other repairs and repays the continuall efflux, and waste of the threefold substance; for Nutrition is nothing else but a replenishing, or repairing whatsoever is wasted or emptied. This nourishing faculty endures from that time the Infant is formed in the wombe untill the end of life. It is a matter of great consequence in Physick to know the 4. other faculties, which as servants attend upon the nourishing faculty; which are the Attractive, Retentive, Digestive, and Expulsive faculty. The Attractive draws that juyce which is fit to nourish the body, that I say which by application may be assimilated to the part. This is that faculty which in such as are hungry draws down the meat scarce chewed, and the drink scarse tasted, into the gnawing and empty stomack. The Retentive faculty is that which retains the nourishment once attracted untill it be fully laboured and perfectly concocted; And by that means it yeelds no small assistance to the Digestive faculty. For the naturall heat cannot perform the office of concoction, unless the meat be embraced by the part, and make some stay therein. For otherwise the meat carryed into the stomach never acquires the form of *Chylus*, unless it stay detained in the wrinkles thereof, as in a rough passage, untill the time of *Chylification*. The Digestive facultie assimilates the nourishment, being attracted and detained, into the substance of that part whose faculty it is, by the force of the inbred heat and proper disposition or temper of the part. So the stomach plainly changes all things which are eat and drunk into *Chylus*, and the Liver turns the *Chylus* into blood. But the Bones and Nerves convert the red and liquid blood which is brought down unto them by the capillary or small veins, into a white and solid substance. Such concoction is far more laborious in a Bone and Nerve, than in the Musculous flesh. For the blood being not much different from its nature, by a light change and concretion turns into flesh. But this Concoction will never satisfie the desire of Nature and the parts, unless the nourishment purged from its excrements, put away the filth and drosse, which must never enter into the substance of the part. Wherefore there do not only two sorts of excrements remain of the first and second Concoction, the one thick, the other thin, as we have said before; but also from the third Concoction which is performed in every part. The one of which we conceive only by reason, being that which vanisheth into Air by insensible transpiration. The other is known sometimes by sweats, sometimes by a thick fatty substance staining the shirt; sometimes by the generation of hairs and nails, whose matter is from fuliginous and earthly excrements of the third Concoction. Wherefore the fourth faculty was necessary which might yeeld no small help to nourishment; it is called the Expulsive, appointed to expell those superfluous excrements which by no action of heat, can obtain the form of the part. Such faculties serving for nutrition are in some parts two-fold; as some common, the benefit of which redounds to the whole body, as in the ventricle, liver and veins; Others only attending the service of those parts in which they remain, and in some parts all these 4. as well common as proper, are abiding and residing as in those parts we now mentioned: some with the 4. proper have only two common, as the Gall, Spleen, Kidnies and Bladder. Others are content only with the proper, as the similar and Musculous parts, who if they want any of these 4. faculties, their health is decayed either by want of nourishment, and ulcer, or otherwise. The like unnaturall affects happen by the deficiency of just aud laudable nourishment. But if it happen those faculties do rightly perform their duty, the nourishment is changed into the proper part, and is truly assimilated as by these degrees. First it must flow to the part, then be joyned to it, then agglutinated, and lastly as we have said, assimilated. Now we must speak of the Actions which arise from the faculties.

The naturall faculty is threefold.

What Nutrition is.

Four other faculties attend upon the nourishing faculty.

The necessity of the retentive faculty.

Two excrements of every concoction.

The work of the expulsive faculty.

By what degrees the nourishment is assimilated.

CHAP.

CHAP. IX.

Of the Actions.

What an Action is.

AN Action or Function is an active motion proceeding from a faculty; for as the faculty depends on the Temperament, so the Action on the faculty, and the Act or work depends upon the Action by a certain order of consequence. But although that the words Action and Act or work are often confounded, yet there is this difference between them, as that the Action signifies the motion used in the performance of any thing; but the Act or work, the thing already done and performed: for example, Nutrition and the Generating of flesh are naturall Actions; but the parts nourished, and a hallow ulcer filled with flesh are the works of that motion, or action. Wherefore the Act ariseth from the Action, as the Action ariseth from the faculty, the integrity or perfection of the instruments concurring in both. For as, if the faculty be either defective, or hurt, no Action will be well performed: so unless the Instruments keep their native and due conformity (which is their perfect health, the operator of the Action proper to the instrument) none of those things, which ought to be, will be well performed. Therefore for the performance of blameless and perfect actions, it is fit a due conformity of the instrument concur with the faculty. But Actions are two fold; for they are either Naturall, or Voluntary. They are termed Naturall, because they are performed not by our will, but by their own accord and against our will: As are, that continuall motion of the Heart, the beating of the Arteries, the expulsion of the Excrements, and such other like which are done in us by the Law of Nature whether we will, or no. These Actions flow either from the Liver and veins, or from the Heart and Arteries. Wherefore we may comprehend them under the names of Naturall and Vitall Actions. For we must attribute his Action to each faculty, lest we may seem to constitute an idle faculty, and no way profitable for use. The unvoluntary vitall actions, are the dilatation and contraction of the Heart and Arteries, the which we comprehend under the sole name of the Pulse: by that they draw in, and by this they expell, or drive forth. The unvoluntary vitall actions be,

An action and and Act are different.

Naturall actions.

Generation, Growth and Nutrition } which proceed from the { Generative, Growing, and Nourishing } facultie.

Generation is nothing else then a certain producing or acquiring of matter, and an introducing of a substantiall form into that matter; this is performed by the assistance of two faculties; of the Altering, which doth diversly prepare and dispose the seed and menstruous blood to put on the form of a Bone, nerve, spleen, flesh and such like: of the Forming faculty, which adorns with figure, site, and composition, the matter ordered by so various a preparation.

What Growth is.

Growth is an inlarging of the solid parts into all the dimensions, the pristine and ancient form remaining safe and sound in figure and solidity. For the perfection of every growth is judged only by the solid parts; for if the body swell into a mass of flesh, or fat, it shall not therefore be said to be grown: but then only when the solid parts do in like manner increase, especially the bones, because the growth of the whole body follows their increase, even although at the same time it wax lean and pine away.

What Nutrition is.

Nutrition is a perfect assimilation of that nourishment which is digested, into the nature of the part which digests. It is performed by the assistance of 4. subsidiary or helping actions, Attractive, Retentive, Digestive, and Expulsive.

Action voluntary.

The voluntary actions which we willingly perform, are so called, because we can at our pleasure hinder, stir up, slow or quicken them. They are three in generall, the sensitive, moving, and principall Action. The sensitive * Soul comprehends all things in five senses, in Sight, Hearing, Smell, Taste and Touch. Three things must necessarily concur to the performance of them, the Organ, the *Medium* or mean, and the Object. The principall Organ, or Instrument, is the Animall spirit diffused by the nerves into each several part of the body, by which such actions are performed. Wherefore for the present we will use the Parts themselves for their Organs. The Mean is a Body, which carryes the Object to the Instrument. The Object is a certain externall quality, which hath power by a fit *Medium* or Mean to stir up and alter the Organ. This will be more manifest by relating the particular functions of the senses by the necessary concurring of these three.

* *Anima sentiens.*

How sight is performed.

Sight, is an action of the seeing faculty, which is done by the Eye, fitly composed of its coats and humors, and so consequently the Organicall body of this Action. The Object is a visible quality brought to the Eye. But such an Object is twofold; for either it is absolutely visible of its self, and by its own Nature, as the Sun, the fire, the Moon and Stars: or desires as it were the help of another that it may be actually such, for so by the coming of the light colours, which were visible in power onely, being brought to the Eye, they do seem and appear such as they actually are.

But ſuch Objects cannot arrive at the Eye, but through a clear and illuminate *Medium*, as the Air, Water, Glaſſe and all ſorts of Cryſtall.

How hearing. The Hearing hath for its Organ the Ear and Auditory paſſage, which goes to the ſtony bone furniſhed with a Membrane inveſting it, an Auditory Nerve, and a certain inward ſpirit there contained. The Object is every ſound ariſing from the ſmitten or broken Air, and the Colliſion of two bodies meeting together. The *Medium* is the encompaſſing Air which carries the ſound to the Ear.

How ſmelling. Smelling (according to *Galens* opinion) is performed in the Mamillary proceſſes produced from the proper ſubſtance of the brain, and ſeated in the upper part of the noſe: although others had rather ſmelling ſhould be made in the very foremoſt ventricles of the brain. This Action is weak in man in compariſon of other Creatures: the Object thereof is every ſmell, or fumid exhalation breathing out of bodies. The *Medium* by which the Object is carried to the noſes of Men, Beaſts and Birds, is the Air, but to Fiſhes the Water it ſelf.

How the taſte. The Action of taſte is performed by the tongue being tempered well and according to nature, and furniſhed with a nerve ſpred over its upper part from the third and fourth conjugation of the brain.

* *Sapor.* The Object is * Taſte, of whoſe nature and kinds we will treat more at large in our Antidotary.

The *Medium* by the which the Object is ſo carried to the Organ, that it may affect it, is either externall or internall: The externall is that ſpattle which doth as it were anoint and ſupple the tongue; the internall is the ſpongy fleſh of the tongue it ſelf, which affected with the quality of the Object doth preſently ſo poſſeſs the nerve that is implanted in it, that the kind and quality thereof by the force of the ſpirit may be carryed into the common ſenſe.

How touching. All parts endued with a nerve enjoy the ſenſe of touching, which is chiefly done, when a tractable quality doth penetrate even to the true and nervous skin, which lyeth under the Cuticle, or ſcarf-skin; we have formerly noted, that it is moſt exquiſite in the skin which inveſts the ends of the fingers. The Object is every tractable quality, whether it be of the firſt rank of qualities, as Heat, Cold, Moiſture, Dryneſs, or of the ſecond, as Roughneſs, Smoothneſs, Heavineſs, Lightneſs, Hardneſs, Softneſs, Rarity, Denſity, Friability, Unctuoſity, Groſneſs, Thinneſs. The *Medium* by whoſe procurement the inſtrument is affected, is either the skin or the fleſh interwoven with many Nerves.

Of motion. The next Action, is that Motion, which by a peculiar name we call voluntary; this is performed and accompliſhed by a Muſcle, being the proper Inſtrument of voluntary Motion. Furthermore every motion of a member poſſeſſing a Muſcle is made either by bending and contraction, or by extention. Although generally there be ſo many differences of voluntary motion, as there are kinds of ſite in place; therefore Motion is ſaid to be made upward, downward, to the right hand, to the left, forward and backward; Hither are referred the many kinds of motions, which the infinite variety of Muſcles produce in the body.

How reſpiration may be a voluntary motion. Into this rank of Voluntary Actions, comes Reſpiration, or breathing, becauſe it is done by the help of the Muſcles; although it be chiefly to temper the heat of the Heart. For we can make it more quick, or ſlow as we pleaſe, which are the conditions of a voluntary Motion.

Laſtly, that we may have ſomewhat in which we may ſafely reſt and defend our ſelves againſt the many queſtions which are commonly moved concerning this thing, wee muſt hold, that Reſpiration is undergone and performed by the Animall faculty, but chiefly inſtituted for the vitall.

The third principall Action. The principall Action and prime amongſt the Voluntary is abſolutely divided in three, Imagination, Reaſoning and Memory.

Imagination is a certain expreſſing, and apprehenſion which diſcerns and diſtinguiſheth between the forms and ſhapes of things ſenſible, or which are known by the ſenſes.

Reaſoning is a certain judiciall eſtimation of conceived or apprehended forms or figures, by a mutuall collating or comparing them together.

Memory is the ſure ſtorer of all things, and as it were the Treaſury which the mind often unfolds and opens, the other faculties of the mind being idle and not imployed. But becauſe all the forementioned Actions whether they be Naturall, or Animall and voluntary, are done and performed by the help and aſſiſtance of the Spirits; therefore now we muſt ſpeak of the Spirits.

CHAP. X.

Of the Spirits.

What a ſpirit is. THe Spirit is a ſubtile and aery ſubſtance, raiſed from the purer blood that it might be a vehicle for the faculties (by whoſe power the whole body is governed) to all the parts, and the prime inſtrument for the performance of their office. For they being deſtitute of its ſweet approach doe preſently ceaſe from action, and as dead do reſt from their accuſtomed labours. From hence it

is

is that making a variety of Spirits according to the number of the faculties, they have divided them into three; as one Animall, another Vitall, another Naturall. Spirits threefold.

The Animall hath taken his seat in the brain; for there it is prepared and made, that from thence conveyed by the Nerves, it may impart the power of sense and motion to all the rest of the members. An argument hereof is, that in the great cold of Winter, whether by the intercepting them in their way, or by the concretion, or, as it were, freezing of those spirits the joynts grow stiff, the hands numb, and all the other parts are dull, destitute of their accustomed agility of motion, and quickness of sense. It is called Animall, not because it is the * Life, but the chief and prime instrument thereof: wherefore it hath a most subtil and aery substance; and enjoys divers names, according to the various condition of the Sensories or seats of the senses into which it enters; for that which causeth the sight, is named the Visive: you may see this by night, rubbing your eys, as sparkling like fire. That which is conveyed to the Auditory passage, is called the Auditive or Hearing: That which is carried to the instruments of Touching, is termed the Tactive; and so of the rest. The Animall spirit. Why so called. * *Anima.*

This Animall spirit is made and laboured in the windings and foldings of the Veins and Arteries of the brain, of an exquisit subtil portion of the vitall brought thither by the *Carotidæ Arteriæ*, or sleepy Arteries; and sometimes also of the pure air, or sweet vapour drawn in by the Nose in breathing. Hence it is, that with Ligatures we stop the passage of this spirit, from the parts we intend to cut off. An Humor which obstructs or stops its passage, doth the like in Apoplexies and Palsies, whereby it happens that the members situate under that place do languish and seem dead, sometimes destitute of motion, sometimes wanting both sense and motion. How it is made.

The Vitall spirit is next to it in dignity and excellency, which hath its chief mansion in the left ventricle of the Heart, from whence, through the Channels of the Arteries, it flows into the whole body, to nourish the heat which resides fixed in the substance of each part, which would perish in short time, unless it should be refreshed by heat flowing thither together with the spirit. And because it is the most subtil next to the Animall, Nature (lest it should vanish away) would have it contained in the Nervous coat of an Artery, which is five times more thick than the coat of the Veins, as *Galen*, out of *Herophilus*, hath recorded. The Vitall spirit.

It is furnished with matter from the subtil exhalation of the blood, and that air which we draw in breathing. Wherefore it doth easily and quickly perish by immoderate dissipations of the spirituous substance, and great evacuations; so it is easily corrupted by the putrefaction of Humors, or breathing in of pestilent air and filthy vapours; which thing is the cause of the so suddain death of those which are infected with the Plague. This spirit is often hindred from entring into some part, by reason of obstruction, fulness, or great inflammations; whereby it follows, that in a short space, by reason of the decay of the fixed and inbred heat, the parts do easily fall into a Gangrene, and become mortified. What the matter of it is.

The Naturall spirit (if such there be any) hath its station in the liver and Veins. It is more gross and dull than the other, and inferior to them in the dignity of the Action, and the excellency of the use. The use thereof is to help the concoction both of the whole body, as also of each severall part, and to carry blood and heat to them. There is some doubt of the Naturall spirit.

Besides those already mentioned, there are other Spirits fixed and implanted in the similar and prime parts of the body, which also are naturall, and Natives of the same place in which they are seated and placed. And because they are also of an aery and fiery nature, they are so joined or rather united to the Native heat, that they can no more be separated from it than flame from heat; wherefore they with these that flow to them, are the principall instruments of the Actions which are performed in each severall part; And these fixed Spirits have their nourishment and maintenance from the radicall and first-bred moisture, which is of an aery and oily substance, and is, as it were, the foundation of these Spirits, and the inbred heat. Therefore without this moisture, no man can live a moment. But also the chief Instruments of life are these Spirits, together with the Native heat. Wherefore this radicall Moisture being dissipated and wasted, (which is the seat, fodder, and nourishment of the Spirits and heat) how can they any longer subsist and remain? Therefore the consumption of the naturall heat, followeth the decay of this sweet and substance-making moisture, and consequently death, which happens by the dissipating and resolving of naturall heat. Fixed Spirits. The radicall Moisture. Naturall death.

But since then these kind of Spirits with the naturall heat, is contained in the substance of each similar part of our body, (for otherwise it could not persist) it must necessarily follow, that there be as many kinds of fixed Spirits, as of similar parts. For because each part hath its proper temper and encrease, it hath also its proper Spirit, and also its own proper fixed and implanted heat, which here hath its abode, as well as its Originall. Wherefore the Spirit and heat which is seated in the bone, is different from that which is impast into the substance of a Nerve, Vein, or such other similar part; because the temper of these parts is different, as also the mixture of the Elements from which they first arose and sprung up. Neither is this contemplation of Spirits of small account, for in these consist all the force and efficacy of our Nature.

These

The use and necessity of the Spirits.

These being by any chance dissipated or wasted, we languish; neither is any health to be hoped for, the flour of life withering and decaying by little and little. Which thing ought to make us more diligent, to defend them against the continuall efflux of the threefold substance. For if they be decayed, there is left no proper indication of curing the disease; so that we are often constrained, all other care laid aside, to betake our selves to the restoring and repairing the decayed powers. Which is done by meats of good juice, easie to be concocted and distributed; good Wines, and fragrant smels.

What the remedy for the dissipation of the Spirits. What the remedy for oppression of the Spirits is.

But sometimes these Spirits are not dissipated, but driven in and returned to their fountains, and so both oppress and are oppresst; whereupon it happens we are often forced to dilate and spread them abroad by binding and rubbing the parts. Hitherto we have spoke of these things which are called Naturall, because we naturally consist of them; it remains that we now say somewhat of their Adjuncts and Associates by familiarity of Condition.

The Adjuncts and Associates to things Naturall: are,
- *Age*: of which, by reason of the similitude of the Argument, we were constrained to speak, when we handled the Temperatures.
- *Sex*.
- *Colour*: of which we have already spoken.
- The conformation of the *Instrumentall* parts.
- *Time*: whose force we have also considered.
- *Region*.
- Order of *Diet*, and condition of *Life*.

CHAP. XI.

Of the Adjuncts of things Naturall.

What sex is.

SEX is no other thing than the distinction of Male and Female; in which this is most observable, that for the parts of the body, and the site of these parts, there is little difference between them; but the Female is colder than the Male. Wherefore their spermaticall parts are more cold, soft, and moist; and all their naturall actions less vigorous and more depraved.

The nature of women.

Of Eunuchs.

The Nature of Eunuchs is to be referred to that of women, as who may seem to have degenerated into a womanish nature, by deficiency of heat; their smooth body, and soft and shrill voice do very much assimilate women. Notwithstanding you must consider, that there be some Manly women, which their manly voice, and chin covered with a little hairiness, do argue: and on the contrary, there are some womanizing, or womanish men, which therefore we term dainty and effeminate.

Of Hermaphrodites.

The Hermaphrodite is of a doubtfull nature, and in the middle of both sexes seems to participate of both Male and Female.

Colour the bewrayer of the Temperament.

The Colour which is predominant in the habit and superficies of the body, and lyes next under the skin, shews the Temperament of what kind soever it be; for as *Galen* notes *in Comment. ad Aphor.* 2. *sect.* 1. Such a colour appears in us, as the contained Humor hath. Wherefore if a rosie hew colour the cheeks, it is a sign the body abounds with blood, and that it is carried abroad by the plenty of Spirits. But if the skin be dyed with a yellow colour, it argues Choler is predominant; if with a whitish and pallid hue, Phlegm; with a sable and duskie, Melancholy. So the colour of the Excrements which are according to Nature, is not of the least consideration. For thus, if an Ulcer being broken send forth white matter, it argues the soundness of the part from whence it flows; but if sanious or bloody, green, blackish, or of divers colours, it shews the weakness of the solid part, which could not assimilate by concoction the colour of the excrementitious humor. The like reason is of unnaturall Tumors: For, as the colour, so the dominion of the Humor causing or accompanying the swelling commonly is.

The perfection of the organicall parts, consists in four things.

The conformity and integrity of the Organicall parts is considered by their figure, greatness, number, situation, and mutuall connexion. We consider the figure, when we say, almost all the externall parts of the body are naturally round, not only for shew, but for necessity, that being smooth and no way cornered, they should be less obnoxious to externall injuries; we speak of Greatness, when we say, some are large and thick, some lank and lean. But we consider their Number, when we observe some parts to abound, some to want, or nothing to be defective or wanting. We insinuate Site and Connexion, when we search, whether every thing be in its proper place, and whether they be decently fitted, and well joined together.

We have handled the varieties of the four seasons of the Year, when we treated of Temperaments. But the consideration of Region (because it hath the same judgment that the Air) shall be referred to that disquisition or enquiry which we intend to make of the Air, amongst the things not naturall.

The

The manner of life, and order of Diet are to be diligently observed by us, because they have great power either to alter, or preserve the Temperament. But because they are of almost infinite variety, therefore they scarce seem possible to fall into Art, which may prosecute all the differences of Diet and Vocations of life. Wherefore if the Calling of Life be laborious, as that of Husbandmen, Mariners, and other such trades, it strengthens and dries the parts of the body. Although those which labour much about Waters, are most commonly troubled with cold and moist diseases, although they almost kill themselves with labour. Diet.

Again, those which deal with Metals, as all sorts of Smiths, and those which cast and work brass, are more troubled with hot diseases, as Feavers. But if their Calling be such, as they sit much, and work all the day long sitting at home, as shoomakers; it makes the body tender, the flesh effeminate, and causeth great quantity of excrements. A life as well idle and negligent in body, as quiet in mind, in all riotousness and excesses of Diet, doth the same. For from hence the body is made subject to the Stone, Gravel, and Gout.

That calling of life which is performed with moderate labour, clothing, and diet, seems very fit and convenient to preserve the naturall temper of the body. The ingenious Chirurgeon may frame more of himself that may more particularly conduce to the examination of these things. Therefore the things naturall, and those which are near or neighbouring to them being thus briefly declared; the Order seems to require, that we make enquiry of things not Naturall. The commodities of an indifferent Diet.

CHAP. XII.

Of things not Naturall.

THe things which we must now treat of, have by the later Physitians been termed Not-naturall; because they are not of the number of those which enter into the constitution or composure of mans body; as the Elements, Humors, and all such things which we formerly comprehended under the name of Natural: although they be such as are necessary to preserve and defend the body already made and composed. Wherefore they were called by *Galen* Preservers; because by the due use of them the body is preserved in health. Also, they may be called Doubtfull, and Neuters, for that rightly and fitly used, they keep the body healthfull, but inconsideratly, they cause diseases. Whereby it comes to pass, that they may be thought to pertain to that part of Physick which is of preserving health; not because some of these things should be absolutely and of their own nature wholsom, and others unwholsom; but only by this, that they are, or prove so by their convenient, or preposterous use. Therefore we consider the use of such like things from four conditions, Quantity, Quality, Occasion, and Manner of using: If thou shalt observe these, thou shalt attain and effect this, That those things which are of themselves, are, as it were, doubtfull, shall bring certain and undoubted health. For these four Circumstances do so far extend, that in them, as in the perfection of Art, the Rules which may be prescribed to preserve health are contained. But *Galen* in another place, hath in four words comprehended these things not Naturall; as, things Taken, Applyed, Expelled, and to be Done. Things Taken, are those which are put into the body, either by the mouth, or any other way; as the air, meat and drink. Things Applyed, are those which must touch the body, as the Air now mentioned, affecting the body with a diverse touch of its qualities of heat, cold, moisture, or driness. Expelled, are what things soever being unprofitable are generated in the body, and require to be expelled. To be Done, are labour, rest, sleep, watching, and the like. We may more distinctly, and by expression of proper Names, revoke all these things to six: Why they are called things not naturall. *Galen* 1. ad Glauconem. *Lib. de sanitat. tuenda.*

Which are
- *Air.*
- *Meat* and *Drink.*
- *Labor* and *Rest.*
- *Sleep* and *Watching.*
- *Repletion* and *Inanition*; or things to be expelled, or retained and kept.
- *Perturbations* of the Minde.

CHAP.

CHAP. XIII.

of the Air.

How necessary for life the Air is.

AIR is so necessary to life, that we cannot live a moment without it; if so be that breathing, and much more transpiration, be not to be separated from life. Wherefore it much conduceth to know, what Air is wholsom, what unwholsom, and which by contrariety of qualities fights for the Patient against the disease; or on the contrary by a similitude of qualities shall nourish the disease, that if it may seem to burden the Patient by increasing or adding to the disease, we may correct it by Art. So in curing the wounds of the head, especially in winter, we labour by all the means we may to make the air warm. For cold is hurtfull to the Brain, Bones, and the wounds of these parts; and heat is comfortable and friendly. But also the Air being drawn into the body by breathing when it is hotter than ordinary, doth with a new warmth over-heat the heart, lungs, and spirits, and weaken the strength by the dissipation of the Spirits too much attenuated; so being too cold, in like manner the strength of the faculties faints and grows dull, either by suppression of the vapors, or by the inspissation or thickning of the Spirits.

What Air is hurtfull.

Therefore to conclude, that Air is to be esteemed healthfull, which is clear, subtil, and pure, free and open on every side, and which is far remote from all carion-like smels of dead carkasses, or the stench of any putrefying thing whatsoever: the which is far distant from standing pools, and fens, and caves, sending forth strong and ill vapors; neither too cloudy nor moist by the nearness of some river.

Such an Air, I say, if it have a vernall temper, is good against all diseases. That Air which is contrary to this, is altogether unhealthfull; as that which is putrid, shut up, and prest by the straitness of neighbouring Mountains, infected with some noisom vapor. And because I cannot prosecute all the conditions of Airs, fit for the expelling of all diseases, as which are almost infinite; it shall suffice here to have set down, what we must understand by this word *Air*.

Three things are understood by the name of the Air.

Physitians commonly use to understand three things by the name of *Air*; The present state of the Air; the Region in which we live; and the season of the Year. We spoke of this last, when we treated of Temperaments. Wherefore we will now speak of the two former. The present state of the Air, one while for some small time, is like the Spring, that is, temperate; otherwhiles like the Summer, that is, hot and dry; otherwhiles like the Winter, that is, cold and moist; and sometimes like the Autumn, which is unequall; and this last constitution of the Air is the cause of many diseases. When upon the same day, it is one while hot, another cold, we must expect Autumnall diseases. These tempers and varieties of constitutions of the Air, are chiefly and principally stirred up by the winds; as which being diffused over all the Air, shew no small force by their sodain change. Wherefore we will briefly touch their natures: That which blows from the East, is called the East-wind, and is of a hot and dry nature, and therefore healthfull. But the Western-wind is cold and moist, and therefore sickly. The South-wind is hot and moist, the Author of putrefaction and putrid diseases. The North-wind is cold and dry, therefore healthy: wherefore it is thought, if it happen to blow in the Dog-days, that it makes the whole year healthfull, and purges and takes away the seeds of putrefaction, if any chance to be in the Air. But this description of the four Winds, is then only thought to be true, if we consider the Winds in their own proper nature, which they borrow from these Regions from which they first proceed. For otherwise they affect the Air quite contrary, according to the disposition of the places over which they came; as Snowie places, Seas, Lakes, Rivers, Woods, or sandy Plains, from whence they may borrow new qualities, with which they may afterwards possess the Air, and so consequently our bodies.

Aphor. 4. sect. 2.

The force of the Winds.

How the winds acquire other faculties, than they naturally have.

The Westwind of it self unwholsom.

Hence it is we have noted the Western-wind unwholsom, and breeding diseases, by reason of the proper condition of the Region from whence it came; and such, that is cold and moist; the *Gascoins* find it truly to their so great harm, that it seldom blows with them, but it brings some manifest and great harm, either to their bodies, or fruits of the earth. And yet the *Greeks* and *Latins* are wont to commend it for healthfulness, more than the rest. But also the rising and setting of some more eminent stars, do often cause such cold winds, that the whole Air is cooled, or infected with some other malign quality. For vapors and exhalations are often raised by the force of the Stars, from whence winds, clouds, storms, whirlwinds, lightnings, thunders, hail, snow, rain, earthquakes, inundations, and violent raging of the sea, have their originall. The exact contemplation of which things, although it be proper to Astronomers, Cosmographers, and Geographers, yet *Hippocrates* could not omit it, but that he must speak something in his book *De Aëre & Aquis*; where he touches by the way, the description of the neighbouring Regions, and such as he knew.

What force stars have upon the Air.

From this force of the Air, either hurtfull, or helping in diseases, came that famous observa-

observation of *Guido* of *Caulius*; That wounds of the head are more difficult to cure at *Paris*, than at *Avignion*, and the plain contrary of wounds of the legs; for the air of *Paris*, compared to that of *Avignion*, is cold and moist, wherefore hurtfull and offensive to the wounds of the head. On the contrary, the same air, because it obscures the spirits, incrassates the blood, condensates the humors, and makes them less fit for defluxions, makes the wounds of the legs more easie to be healed, by reason it hinders the course of the humors, by whose defluxion the cure is hindred. But it is manifest, that hot and dry places make a greater dissipation of the naturall heat, from whence the weakness of the powers; by which same reason, the Inhabitants of such places do not so well endure blood-letting; but more easily suffer purgations, though vehement, by reason of the contumacie of the humor, caused by drines. To conclude, the Air changes the constitutions of our bodies, either by its qualities, as if it be hotter, colder, moister, or drier; or by its matter, as if it be grosser, or more subtil than is fit, or corrupted by exhalations from the earth, or by a sodain and unaccustomed alteration, which any man may prove, who makes a sodain change out of a quiet air into a stormy and troubled with many winds. But because, next to the Air, nothing is so necessary to nourish mans body, as Meat and Drink, I will now begin to speak of them both.

How the air of *Paris* comes to be ill for wounds of the head, and good for those of the leggs.

By what means the air changes our bodies.

CHAP. XIIII.

Of Meat and Drink.

THat this our Treatise of meat and drink may be more brief and plain, I have thought good to part it into these heads, as to consider the goodness and ilness of both of them, their quantity, quality, custom, delight, order, time, and to accommodate them all to the ages and seasons of the year. We judge of the goodness and pravity of meats and drinks, from the condition of the good or vicious humours, or juice which they beget in us. For evill juice causeth many diseases. As on the contrary, good juice drives away all diseases from the body, except the fault happen from some other occasion, as from quantity, or too much excess. Wherefore it is principally necessary, that those who will preserve their present health, and hinder the access of diseases, feed upon things of good nourishment and digestion, as are good wine, the yolks of egs, good milk, wheaten bread well baked, the flesh of Capons, Partridge, Thrushes, Larks, Veal, Mutton, Kid, and such like other, which you may find mentioned in the Books which *Galen* writ, *De Alimentorum facultatibus*; where also he examins those which are of evill juice by their manifest qualities, as acrimony, bitterness, saltness, acidity, harshness, and such like.

The goodness of nourishments.

But unless we use a convenient quantity and measure in our meats, howsoever laudable they be, we shall never reap these fruits of health we hoped for. For they yeeld matter of diseases, by the only excess of their quantity; but we may by this know the force of quantity on both parts, because often the poisonous quality of meats of ill nourishment doth not hurt, by reason they were not taken into the body into a great quantity. That measure of quantity is chiefly to be regarded in diseases: for as *Hippocrates* saith, If any give meat to one sick of a Feaver, he gives strength to the well, and increases the disease to the sick, especially if he do not use a mean. Wherefore it is a thing of no small consequence, to know what diseases require a slender, and what a large diet; of which thing there is large relation made in the 1 *Sect.* of the Aphorisms of *Hippocrates*; where he teacheth, the sick must feed more largely in the beginnings of long diseases, whereby they may be enabled to endure the length of the disease, and last to the state thereof. But in sharp and violent diseases, which presently come to their height, we must use a slender diet; but most slender, when the disease is in the height; and besides, all our consultations in this kinde, must be referred to the strength of the Patients. But those who enjoy their perfect health, must use a quantity of meat, agreeable to their evacuation and transpiration; for men, by reason of the strength of their heat, and the more copious dissipation of the triple substance, have greater appetite than women; altogether by the same reason, that young people, and such as grow, need more frequent and plentifull nourishment, than old men; and also amongst young men of the like age; some do rightly require more copious nourishment than othersome, that is, according to the quantity of their evacuations and custom. Certainly for gluttony, it is such as may be extended to all; but we all should take so much meat and drink, that our powers may be refreshed and not oppressed; for by the decree of *Hippocrates*, these be the two compendiary ways of preserving health; not to be over-filled with meat, and to be quick to work; and thus much of the quantity of meats. Neither must these who are either sound, or sick, have less regard to the qualities of their Meats; and those are either the first, as heating, cooling, moistening, drying; or the second, attenuating, incrassating, obstructing, opening, or some other-like, working according to the condition of their nature. The manner of our diet is not only to be framed according to

Their quantity

The quantity of meats must be esteemed according to the nature of the disease, and strength of the Patient.

The qualities of meat.

to theſe, but alſo to be varied; for the preſent ſtate of ſuch as be in health, requires to be preſerved by the uſe of like things. As hot and moiſt nouriſhment is to be preſcribed to children, as to thoſe which are hot and moiſt: and cold and dry to old men, as to thoſe who are cold and dry; if ſo be that vulgar ſaying be true, that, *Health delights in the uſe of like things*. Yet becauſe Old-age how green and new-begun howſoever it be, is of it ſelf, as it were, a diſeaſe, it ſeems to be more convenient, both to truth, and for health, that old people ſhould eat meats contrary to their nature, that is, hot and moiſt, that ſo we may defer as much as we can, the cauſes of death, cold and drineſs, which haſten the deſtruction of that age. For we muſt reſiſt diſeaſes by the uſe of their contraries, as thoſe things which are contrary to nature. For otherwiſe, as much meat as you give to the ſick, you add ſo much ſtrength to the diſeaſe. And the ſame is the cauſe why *Hippocrates* ſaid, that a moiſt diet is convenient for all ſuch as are ſick of Feavers, becauſe a Feaver is a dry diſtemperature. Therefore we muſt diligently pry into the nature of the diſeaſe, that knowing it, we may endevour to abate its fury by the uſe of contraries.

Old-age is a diſeaſe.

Aphor. 16. *ſect.* 1.

But if Cuſtom (as they ſay) be another nature, the Phyſitian muſt have a great care of it, both in ſound and ſick. For this ſometimes by little and little, and inſenſibly, changes our naturall temperament, and in ſtead thereof gives us a borrowed temper. Wherefore if any would preſently or ſodainly change a Cuſtom which is ſometimes ill, into a better, truly he will bring more harm than good; becauſe all ſodain changes (according to the opinion of *Hippocrates*) are dangerous. Wherefore if neceſſity require that we ſhould withdraw any thing from our Cuſtom, we muſt do it by little and little, that ſo nature may by degrees be accuſtomed to contraries without violence, or the diſturbance of its uſuall government. For that meat and drink which is ſomwhat worſe, but more pleaſant and familiar by cuſtom, is to be preferred (in *Hippocrates* opinion) before better, but leſs pleaſant and accuſtomed. Hence is it, that Country-men do very well digeſt Beef and Bacon, which commonly they uſe; but will turn into nidorulent vapors, Partridg, Capons, and other meat of good nouriſhment, ſooner than change them into good and laudable *Chylus*. The cauſe of which thing is not only to be attributed unto the property of their ſtronger, & as it were, burning heat, but much more to Cuſtom; which by a certain kind of familiarity, cauſeth that meats of hard digeſtion, are eaſily turned into laudable blood. For the force of Cuſtom is ſo great, that accuſtomed Meats are more acceptable; whereby it comes to paſs, that while the ſtomach delights in them, it more ſtraitly embraces them, and happily digeſts them, without any trouble of loathing, vomiting, or heavineſs. All the contrary meet and happen in the uſe of Meats which are unpleaſant to the taſte and ſtomach. For the ventricle abhorring thoſe things, makes manifeſt how it is troubled by its acide and nidorulent belchings, loathing, nauſeouſneſs, vomit, heavineſs, pain of the head, and trouble of the whole body.

The force of Cuſtom.

Aphor. 91. *ſect.* 2.

Aphor. 38. *ſect.* 2.

Accuſtomed meats are more gratefull, and ſo by that means more nouriſhing.

Wherefore we muſt diligently enquire, what Meats the Patient chiefly delighted in, that by offering them, his appetite languiſhing by reaſon of ſome great evacuation, vomit, or the like, may be ſtirred up. For it will be better and more readily reſtored by things acceptable, though they be ſomewhat worſe, as we noted a little before out of *Hippocrates*. By which words he plainly taught, that it is the part of a good and prudent Phyſitian to ſubſcribe to, and pleaſe the palat of his Patient.

The order of eating our meats.

But ſeeing that order is moſt beautifull in all things, it is truly very neceſſary in eating our Meat: for how laudable ſoever the Meats be in their quantity and quality, howſoever familiar by uſe, and gratefull by cuſtom, yet unleſs they be eaten in due order, they will either trouble or moleſt the ſtomach, or be ill, or ſlowly and difficultly concocted; wherefore we muſt diligently obſerve, what Meats muſt be eaten at the firſt, and what at the ſecond courſe; for thoſe Meats which be hard to concoct, are not to be eaten before thoſe which are eaſie of digeſtion; neither dry and aſtringent things, before moiſtening and looſing.

We muſt begin our meals with moiſt or liquid meat.

But on the contrary, all ſlippery, fat, and liquid things, and which are quickly changed, ought to go before, that ſo the belly may be moiſtned; and then aſtringent things muſt follow, that the ſtomach, by their help, being ſhut and drawn together, may more ſtraitly comprehend the Meat on every ſide, and better perform the Chylification by its proper heat united and joined together.

For this cauſe *Hippocrates*, *Lib. de victu in acutis*, commands thoſe things to be always eaten in the morning, which are fit to looſen the belly, and in the evenings ſuch as nouriſh the body. Yet notwithſtanding drink ought not to precede or go before meat, but on the contrary meat muſt precede drink, by the order preſcribed by him.

The time of eating.

The profit of labour before meat.

Whether ought we in our eating to have leſs care of the time, than we have of the order; for the time of eating of ſuch as are healthfull, ought to be certain and fixt; for at the accuſtomed hour, and when hunger preſſes, any ſound man, and which is at his own diſpoſure may eat, but exerciſe and accuſtomed labors ought to go before; for it is fit, according to the precept of *Hippocrates*, that labor precede meat, whereby the excrements of the third concoction may be evacuated; the native heat increaſed, and the ſolid parts confirmed and ſtrengthened, which are three commodities of exerciſe very neceſſary to the

the convenient taking of meat. But in ſick perſons we can ſcarce attend and give heed to theſe circumſtances of time, and accuſtomed hour of feeding; for that Indication of giving meat to the ſick, is the beſt of all, which is drawn from the motion of the diſeaſe, and the declining of the fit: for if you give meat in feavers, ſpecially the fit then taking the Patient, you nouriſh not him, but the diſeaſe. For the meat then eaten, is corrupted in the ſtomach, and yeelds fit matter for the diſeaſe: For meat (as we noted before out of *Hippocrates*) is ſtrength to the ſound, and a diſeaſe to the ſick, unleſs it be eaten at convenient time, and diligent care be had of the ſtrength of the Patient, and greatneſs of the diſeaſe.

We muſt not give meat in a fit of a Feaver.

But neither is it convenient that the meat ſhould be ſimple, and of one kind, but of many ſorts, and of divers diſhes dreſſed after different forms, leſt nature by the continuall and hatefull feeding upon the ſame meat, may at the length loath it, and ſo neither ſtraitly contain it, nor well digeſt it; or the ſtomach accuſtomed to one meat, taking any loathing thereat, may abhor all other; and as there is no deſire of that we do not know, ſo the dejected appetite cannot be delighted and ſtirred up with the pleaſure of any meat which can be offered. For we muſt not credit thoſe ſuperſtitious or too nice Phyſitians, who think the digeſtion is hindred by the much variety of meats.

Variety of meats.

The matter is far otherwiſe, for by the pleaſure of what things ſoever the ſtomach allured doth require, it embraces them more ſtraitly, and concocts them more perfectly. And our nature is deſirous of variety.

Why variety of meats is good.

Moreover, ſeeing our body is compoſed of a ſolid, moiſt, and airy ſubſtance, and it may happen, that by ſo many labors, which we are compelled to undergo and ſuſtain in this life, one of theſe may ſuffer a greater diſſipation and loſs than another; therefore the ſtomach is neceſſarily compelled to ſeek more variety, leſt any thing ſhould be wanting to repair that which is waſted. But alſo the age and ſeaſon of the year, yeeld Indications of feeding, for ſome things are convenient for a young man, ſome for an old; ſome in ſummer, ſome in winter. Wherefore we ought to know what befits each age and ſeaſon. Children need hot, moiſt, and much nouriſhment, which may not only ſuffice to nouriſh, but increaſe the body. Wherefore they worſt endure faſting, and of them, eſpecially thoſe who are the moſt lively and ſpiritfull. With old men it is otherwiſe, for becauſe their heat is ſmall, they need little nouriſhment, and are extinguiſhed by much. Wherefore old men eaſily endure to faſt; they ought to be nouriſhed with hot and moiſt meats, by which their ſolid parts now growing cold and dry, may be heated and moiſtned, as by the ſweet nouriſhment of ſuch like meats. Middle-ag'd men delight in the moderate uſe of contraries, to temper the exceſs of their too acrid heat. Young people as temperate, are to be preſerved by the uſe of like things.

Indications of feeding, taken from the age.

The manner of Diet in Winter muſt be hot, and inclining to drineſs. Wherefore then we may more plentifully uſe roſt-meats, ſtrong wines and ſpices; becauſe in the Winter-ſeaſon we are troubled with the cold and moiſt air, and at the ſame time, have much heat inwardly; for the inner parts, according to *Hippocrates*, are naturally moſt hot in the Winter and the Spring, but feaveriſh in Summer; ſo the heat of Summer is to be tempered by the uſe of cold and moiſt things, and much drink. In the temperate Spring all things muſt be moderate; but in Autumn, by little and little, we muſt paſs from our Summer to our Winter diet.

Indication from the time of the year.

CHAP. XV.

Of Motion and Reſt.

HEre Phyſitians admoniſh us, that by the name of Motion, we muſt underſtand all ſorts of exerciſes, as walking, leaping, running, riding, playing at tennis, carrying a burden, and the like. Friction or rubbing is of this kind, which in times paſt was in great uſe and eſteem, neither at this day is it altogether neglected by Phyſitians. They mention many kinds of it, but they may be all reduced to three; as, one gentle, another hard, a third indifferent; and that of the whole body, or only of ſome part thereof. The Friction is called hard, which is made by the rough, or ſtrong preſſure of the hands, ſpunges, or a courſe and new linnen cloth: it draws together, condenſates, binds and hardens the fleſh, yet if it be often and long uſed, at length it rarifies, diſſolves, attenuates, and diminiſhes the fleſh, and any other ſubſtance of the body; and alſo it cauſeth revulſion, and draws the defluxion of humors from one part to another. The gentle Friction, which is performed by the light rubbing of the hand, and ſuch like, doth the contrary; as, ſoftens, relaxes, and makes the skin ſmooth and unwrinkled; yet unleſs it be long continued, it doth none of theſe worthy to be ſpoken of. The indifferent kinds, conſiſting in the mean betwixt the other two, increaſeth the fleſh, ſwels or puffs up the habit of the body, becauſe it retains the blood and ſpirits which it draws, and ſuffers them not to be diſſipated.

What motion ſignifies.

Three kinds of Fristions.

Hard.

Gentle.

Indifferent.

The use of exercises.

The benefit of exercise is great, for it increases naturall heat, whereby better digestion follows, and by that means nourishment, and the expulsion of the excrements; and lastly, a quicker motion of the spirits, to perform their offices in the body, all the ways and passages being cleansed. Besides, it strengthens the respiration, and the other actions of the body, confirms the habit, and all the limbs of the body, by the mutuall attrition of the one with the other; whereby it comes to pass they are not so quickly wearied with labor. Hence we see that Country people are not to be tired with labor.

What the fittest time for exercise.

If any will reap these benefits by exercise, it is necessary that he take opportunity to begin his exercise, and that he seasonably desist from it, not exercising himself violently and without discretion; but at certain times according to reason.

Wherefore the best time for exercise will be before meat (that the appetite may be increased by augmenting the naturall heat) all the excrements being evacuated, lest nature being hungry and empty, do draw and infuse the ill humors contained in the guts and other parts of the body, into the whole habit, the liver, and other noble parts. Neither is it fit presently, after meat, to run into exercise, lest the crude humors and meats not well concocted, be carried into the veins. The measure and bounds of exercise must be, when the body appears more full, the face looks red, sweat begins to break forth, we breath more strongly and quick, and begin to grow weary; if any continue exercise longer, stiffness and weariness assails his joints, and the body flowing with sweat suffers a loss of the spirituous and humid substance, which is not easily repaired; by which it becomes more cold, and lean even to deformity.

The quality of exercise.

The quality of exercise which we require, is in the midst of exercise, so that the exercise must be neither too slow and idle, neither too strong nor too weak, neither too hasty nor remiss, but which may move all the the members alike. Such exercise is very fit for sound bodies. But if they be distempered, that sort of exercise is to be made choice of, which by the quality of its excess, may correct the distemper of the body, and reduce it to a certain mediocrity. Wherefore such men as are stuffed with cold, gross, and viscous humors, shall hold that kind of exercise most fit for them, which is more laborious, vehement, strong, and longer continued. Yet so, that they do not enter into it before the first and second concoction, which they may know by the yellowness of their urine. But let such as abound with thin and cholerick humors, chuse gentle exercises, and such as are free from contention, not expecting the finishing of the second concoction, for the more acride heat of the solid parts delights in such half concocted juices, which otherwise it would so burn up, all the glutinous substance thereof being wasted, that they could not be adjoyned or fastened to the parts. For the repeating or renewing of exercise, the body should be so often exercised, as there is a desire to eat. For exercise stirs up and revives the heat which lies buried and hid in the body: for digestion cannot be well performed by a sluggish heat; neither have we any benefit by the meat we eat, unless we use exercise before.

For whom strong exercises are convenient.

* Anthegmia.

The last part of exercise begun and performed according to reason, is named, * *The ordering of the body*, which is performed by an indifferent rubbing and drying of the members; that so the sweat breaking forth, the filth of the body, and such excrements lying under the skin, may be allured and drawn out; and also that the members may be freed from stiffness and weariness. At this time it is commonly used by such as play at Tennis.

What discommodities proceed from idleness.

But, as many and great commodities arise from exercise conveniently begun and performed, so great harm proceeds of idleness; for gross and vicious juices heaped up in the body commonly produce crudities, obstructions, stones both in the reins and bladder, the Gout, Apoplexie, and a thousand other diseases.

CHAP. XVI.

Of Sleep and Watching.

THat this our speech of Sleep and Watching, which we now intend, may be more plain, we will briefly declare, what commodity or discommodity they bring; what time and what hour is convenient for both; what the manner of lying must be, and the choice thereof; what the dreams in sleeping, and what pains or heavineſs and chearfulness after sleep may portend.

What sleep is.

Sleep is nothing else than the rest of the whole body, and the cessation of the Animall faculty from sense and motion. Sleep is caused, when the substance of the brain is possessed, and after some sort overcome and dulled by a certain vaporous, sweet and delightsome humidity; or when the spirits almost exhaust by performance of some labor, cannot any longer sustain the weight of the body, but cause rest by a necessary consequence, by which means nature may produce other from the meat by concoction turned into blood.

The use of sleep.

Sleep fitly taken much helps the digestion of the parts, because in the time of rest, the heat being the worker of all concoction, is carried back to them, together with the spirits

ſpirits. Neither doth ſleep only give eaſe to the wearied members, but alſo leſſens our cares, and makes us to forget our labors.

Fit time for ſleep and the nature of the night.

The night is a fit time to ſleep and to take our reſt in, as inviting ſleep by its moiſture, ſilence and darkneſs. For the heat and Spirits in the thick obſcurity of night, are driven in and retained in the center of the body; as on the contrary by the daily, and as it were, friendly and familiar light of the Sun, they are allured and drawn forth into the ſuperficies, and outward part of the body; from whence they leave ſleeping, and begin to wake. Beſides alſo, which makes not a little to that opportunity and benefit which we look for from ſleep, the night ſeaſon ſuffices for the work of juſt and perfect concoction. Which is one reaſon amongſt many that ſleep on the day time may be hurtfull. For we are wakened from our ſleep by the heat and ſpirits, called forth to the skin either by the light, or noiſe on the day time, before that the concoction which was begun be finiſhed. But that ſleep cannot but be light which comes without neceſſity of ſleeping. Wherefore the concoction being attempted, but not perfected, the ſtomach is filled with crudities, diſtended with acide or ſour belchings, and the brain troubled with groſs vapors and excrementitious humidities. From whence proceeds pain and heavineſs of the head, and ſtore of cold diſeaſes. But although ſleep on the night time be wholſome, yet it is fit, that it be reſtrained within the limits of an indifferent time. For that which exceeds, hinders the evacuation of excrements both upwards and downwards: but in the mean time the heat which is never idle, draws from them ſome portion or vapor into the veins, principall parts and habit of the body, to become matter for ſome diſeaſe. We muſt meaſure this time, not by the ſpace of hours, but by the finiſhing the work of concoction, which is performed in ſome ſooner than in other ſome. Yet that which is longeſt is perfected and done in ſeven or eight hours. The ventricle ſubſiding and falling into its ſelf and its proper coats, and the urine tinctured yellow, gives perfect judgment thereof. For on the contrary the extenſion of the ſtomach, acide belching, pain of the head, and heavineſs of the whole body, ſhew that the concoction is unperfect.

Sleep on the day-time.

There ought to be a moderation of our nights ſleep.

How to be known.

What the form and fite of our body ought to be while we ſleep.

In ſleeping we muſt have ſpeciall care of our lying down; for firſt we muſt lye on our right ſide, that ſo the meat may fall into the bottom of our ſtomach, which being fleſhy, and leſs membranous, is the hotter, and more powerfull to aſſimilate. Then a little after we muſt turn upon our left ſide, that ſo the Liver with its Lobes, as with hands may on every ſide embrace the ventricle, and as fire put under a kettle, haſten the concoction. Laſtly, towards morning it will not be unprofitable to turn again upon our right ſide, that by this ſituation the mouth of the ſtomach being opened, the vapors which ariſe from the elixation of the *Chylus* may have freer paſſage. Lying upon the back is wholly to be avoided; for from hence the Reins are inflamed, the Stone is bred, Palſies, Convulſion, and all diſeaſes which have their originall from the defluxion into the ſpinall marrow, and to the Nerves taking beginning from thence. To lye upon the belly is not unprofitable for ſuch as have uſed to lye ſo, if they be not troubled with defluxions into the eys; for ſo the humor will more eaſily flow into the part affected. But thus the work of concoction is not a little furthered, becauſe by that form of lying, not only the inward heat is contained and gathered together about the ventricle, but the encompaſſing warmneſs of the ſoft feathers of the bed aids and aſſiſts it.

The harm of lying on our backs.

Upon our bellies.

The conſideration of dreams.

Neither are the Dreams which we have in our ſleep to be neglected, for by the diligent conſideration of theſe, the affections and ſuperfluous Humors which have chief power in the body are marvailouſly known. For thoſe who have raging choler running up and down their bodies while they ſleep, all things to them appear bright, ſhining, fiery, burning, full of noiſe and contention. Thoſe who abound with Phlegm, dream of floods, ſnows, ſhowers, and inundations and falling from high places. Thoſe who are Melancholy dream of gapings and gulfs in the earth, thick and obſcure darkneſs, ſmokes, caves, and all black and diſmall things. But thoſe whoſe bodies abound in blood, dream of marriages, dances, embracings of women, feaſts, jeſts, laughter, of orchards and gardens; and to conclude, of all things pleaſant and ſplendent.

Alſo we muſt obſerve how the Patient doth after ſleep, whether more lively and chearfull, or more heavie: for by the opinion of *Hippocrates*,

Cum labor à ſomno eſt, Lethalem collige morbum:
Sin proſit ſomnus, nihil hinc Lethale timendum eſt. *Aphor. 1. ſect. 2.*

Pain ſleep enſuing, an ill diſeaſe doth ſhow:
But if ſleep profit bring, no harm from thence will flow.

And as ſleep, ſo watching, if it exceed meaſure, is hurtfull; for it hurts the temperature of the brain, weakens the ſenſes, waſtes the ſpirits, breeds crudities, heavineſs of the head, falling away of the fleſh, and leanneſs over all the body; and to conclude, it makes ulcers more dry, and ſo conſequently rebellious, difficult to heal and malign. There are many other things may be ſpoken of ſleep and watching, but theſe may ſuffice a Chirurgeon.

CHAP. XVII.

Of Repletion, and Inanition, or Emptineſs.

The kinds of Repletions, or rather of Exceſſes.

THere are, to be ſhort, two ſorts of Repletion, or of all exceſs; one is of a ſimple quality, without any defluxion, or ſociety of any humor, as appears in diſtempers without matter: the other is of quantity and maſs, the body being diſtended with too much meat, or too great quantity of humors; from whence proceed an infinite number of diſeaſes. They call the Repletion of meats, ſatiety or fulneſs; and it is of two kinds: The one which is called * Repletion or Fulneſs to the veſſels; the other * Repletion to the ſtrength.

*Repletio ad vaſa adnires

We judg of ſatiety to the veſſels, by the diſtention and ſwelling of the veins and entrails, as the ſtomach. We call ſatiety to the ſtrength, when the body is loaded with more meats than it can well bear. But alſo there is a double Repletion of humors. For either it is of ſome one humor, or of all the humors; they call this by a peculiar name, *Plethora*. For *Galen* defines *Plethora* an equal exceſs of all the humors. For if at any time he define a *Plethora* to be an exceſs of blood only; then verily by the name of blood, he underſtands an equal comprehenſion of the four humors; as it is taught in Phyſick ſchools.

Gal. Meth. 13. cap. 6.

What *Cacochymia*.

The Repletion which is cauſed by ſome one humor, is termed by *Galen* in the place before mentioned, *Cacochymia*, (that is, An evil juice) whether the Repletion proceed of a Cholerick, Melancholick, Phlegmatick, or ſerous Humor.

The kinds of evacuation.

Now Inanition, or evacuation is no other thing than the expulſion or effuſion of humors which are troubleſome, either in quantity or quality. Of Evacuations, ſome are univerſall, which expell ſuperfluous humors from the whole body; ſuch are purging, vomiting, tranſpiration, ſweats, Phlebotomy. Some particular, which are performed only to evacuate ſome part, as the brain by the noſe, palat, eys, ears; the lungs by the weazon; the ſtomach by vomit and ſtool; the guts by ſtool; the liver and the ſpleen by urine and ordure. Theſe evacuations are ſometimes performed by nature, freeing it ſelf of that which is troubleſome to it; otherwhiles by the Art of the Phyſitian in imitation of nature.

And again, one of theſe is good and requiſite, when only the humor which is hurtfull either in quantity or quality, is evacuated; The other not requiſite, or immoderate, when the profitable Humors together with the unprofitable, are expelled.

The commodities of moderate ſcratching.

But what evacuations ſoever theſe be, they are performed and done, either by the ſcratching and rubbing of the skin, as when a Cholerick, ſalt, or ſerous Humor, or ſome windineſs lying between the skin and the fleſh, cauſe itching. For by ſcratching the skin, it gets paſſage out, which is manifeſt by the efflux of a ſerous matter burning, or cauſing ſcabs and ulcers, if the humor be ſomewhat groſs, but inſenſible and not ſo manifeſt, if it be windineſs, the skin by that rubbing being rarified, and the groſs flatulency attenuated. Wherefore they do ill who hinder their Patients from ſcratching, unleſs they ſcratch ſo cruelly and hard, that there may be danger (by reaſon of the great heat and pain thereby cauſed) of ſome defluxion or falling down of humors into the part.

Or theſe evacuations are performed by much matter evacuated from an opened Bile, or running Ulcer, a Fiſtula, or ſuch like ſores. Or by ſweats which are very good and healthfull, eſpecially in ſharp diſeaſes, if they proceed from the whole body, and happen on the criticall days.

The force of vomits.

By vomit, which often violently draws theſe humors from the whole body, even from the utmoſt joints, which purging medicins could not evacuate, as we may ſee in the Palſie, and Sciatica, or Hip-gout.

Salivation.

By ſpitting, as in all who are ſuppurated either in the ſides or lungs. By Salivation, or a Phlegmatick flux by the mouth, as in thoſe who are troubled with the French-pox. By ſneezing and blowing the noſe; for by theſe, the brain oppreſt with moiſture, diſburdeneth its ſelf, whether it be done without, or with the help of ſternutatories and errhines; wherefore children, and ſuch as have ſomewhat moiſt brains, purge themſelves often this way.

The whole body is alſo purged by urine.

By hicket and belching; for by theſe the windineſs contained in the ſtomach, is often expelled. By urine, for by this not only Feavers, but which is more to be admired, the French-pox hath often been terminated and cured.

For there have been ſome troubled with the Pox, in whom a flux of the vicious and venenate humor could not by Unctions of quickſilver be procured, either from the mouth or belly; yet have been wonderfully freed by abundance of urine, both from danger of death and their diſeaſe. By bleeding; for nature hath often found a way for grievous diſeaſes, eſpecially in young bodies, by bleeding at the noſe, and by their courſes in women. By a flux, or laſk, purgation, ſweats; inſenſible evacuation and tranſpiration; for ſo tumors, the matter being brought to ſuppuration, do ſometimes vaniſh away and are diſſolved, both of their own accord, as alſo by diſſolving or diſcuſſing medicins. We do the ſame by exerciſe, diet, hot-houſes, long ſleep, waking, and ſhedding of tears. By ſucking, as with cupping-glaſſes, and horſ-leeches, in wounds made by venemous bitings.

In

In all ſuch kinds of evacuations, we muſt conſider three things, the quantity, quality, and manner of evacuation. As for an example, when an *Empyema* is opened, the matter which runs out, ought to be anſwerable in proportion to the purulent matter, which was contained in the capacity of the breaſts; otherwiſe, unleſs all the matter be emptied, there may happen a relapſe; the matter ſhould be white, ſoft, equal, and nothing ſtinking: Laſtly, you muſt let it forth not all together, and at one time, but by little and little, and at ſeverall times, otherwiſe not a little quantity of the Spirits and heat doth flow out together, with the unprofitable matter, and ſo conſequently a diſſolution of all the powers.

We muſt obſerve three things in every evacuation.

CHAP. XVIII.

Of the Perturbations, or Paſſions of the minde.

THe Perturbations are commonly called the Accidents of the minde, becauſe as bodily accidents from the body, ſo may theſe be preſent and abſent from the mind, without the corruption of the ſubject. The knowledg of theſe muſt not be lightly paſſed over by the Chirurgeon; for they ſtir up great troubles in the bodies, and yeeld occaſion of many and great diſeaſes; of which things, joy, hope, and love, may give an apparent teſtimony. For by theſe motions the heat and ſpirits are ſometimes gently, ſometimes violently diffuſed over all the body, for the enjoying of the preſent, or hoped for good. For then the heart is dilated, as to embrace the thing beloved, and the face is died with a roſie and lively colour. For it is likely, that the faculty it ſelf is ſtirred by the object, by whoſe power the heart it ſelf is moved.

Why the Paſſions of the minde are called Accidents. Their force.

For it is firſt neceſſary, before we be moved by any Paſſions, that the ſenſes in their proper ſeats, in which they are ſeldom deceived, apprehend the objects, and ſtraight, as meſſengers carry them to the common ſenſe, which ſends their conceived forms to all the faculties. And then, that each faculty, as a Judge may afreſh examin the whole matter, how it is, and conceive in the preſented objects ſome ſhew of good, or ill, to be deſired, or ſhunned. For what man that was well in his wits, did ever fall into a laughter, unleſs he formerly knew, or ſaw ſomewhat ſaid or done, which might yeeld occaſion of laughter? Therefore Joy proceeds from the heart, for the thing cauſing mirth or joy, being conceived, the faculty moves the heart, which ſhaken and moved by the faculty which hath dominion over it, is dilated and opened, as ready to embrace the exhilarating object. But in the mean time by the force of that dilatation, it ſends forth much heat, and ſpirits together with the bloud into all the body. A great part of which comming to the face, dilates it, the forehead is ſmooth and plain, the eies look bright, the cheeks become red, as died with Vermilion, the lips and mouth are drawn together, and made plain and ſmooth; ſome have their cheeks dented with two little pits (which from the effects are called laughing cheeks) becauſe of the contraction or curling, which the muſcles ſuffer by reaſon of their fulneſs of bloud and ſpirits, all which to be brief is nothing but to laugh.

From whence they have their force.

The reaſon of Joy.

Joy recreates and quickens all the faculties, ſtirs up the ſpirits, helps concoction, makes the body to be better liking, and fattens it, the heat, bloud, and ſpirits flowing thither, and the nouriſhing dew or moiſture, watering and refreſhing all the members; from whence it is, that of all the paſſions of the mind, this only is profitable, ſo that it exceed not meaſure; for immoderate and unaccuſtomed joy carries ſo violently the bloud and ſpirits from the heart, into the habit of the body, that ſodain and unlookt for death enſues, by a ſpeedy decay of the ſtrength, the laſting fountain of the vitall humour being exhauſted. Which thing principally happens to thoſe who are leſs hearty, as women and old men.

The effects of Joy.

Anger cauſeth the ſame effuſion of heat in us, but far ſpeedier than joy; therefore the ſpirits and humors are ſo enflamed by it, that it often cauſes putrid feavers, eſpecially if the body abound with any ill humour.

Anger.

Sorrow, or grief dries the body by a way quite contrary to that of anger, becauſe by this the heart is ſo ſtraitned, the heat being almoſt extinct, that the accuſtomed generation of ſpirits cannot be performed; and if any be generated, they cannot freely paſs into the members with the bloud; wherefore the vitall faculty is weakned, the lively colour of the face withers and decays, and the body waſtes away with a lingering conſumption.

Sorrow.

Fear in like ſort draws in and calls back the ſpirits, and not by little and little as in ſorrow, but ſodainly and violently; hereupon the face growes ſodainly pale, the extreme parts cold, all the body trembles or ſhakes, the belly in ſome is looſed, the voice as it were ſtays in the jawes, the heart beats with a violent pulſation, becauſe it is almoſt oppreſt by the heat, ſtrangled by the plenty of bloud, and ſpirits aboundantly ruſhing thither; The hair alſo ſtands upright, becauſe the heat and bloud are retired to the inner parts, and the utmoſt parts are more cold and drie than ſtone; by reaſon whereof the utmoſt skin and the pores, in which the roots of the hairs are faſtned, are drawn together.

Fear.

Hippocr. lib. 4. de Morb.

Shame.

Shame is a certain affection mixed, as it were, of Anger and Fear; therefore if, in that conflict of, as it were, contending passions, Fear prevail over Anger, the face waxeth pale, (the blood flying back to the heart;) and these or these Symptomes rise, according to the vehemency of the contracted and abated heat. But if on the contrary, Anger get the dominion over Fear, the blood runs violently to the face, the eyes look red, and sometimes they even fome at the mouth.

Shamefastnes.

There is another kind of shame, which the *Latins* call *Verecundia* (we Shamefastnes) in which there is a certain flux, and reflux of the heat, and blood, first recoiling to the heart, then presently rebounding from thence again. But that motion is so gentle, that the heart thereby suffers no oppression, nor defect of spirits; wherefore no accidents worthy to be spoken of, arise from hence: this affect is familiar to young maids and boyes, who if they blush for a fault committed unawares, or through carelesnes, it is thought an argument of a vertuous and good disposition.

An agony.

But an agony, which is a mixt passion of a strong fear, and vehement anger, involves the heart in the danger of both motions; wherefore by this passion, the vitall faculties is brought into very great danger. To these six Passions of the mind, all other may be revoked, as Hatred and Discord, to Anger: Mirth and Boasting, to Joy; Terrors, Frights and Swoundings, to Fear; Envy, Despair and Mourning, to Sorrow.

By these it is evident, how much the passions of the mind can prevail, to alter and overthrow the state of the body; and that by no other means, than that by the compression and dilatation of the heart, they diffuse and contract the spirits blood, and heat; from whence happens the dissipation, or oppression of the spirits.

Why the first signs of passions of the mind appear in the face.

The signes of these Symptomes quickly shew themselves in the face; the heart, by reason of the thinnes of the skin in that part, as it were painting forth the notes of its affections. And certainly the face is a part so fit to disclose all the affections of the inward parts, that by it you may manifestly know an old man from a young, a woman from a man, a temperate person from an untemperate, an *Ethiopian* from an *Indian*, a *Frenchman* from a *Spaniard*, a sad man from a merry, a sound from a sick, a living from a dead. Wherefore many affirm that the manners, and those things which we keep secret and hid in our hearts, may be understood by the face and countenance.

The use of passions of the mind.

Now we have declared what commodity and discommodity may redound to the man from these forementioned passions, and have shewed that anger is profitable to none, unless by chance to some dull by reason of idleness, or oppreſt with some cold, clammy and phlegmatick humor; and fear convenient for none, unless peradventure for such as are brought into manifest and extream danger of their life by some extraordinary sweat, immoderate bleeding, or the like unbridled evacuation: Wherefore it behoves a wise Chirurgeon to have a care, lest he inconsiderately put any Patient committed to his charge into any of these passions, unless there be some necessity thereof, by reason of any of the forementioned occasions.

CHAP. XIX.

Of things against Nature, and first of the Cause of a disease.

What things against nature are.

What, and how many the causes of diseases be.

HAving intreated of things naturall, and not naturall, now it remains we speak of things (which are called) against nature, because that they are such as are apt to weaken & corrupt the state of our body. And they be three in number; The cause of a disease, a Disease, and a Symptome. The cause of a disease is an affect against nature, which causes the disease. Which is divided into Internall and Externall. The External, originall or primitive comes from some other place, and outwardly into the body: such be meats of ill nourishment, and such weapons as hostilely wound the body.

The primitive cause.

Internall antecedent.

Internall conjunct.

The Internall have their essence and seat in the body, and are subdivided into antecedent and conjunct. That is called an antecedent cause, which as yet doth not actually make a disease, but goes near to cause one; so humors copiously flowing, or ready to flow into any part, are the antecedent causes of diseases; The conjunct is that which actually causes the disease, and is so immediately joyned in affinity to the disease, that the disease being present, it is present, and being absent, it is absent.

Again, of all such causes, some are born together with us, as the over-great quantity and malign quality of both the seeds, and the menstruous blood from diseased Parents are causes of many diseases, and specially of those which are called Hereditary.

Other happen to us after we be born, by our diet and manner of life, a stroke, fall or such other like. Those which be bred with us, cannot be wholly avoided or amended, but some of the other may be avoided, as a stroke and fall; some not, as those which necessarily enter into our body, as Air, Meat, Drink, and the like.

The congenit, or inevitable cause of death.

But if any will reckon up amongst the internal, inherent, and inevitable causes, the dayly, nay hourely dissipation of the radicall moisture, which the naturall heat continually preys upon;

upon; I do not gainsay it, no more than that division of Causes celebrated and received of Philosophers, divided into Materiall, Formall, Efficient, and Finall; for such a curious contemplation belongs not to a Chirurgeon, whom I only intend plainly to instruct. Wherefore that we have written may suffice him.

CHAP. XX.

Of a Disease.

A Disease is an affect against Nature, principally, and by it self, hurting and depraving the action of the part in which it resides. The division of a Disease is threefold; Distemperature, ill Conformation, and the Solution of Continuity. *What a disease is, and how various.*

Distemperature is a Disease of the similar parts dissenting, and changed from their proper and native temper. That digression from the native temper, happens two ways; either by a simple distemperature from the excess of one quality; and this is fourfold, Hot, Cold, Moist, and Dry; or by a compound distemperature, by the excess of two qualities, which also is fourfold, Hot and Moist, Hot and Dry; Cold and Moist, Cold and Dry. Again, every distemper is the fault of one simple and single quality, as an inflammation; or hath some vicious humors joined with it, as a Phlegmon: Again, a Distemperature is either equal, as in a *Sphacele*; or unequal, as in a *Phlegmon*, beginning or increasing. *A Distemperature.*

Ill Conformity is a fault of the organicall parts, whose composure is thereby depraved. This hath four kinds; the first is, when the figure of the part is faulty, either by nature or accident, or some cavitie abolished; as if a part which nature would have hollow for some certain use, do grow or close up: Or lastly, if they be rough, or smooth otherwise than they should, as if that part which should be rough, be smooth, or the contrary. Another is in the magnitude of the part increased, or diminished contrary to nature. The third is in the number of the parts increased or diminished; as if a hand have but four or else six fingers. The fourth is in the site and mutuall connexion of the parts; as if the parts which should be naturally united and continued be pluckt asunder, as happens in Luxations; or the contrary. The third generall kind of disease, is the solution of continuity, a Disease common, both to the similar and organicall parts, acquiring diversity of names, according to the variety of the parts in which it resides. *Ill Conformation.* *Solution of Continuity.*

CHAP. XXI.

Of a Symptome.

WE do not in this place take the word Symptome in the most generall acceptation, for every change or accident which happens to man besides his own nature; but more reservedly and specially, only for that change which the disease brings, and which follows the disease, as a shadow doth the body. *What a Symptome is.*

There be three kindes of a Symptome properly taken. The first is, when the action is hurt; I say hurt, because it is either abolished, weakned, or depraved; so blindness is a deprivation or abolishing of the action of seeing; dulness of sight, is a diminution or weakning thereof; and a suffusion, such as happens at the beginning of a Cataract, when they think flies, hares, and such like bodies fly to and fro before their eys, is a depravation of the sight. *Three kinds thereof.*

The second is a simple affect of the body, and a full fault of the habit thereof being changed, happening by the mutation of some qualities: such is the changing of the native colour into a red by a Phlegmon, and into a livid and black by a Gangrene; such is the filthy stench the nose affected with a *Polypus* sends forth; the bitter taste, in such as have the Jaundise; and the rough and rugged skin in them which are Leprous.

The third is the fault of the overmuch retention of excrements which should be expelled, and expulsion of such as should be retained; for the evacuation of an humor profitable both in quantity and quality, is against nature, as bleeding in a body not full of ill Humors, nor Plethorick; and also the retention of things hurtfull in substance, quantity and quality, as the Courses in women, the urine, and the stone in the bladder.

CHAP.

CHAP. XXII.

Of Indications.

What Indication is.

THe knowledg and exercise of Indications befits that Chirurgeon, whom no blind rashness of fortune, but reason; no chance, but counsell directs in the undertaking and performing the works of his Art. For an Indication is a certain safe and short way, which leads the Physitian, as by the hand, to the attainment of his purposed end, of preserving the sound, or curing the sick.

See *Method.* Cap. 7. *Lib. de opt. sect.*, Cap. 11.

For *Galen* doth define an Indication to be a certain insinuation of what is to be done, or a quick and judicious apprehension of that which may profit or hurt. And as Faulconers, Mariners, Plowmen, Souldiers, and all manner of Artizens, have their peculiar terms and words, which are neither known, nor used by the vulgar; so this word Indication is proper and peculiar to Physitians and Chirurgeons, as a Term of Art not vulgar; by consideration of which, as by some sign, or secret token, they are admonished what is to to be done to restore health, or repell an imminent danger.

The kinds of Indications.

There are three prime and principall kinds of Indications, every of which is subdivided into many other. The first is from things naturall. The second from those things which are termed not naturall. The third from those things which are contrary to nature. Things naturall shew they must be preserved by their like, and in the compass of these are contained all the Indications which are drawn from the nature of the Patient, that is, from his strength, temper, age, sex, habit, custome, diet.

Things not naturall may be doubted as uncertain, for one while they indicate the same things with things naturall, that is, they coindicate with the strength, temper and the rest; otherwhiles they consent with things against nature, that is, they coindicate with the disease. Wherefore *Galen* when he saith, that Indications are drawn from three things; The disease, the nature of the Patient, and the encompassing air; by proposing the familiar example of the air, he would have us to understand the other things not naturall; because we may shun or imbrace them more or less as we will our selves, but we must, whether we will or no, endure the present state of the air. Therefore the air indicates something to us, or rather coindicates; for if it nourish the disease, as conspiring with it, it will indicate the same that the disease, that is, that it must be preserved in the same state.

Lib. 9. Method. cap. 9.

Indications drawn from things naturall.

Things contrary to nature indicate they must be taken away by their contraries; therefore that we may more accurately and fully handle all the Indications drawn from things naturall, we must note, that some of these are concerning the strength of the Patient, by care to preserve which, we are often compelled for a time to forsake the cure of the proper disease: for so a great shaking happening at the beginning of an ague or feaver, we are often forced to give sustenance to the Patient, to strengthen the powers shaken by the vehemency of the shaking, which thing notwithstanding lengthens both the generall and particular fits of the ague. Other pertain to the temper, other respect the habit, if the Patient be slender, if fat, if well flesht, if of a rare, or dense constitution of body. Other respect the condition of the part affected in substance, consistence, softness, hardness, quick or dull sense, form, figure, magnitude, site, connexion, principality, service, function and use. From all these, as from notes, the skilfull Chirurgeon will draw Indications according to the time and part affected: for the same things are not fit for sore eyes, which were convenient for the ears, neither doth the phlegmon in the jaws and throat admit the same form of cure, as it doth in other parts of the body. For none can there outwardly apply repercussives, without present danger of suffocation. So there is no use of repercussives in defluxions of those parts which in site are neer the principall. Neither must thou cure a wounded Nerve and Muscle, after one manner. The temperature of a part, as Moisture, alwayes indicates its preservation, although the disease be moist, and give Indication of drying, as an ulcer. The principality of a part alwayes insinuates an Indication of astringent things, although the disease require dissolving, as an Obstruction of the Liver; for otherwise unless you mix astringent things with dissolving, you will so dissolve the strength of the part, that hereafter it cannot suffice for sanguification. If the texture of a part be rare, it shews it is less apt, or prone to obstruction; if dense, it is more obnoxious to that disease, hence it is that the Liver is oftener obstructed than the Spleen. If the part be situate more deep, or remote, it indicates the medicines must be more vigorous and liquid, that they may send their force so far. The sensibleness, or quick-sense of the part, gives Indication of milder medicines, than peradventure the signs, or notes of a great disease require. For the Physitian which applies things equally sharp to the Horny tunicle of the eye being ulcerated, and to the Leg, must need be counted either cruell, or ignorant. Each sex and Age hath its Indications, for some diseases are curable in youth, which we must not hope to cure in old age; for hoarseness and great distillations in very old men, admit no digestion, as *Hippocrates* saith.

What the conditions of the parts affected do indicate.

Indications from the ages.

Aphor. 40. li. 2.

Numquam

Nunquam decrepitus Brancham coquit, atque Coryzam.
The feeble Sire, for age that hardly goes,
Ne're well digests the hurtfull Rheume or pose.

Moreover according to his decree the diseases of the Reins, and whatsoever pains molest the bladder, are difficultly healed in old men; and also reason perswades that a Quartain admits no cure in Winter, and scarce a Quotidian; and ulcers in like manner are more hard to heal in Winter; that hence we may understand certain Indications to be drawn from time; and to increase the credit of the variety and certainty of Indications, some certaine time, and seasons in those times command us to make choise of medicines; for as *Hippocrates* testifies; *Aphor. 6 sect. 6.* *Aphor. 5 sect. 4.*

Ad Canis ardorem facilis purgatio non est.
In Dogdayes heat it is not good,
By purging for to cleanse the blood.

Neither shalt thou so well prescribe a slender diet in Winter, as in the Spring, for the air hath its Indications. For experience teaches us, that wounds of the head are far more difficultly and hardly cured, at *Rome*, *Naples*, and *Rochell* in *Xantoigne*. But the times of diseases yeeld the principall Indications, for some Medicines are only to be used at the beginning and end of diseases, others at the increase and vigour of the disease. Wee must not contemn those Indications which are drawn from the vocation of life, and manner of Diet; for you must otherwise deal with the painfull Husbandman (when he is your Patient) which leads his life sparingly and hardly, than with the Citizen who lives daintily and idlely. To this manner of life and Diet may be referred a certain secret and occult property, by which many are not only ready to vomit at eating of some meats, but tremble over all their bodies when they hear them but spoken of. I knew a prime Nobleman of the *French* Nobility, who was so perplext at the serving in of an Eel to the Table, at the midst of dinner and amongst his friends, that he fell into a swound, all his powers failing him. *Galen* in his book *de Consuetudine* tells that *Arius* the *Peripatetick* died sodainly, because compelled by the advice of those Physitians he used, he drank a great draught of cold water in the intolerable heat of a Feaver. For no reason, saith *Galen*, than that, because he knowing he had naturally a cold stomach from his childhood, perpetually abstained from cold water. From our diet. Hatred arising from secret properties.

For as much as belongs to Indications taken from things against nature; the length and depth of a wound or ulcer indicates one way; the figure cornered, round, equall and smooth, unequall and rough, with a hollowness streight or winding, indicate otherwise; the site right, left, upper, lower in another manner; and otherwise the force and violence of antecedent and conjunct causes. For oftentimes the condition of the cause indicates contrary to the disease, as when abundance of cold and gross humors cause and nourish a Feaver. So also a Symptome often indicates contrary to the disease, in which contradiction, that Indication must be most esteemed, which doth most urge; as for example sake, if swounding happen in a Feaver, the feaverish burning shall not hinder us from giving wine to the Patient. Indications taken from things against nature.

Wherefore these Indications are the principallest and most noble which lead us, as by the hand, to doe these things which pertain to the cure, prevention and mitigating of diseases. But if any object, that so curious a search of so many Indications is to no purpose, because there are many Chirurgeons, which setting only one before their eyes, which is drawn from the Essence of the disease, have the report and fame of skilfull Chirurgeons, in the opinion of the vulgar; But let him know that it doth not therefore follow, that this indication is sufficient for the cure of all diseases; for we do not alwayes follow that which the Essence of the disease doth indicate to be done. But chiefly then, where none of the forerecited Indications doth resist or gainsay; you may understand this by the example of a *Plethora*, which by the Indication drawn from the Essence of the thing requires Phlebotomy; yet who is it, that will draw blood from a child of three months old? Besides, such an Indication is not artificiall but common to the Chirurgeon with the common people. For who is it that is ignorant, that contraries are the remedies of contraries? and that broken bones must be united by joyning them together? but how it must be performed and done, this is of Art and peculiar to a Chirurgeon, and not known to the vulgar. Which the Indications drawn from those fountains we pointed at before, aboundantly teaches, which, as by certain limits of circumstances, encompass the Indication which is taken from the Essence of the disease, lest any should think, we must trust to that only. For there is some great and principall matter in it, but not all. For so the meanest of the common people is not ignorant, that the solution of continuity is to be cured by repairing that which is lost. But in what parts we may hope for restitution of the lost substance, and in which not, is the part of a skilfull Chirurgeon to know and pronounce. Wherefore he will not vainly bestow his labour We do not alwayes follow the Indication which is from the disease. In what parts we cannot hope for restoring of solution of continuity

labor to cure the nervous part of the *Diaphragma*, or Midriffe being wounded, or the Heart, ſmall Guts, Lungs, Liver, Stomach, Brain or Bladder; and that I may ſpeak in a word, Empericks are not much more skilfull than the common people, although they do ſo much extoll themſelves above others by the name of experience. For although experience be another inſtrument to find out things with reaſon, yet without reaſon, it will never teach, what the ſubſtance of the part in which the diſeaſe lies, may be; or what the action, uſe, ſite, connexion, from whence ſpeciall and proper Indications are drawn; With which the Chirurgeon being provided and inſtructed ſhall not only know by what means to find out a remedy, but alſo, leſt he may ſeem to mock any with vain promiſes, he ſhall diſcern what diſeaſes are uncurable, and therefore not to be medled withall.

Experience without reaſon is like a blind man without a guide.

But implicit or intricate diſeaſes require each to be cured in their ſeverall order, except ſome one of them be deſperate, or ſo urge & preſs that the Phyſitian think it neceſſary after prepoſterous order, to begin with it, although often he be forced to make ſome one of theſe diſeaſes incurable, or give occaſion of cauſing ſome new one: into which ſtraits we are neceſſarily compelled to fall, when, (for example) we determine to pull, or take away ſome extraneous body; for the performance whereof we are compelled to inlarge the wound. So we are forced by neceſſity to open the neck of the bladder, (that ſo we may draw forth the ſtone therein contained) with a wound which often degenerates into an uncurable Fiſtula. For that diſeaſe which threatens danger of preſent death is of ſuch moment, that to ſhun that it may be counted a ſmall matter, and commodious for the ſick to bring in other diſeaſes, though uncurable. For if a convulſion happen by pricking a Nerve, which we cannot heal by any remedies, then by cutting the Nerve aſunder we end the convulſion, but deprive the part into which that Nerve did goe, of the uſe of ſome voluntary motion. So if in any great joynt there happen a Luxation with a wound, becauſe there is danger of convulſion by trying to reſtore and ſet right the luxated part, we are forc'd for ſhunning thereof, to attend the wound only, and in the mean time to let alone the Luxation. Otherwiſe in implicit diſeaſes if there be nothing which may urge, or call us from the ordinary cure, we muſt obſerve this order, that beginning with that affect, which hinders the cure of the principall diſeaſe, we proſecute the reſt in the ſame and their proper order, untill all the diſeaſes being overcome we ſhall reſtore the part affected to its integrity. Therefore let us take for an example, an ulcer in the Leg, a *Varix* (or big ſwollen vein) and a Phlegmonous tumor round about it; and laſtly, a body wholly plethorick and filled with ill humors; order and reaſon require this, that uſing the adviſe of ſome learned Phyſitian we preſcribe a convenient diet, and by what means we may, bring him to an equality by purging and blood-letting, and then we will ſcarifie in divers places the part where it is moſt ſwollen, then preſently apply Leeches, that ſo we may free it from the burden of the conjunct matter; then uſe Cauteries to help the corruption of the bone, and in the mean time change the circular figure of the ulcer into an ovall, or triangular; then at the length we will undertake the cutting of the *Varix*, and cure the ulcer which remains according to Art, and ſo at the length cicatrize it. In all this whole time the Patient ſhall neither walk, nor ſtand, nor ſit, but ly quietly, having his Leg orderly and decently rowled up. But if (as it often happens) the temper of the hurt part, be different from the temper of the whole body, the manner of curing muſt be ſo tempered, that we increaſe the doſis of hot or cold medicines, according to the ratable proportion of the indications requiring this or that, therefore imagine the part ulcerated to be ſuch, as that it is two degrees dryer than the juſt temper; but the whole body to exceed the ſame temper in one degree of humidity: reaſon and Art will require, that the medicin applyed to the ulcer be dryer by one degree than that which the part would otherwiſe require if it were temperate; but on the contrary let us ſuppoſe thus: the whole body to be one degree more moiſt then the temper requires, and the ulcerated part to be one degree dryer: truly in this caſe the medicine that is applyed to the ulcer by reaſon of the part it ſelf, ſhall not be increaſed in dryneſs, but wholly compoſed and tempered to the Indication of the ulcer, becauſe the force of the moiſture exceeding in the like degree, doth counterpoiſe the ſuperfluous degree of dryneſs. But it is more eaſie by an artificiall conjecture to determine of all ſuch things, than by any rules or precepts.

Indications in implicit diſeaſes.

An example of Indications in implicit diſeaſes.

What we muſt do when the temper of the part is different from the temper of the whole body.

An artificiall conjecture is of much force in Indications.

To theſe ſo many and various Indications, I think good to add two other; the one from ſimilitude; the other of a certain crafty deviſe, & as the latter Phyſitians term it, of a certain ſubtile ſtratagem. We draw Indication from ſimilitude, in diſeaſes which newly ſpring up and ariſe, as which cannot be cured by Indications drawn from their contraries, as long as their Eſſence is unknown and hid; wherefore they think it neceſſary to cure them by a way and Art like thoſe diſeaſes, with which they ſeem to have an agreeing ſimilitude of Symptomes and Accidents; Our Anceſtors did the ſame in curing the French Pocks, at the firſt beginning thereof, as long as they aſſimilated the cure to that of the Leproſie, by reaſon of that affinity, which both the diſeaſes ſeem to have. But we follow crafty devices and ſubtile counſels, when the Eſſence of the diſeaſe we meet, with is wholly ſecret and hid, either becauſe it is altogether of a hidden and ſecret nature, and which cannot be unfolded by manifeſt qualities, or elſe reſides in a ſubject which is not ſufficiently known to us, nor of a phyſicall contemplation, as the Mind. For then we being deſtitute of Indications taken from

Indication from ſimilitude.

Indication of a ſubtile device.

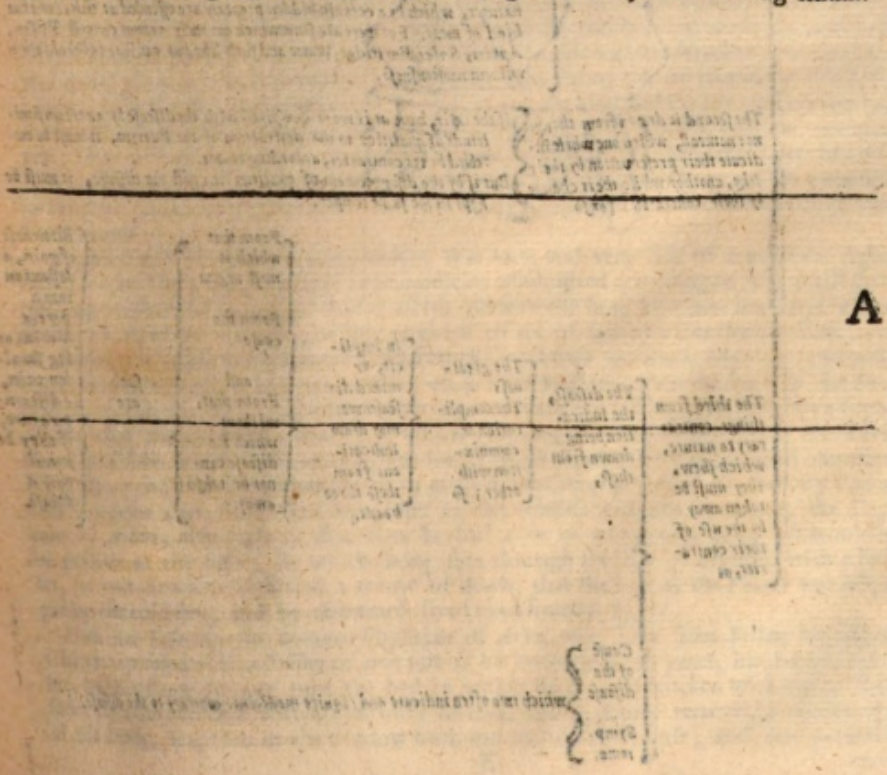
from the nature of the thing, are compelled to turn our cogitations to impostures and crafty counsels; and they say this Art and Craft is of chief use in Melancholy affects and fictions, which are often more monstrous and deformed than the *Chimera* so much mentioned in the fables of the Ancients; to which purpose, I will not think much to recite two Examples. A certain man troubled with a Melancholick disease, I know not by what errour of opinion, had strongly perswaded himself that he was without a head; the Physitians omitted nothing, by which they might hope to take this mad opinion out of his mind. But when they had in vain tryed all medicines, at length they devised this crafty, but profitable device, they fastened and put upon his head a most heavy helmet, that so by the pain and trouble of his head nodding and drawn down by that weight, he might be admonished of his error. Examples.

It is reported, another molested by the obscurity and darkness of the same disease, did verily beleeve, that he had horns upon his head; neither could he be drawn or diverted from that absurd and monstrous opinion, untill that binding up his eyes, they miserably bruised and scratched his forehead with the bony roughness of the lower parts of an oxes horns, that so he begun to believe by the painfull drawing of the blood that ran down his face, that those bloody horns were forcibly plucked from him. Ingenious Chirurgeons in imitation of these examples may in like cases do the like. For that case requires a man of a quick apprehension and advice, who may give manifest proof of his diligence and skill by medicinall stratagems, as who forthwith can politickly devise stratagems of divers sorts. A Physitian should be of a quick apprehension.

But, now coming to the end of this our tract of Indications, we must chiefly and principally observe; That of Indications some are Indicative; which absolutely and of themselves command this to be done; other conidicative, which indicate the same with the Indicative, and joyntly shew it to be done, but in some sort secondarily and not primitively; some are repugnant, which of themselves and their own nature perswade quite contrary to that the indicative primitively did perswade us; other correpugnant, which give their voice after the same form and manner with the repugnant against the indicative, as the coindicative consent to and maintain them. Let this serve for an example of them all. Indications indicative. Coindicative. Repugnant. Correpugnant.

A *Plethora*, or plenitude of humors of its own nature, requires and indicates bloodletting, the Spring time perswades and coIndicates the same, but to this counsell is quite opposite and repugnant, a weak faculty, and childhood is correpugnant.

Wherefore these four must be diligently weighed and considered when we deliberate what is to be done, and we must rather follow that which the indicative, or repugnant shew and declare, as what the diseases and strength of the Patient require, than that which the coindicative, or correpugnant shall perswade, because they have a weaker and but secundary power of indicating, and not essentiall & primitive. But because the kinds of Indications are so many and divers, therefore that the knowledg of them may be more perspicuous and less confused, I have thought good to describe and distinguish them by this following scheme.



A Table of Indications.

An Indication is a certain plain and compendious way which leads the Chirurgeon to a certain, determinate and proposed end for the cure of the present disease, of which there are three kinds.

The first is drawn from things naturall which indicate their preservation by their like; of this kind are many other which are drawn, either

- From the strength and faculties of the patient. — For whose preservation, oftentimes the proper cure of the disease must be neglected; for where these fail, it is impossible the Chirurgeon should perform what he desires and expects.
- From the temperament, as if the Patient shall be — Sanguine, Cholerick, Flegmatick, Melancholick. — Of preservation of which the Chirurgeon must have care, and if they swarve from equality, to reduce them to that which formerly they naturally were.
- From the habit of the body, as the patient shall be — Dainty and delicate. Slender and weak. Low of stature. Rare, or else dense and compact.
- From the native condition of the parts or affected parts, in which we consider, either
  - The substance thereof, as far as much as it is similar, we consider whether it be hot, cold, moist, dry, or as it is organicall, and then whether it be a principall and noble part, or a subordinate and ignoble part.
  - Or the sense, whether quick, or dull, by reason whereof the eye cannot endure such sharpe and acrid medicines, as simple flesh can.
  - Or the form, figure, magnitude, number, site, connexion, action, use.
- From the Age, for each age yeelds his peculiar Indications, hence you may observe most diseases to be incurable in old men, which are easily cured in young, others which in youth admit of no cure, unless by the change of age and the ensuing temperament.
- From Sex, for medicines work upon women far more easily than upon men.
- From the time of the year, for some meats and medicines are fit in Winter, some in Summer.
- From the Region, for as there are diversities of situations and habits of places, so also there are motions of humors, and manners of diseases: hence it is that wounds on the head at Paris, and sore slains at Avignion are more difficult to be cured.
- From the times of diseases, for some things in the beginning, others in the increase, state and declining of the disease, are more convenient.
- From the manner of diet, for this, as the proper temper, must be preserved. Wherefore such must be fed otherwise who live daintily, than those who lead their lives sparingly and hardly. Hereunto add certain peculiar natures, which by a certain hidden property are offended at this, or that kind of meat. For there are some which not only cannot concoct Ptisan, Apples, Soles, Partridge, Water and such like, but can scarce behold them without nauseousnesse.

The second is drawn from things not naturall, which one while indicate their preservation by their like, another while their change by their contraries; for so

- If the Air, have as it were conspired with the disease by a certain similitude of qualities to the destruction of the Patient, it must be corrected by its contraries, according to Art.
- But if by the disagreement of qualities it resist the disease, it must be kept in the same temper.

The third from things contrary to nature, which shew, they must be taken away by the use of their contraries, as

- The disease, the Indication being drawn from these,
  - The greatnesse
  - The complication or commixtion with other; so
    - In implicit, or mixed diseases we may draw Indications from these three heads,
      - From that which is most urgent
      - From the cause
      - From that, without which the disease cannot be taken away:

  such are

  - Bitternesse of pain, a defluxion into a part, a Varix, or big swollen vein, a distemperature, if they be joyned with a disease.
- Cause of the disease
- Symptome.

which two often indicate and require medicines contrary to the disease.

CHAP. XXIII.

Of certain wonderfull and extravagant ways of curing Diſeaſes.

AS monſters ſometimes happen in nature, ſo alſo in diſeaſes, and in the events and cures of diſeaſes. I underſtand by monſters certain marvailous ſucceſſes in diſeaſes, or certain ways of curing them, which ſwerve from Art, and happen beſides reaſon, nature, and common uſe. Monſtrous diſeaſes.

Alexander ab Alexandro, and *Peter Gilius* tell, that in *Apulia* a part of *Italy* they have a certain kind of Spider very frequent; the natives call it *Tarantula*, *Petrus Rhodius* cals it *Phalangium*; The Inhabitants find theſe Spiders in the firſt heat of Summer ſo venenate and deadly, that whomſoever they touch with their virulent biting, he preſently, without he have ſpeedy remedy, deprived of all ſenſe and motion fals down, or certainly if he eſcape the danger of death, he leads the remnant of his life in madneſs. Experience hath found a remedy by Muſick for this ſo ſpeedy and deadly a diſeaſe: Wherefore as ſoon as they can they fetch Fidlers and Pipers of divers kinds, who by playing and piping may make muſick; at the hearing whereof, he which was fallen down by reaſon of the venemous bite, riſes cheerfully, and dances ſo long to their meaſures and tunes, untill by the painfull and continued ſhaking and agitation of the whole body, all the malignity is diſſipated by tranſpiration and ſweats. The wonderfull force of the bite of a certain Spider. Muſick the remedy thereof.

Alexander adds, that it happened once in his ſight, that the Muſicians their wind and hands failing them ceaſed playing, and then the Dancer preſently fell down as if he had been dead; but by and by the Muſick beginning anew, he riſe up again and continued his dancing till the perfect diſſipation of the venome. And that it hath happened beſides, that one not ſo perfectly healed, certain reliques of the diſeaſe yet remaining, when a long time after he heard by chance a noiſe of Muſicians, he preſently fell a leaping and dancing, neither could he be made to leave before he was perfectly cured.

Some affirm according to the opinion of *Aſclepiades*, that ſuch as are frantick are much helped with a ſweet and muſicall harmony. *Theophraſtus* and *Aulus Gellius* ſay, that the pain of the Gout and Sciatica are taken away by Muſick. And the ſacred Scripture teſtifies, that *David* was wont by the ſweet ſound of the Harp to refreſh and eaſe king *Saul* when he was miſerably tormented by his evil ſpirit. *Herodotus* in *Clio* tels, that *Cræſus* the king of *Lydia* had a Son, which of a long time could not ſpeak, and when he came to mans eſtate was accounted dumb: but when an enemy with his drawn ſword invaded his father (overcome in a great fight, and the City being taken in which he was) not knowing that he was the King, the young man opened his mouth endevouring to cry out, and with that ſtriving and forcing of the Spirit, he broke the bonds and hinderances of his tongue, and ſpoke plainly and articulately, crying out to the enemy that he ſhould not kill King *Cræſus*. So both the enemy with-held his ſword, and the king had his life, and his ſon had his ſpeech always after. *Plutarch* in his book, Of the benefit to be received from our enemies, tels, That a *Theſſalian* called *Proteus*, had a certain inveterate and incurable Ulcer in a certain part of his body, which could not be healed, before he received a wound in a conflict in the ſame place, and by that means the cure being begun afreſh, the wound and ulcer were both healed. Muſick gives eaſe to pain. A ſtrong perturbation of the mind helps by moving the ſpirits.

Quintus Fabius Maximus, as *Livie* writes, was long and very ſick of a quartain Ague, neither could have wiſhed ſucceſs from medicins adminiſtred according to Art, untill skirmiſhing with the *Allobroges*, he ſhaked off his old feaveriſh heat, by a new heat and ardent deſire of fighting. It was credibly reported to me of late by a Gentleman of the Lord of *Lanſackes* Chamber, that there was a French Gentleman in *Polonia*, who was grievouſly tormented with a quartain Feaver, who on a time walking upon the bank of the river *Wixell*, to take away the irkſomneſs of his fit, was thruſt in jeſt into the River by a friend of his that met him by chance, by which (although he could ſwim, as he alſo knew that thruſt him in) he conceived ſo great fear, that the Quartain never troubled him after. King *Henry* the ſecond commanded me to go from the Camp at *Amiens* to the City *Dorlan*, that I might cure thoſe that were hurt in the conflict with the Spaniards, the Captain *S. Arbin*, although at that time he had a fit of a Quartain ague, yet would he be preſent at the fight, in which being ſhot through the ſide of his neck with a Bullet, he was ſtrucken with ſuch a terror of death, that the heat of the Feaver was aſſwaged by the cold fear, and he afterwards lived freed from his Ague. Chance ſometimes exceeds Art.

Franciſcus Valeriola the famous Phyſitian of *Arles*, tels, That *John Berlam* his fellow Citizen troubled with a Palſey of one ſide of his body for many years, his houſe taking fire, and the flame coming near the bed in which he lay, he ſtrucken with a great fear, ſuddenly raiſed himſelf with all the force he had, and preſently recovering the ſtrength of his body, leaps out at the window from the top of the houſe, and was preſently *Obſerv. A. lib. 2.*

cured of his diſeaſe, ſenſe and motion being reſtored to the part, ſo that afterward he went upright without any ſenſe of pain, who lay unmovable for many yeers before. He tells the like in the ſame place of his couſen *John Soliratius*; hee was a long time lame at *Avignion*, by reaſon that the Nerves of his hams were ſhrunk and drawn up, ſo that he could not go; being moved with a vehement and ſodain paſſion of anger againſt one of his ſervants whom hee endevoured to beat, he ſo ſtirred his body that forthwith the Nerves of his hams being diſtended and his knees made pliant he began to go and ſtand upright without any ſenſe of pain, when he had been crooked about the ſpace of ſix years before, and all his life after he remained ſound.

Cap ult. lib. de cur. rat per ſanguinis miſs.

Galen tels he was once fetched to ſtanch the bleeding, for one who had an Artery cut neer his Anckle, and that by his means he was cured without any danger of an *Aneuriſma(i)* a relaxation of a veinous veſſell; and beſides by that accidentall wound he was freed from moſt grievous pain of his hip, with which he was tormented four yeers before: but although this eaſing of the pain of the Sciatica happened according to reaſon by the evacuation of the conjunct matter, by the artery of the anckle of the ſame ſide being opened; yet becauſe it was not cut for this purpoſe, but happened only by chance, I judged it was not much diſſenting from this argument.

Galen by a dream cures the *Sciatica*.

Pliny writes that there was one named *Phalereus*, which caſting up blood at his mouth, and at the length medicines nothing availing, being weary of his life, went unarmed in the front of the battell againſt the enemy, and there receiving a wound in his breaſt, ſhed a great quantity of blood, which gave an end to his ſpitting of blood, the wound being healed, and the vein which could not contain the blood being condenſate.

At *Paris*, *Anno* 1572. in *July*, a certain Gentleman being of a modeſt and curteous cariage fell into a continuall Feaver, and by that means became Frantick, moved with the violence of which he caſt himſelf headlong out of a window two ſtories high, and fell firſt upon the ſhoulder of *Vaterra* the Duke of *Alenzons* Phyſitian, and then upon the pavement; with which fall he cruelly bruiſed his ribs and hip, but was reſtored to his former judgment and reaſon. There were preſent with the Patient beſides *Valterra*, witneſſes of this accident theſe Phyſitians, *Alexis*, *Magnus*, *Duretus*, and *Martinus*. The ſame happened in the like diſeaſe, and by the like chance to a certain *Gaſcoyn* lying at the houſe of *Agrippa* in the Paved ſtreet.

Othomannus Doctor of Phyſick of *Mompelier* and the Kings Profeſſor, told me that a certain Carpenter at *Broquer* a village in *Switzerland*, being frantick caſt himſelf headlong out of an high window into a river, and being taken out of the water was preſently reſtored to his underſtanding.

The cauſe of the laſt recited cures.

But if we may convert caſualties into counſel and Art, I would not caſt the Patient headlong out of a window. But would rather caſt them ſodainly and thinking of no ſuch thing into a great ciſtern filled with cold water, with their heads foremoſt, neither would I take them out untill they had drunk a good quantity of water, that by that ſodain fall and ſtrong fear, the matter cauſing the Frenzy might be carryed from above downwards, from the noble parts to the ignoble; the poſſibility of which is manifeſt by the forecited examples, as alſo by the example of ſuch as bit by a mad Dog, fearing the water are often ducked into it to cure them.

CHAP. XXIV.

Of certain juggling and deceitfull wayes of Curing.

HEre I determine to treat of thoſe Impoſtors, who taking upon them the perſon of a Chirurgeon, do by any means either right or wrong, put themſelves upon the works of the Art; but they principally boaſt themſelves amongſt the ignorant common ſort, of ſetting bones which are out of joint and broken, affirming as falſly as impudently, that they have the knowledg of thoſe things from their Anceſtors; as by a certain hereditary right; which is a moſt ridiculous fiction; for our minds when we are born, is as a ſmooth table, upon which nothing is painted. Otherwiſe what need we take ſuch labour and pains to acquire and exerciſe ſciences? God hath endued all brute beaſts with an inbred knowledg of certain things neceſſary for to preſerve their life, more than man.

Sciences are not hereditary.

But on the contrary he hath enriched him with a wit furniſhed with incredible celerity and judgment, by whoſe diligent and laborious agitation he ſubjects all things to his knowledg. For it is no more likely, that any man ſhould have skill in Chirurgery becauſe his father was a Chirurgeon, than that one who never endured ſweat, duſt nor Sun in the field, ſhould know how to ride and govern a great horſe, and know how to carry

carry away the credit in tilting, only becauſe he was begot by a Gentleman and one famous in the Art of War.*

There is another ſort of Impoſtors far more pernicious and leſs ſufferable, boldly and inſolently promiſing to reſtore to their proper unity and ſeat, bones which are broken and out of joint, by the only murmuring of ſome conceited charms, ſo that they may but have the Patients name and his girdle. In which thing I cannot ſufficiently admire the idleneſs of our Country-men ſo eaſily crediting ſo great and pernicious an error; not obſerving the inviolable law of the ancient Phyſitians, and principally of Divine *Hippocrates*, by which it is determined, that three things are neceſſary to the ſetting of bones diſlocated and out of joynt; to draw the bones aſunder; to hold the bone receiving, firmly immoveable with a ſtrong and ſteddy hand; to put the bone to be received into the cavity of the receiving. For which purpoſe the diligence of the Ancients hath invented ſo many engines, Gloſſocomies and Bands, leſt that the hand ſhould not be ſufficient for that laborious work. What therefore is the madneſs of ſuch Impoſtors to undertake to do that by words, which can ſcarce be done by the ſtrong hands of ſo many Servants, and by many artificiall engines?

A moſt impudent ſort of Impoſtors.

Three things neceſſary for the cure of a Luxation.

Of late years another kind of Impoſture hath ſprung up in *Germany*, they beat into fine powder a ſtone which in their mother tongue they call *Bembruch*, and give it in drink to any who have a bone broken, or diſlocated, and affirm that it is ſufficient to cure them. Through the ſame *Germany* there wander other Impoſtors who bid to bring to them the Weapons with which any is hurt; they lay up in a ſecret place and free from noiſe, and put and apply medicines to it, as if they had the patient to dreſs, and in the mean time they ſuffer him to go about his buſineſs, and impudently affirm that the wound heals by little and little by reaſon of the medicine applyed to the weapon.

But it is not likely that a thing inanimate which is deſtitute of all manner of ſenſe, ſhould feel the effect of any medicine; and leſs probable by much, that the woumded party ſhould receive any benefit from thence. Neither if any ſhould let me ſee the truth of ſuch juggling by the events themſelves and my own eyes, would I therefore beleeve that it were done naturally and by reaſon, but rather by charms and Magick.

In the laſt aſſault of the Caſtle of *Hiſdin* the Lord of *Martigues* the elder was ſhot through the breaſt with a Muſket bullet. I had him in cure together with the Phyſitians, and Chirurgeons of the Emperour *Charles* the fift and *Emanuel Philibert* the Duke of Savoy, who becauſe he entirely loved the wounded priſoner, cauſed an aſſembly of Phyſitians and Chirurgeons to conſult of the beſt means for his cure. They all were of one opinion, that the wound was deadly and incurable, becauſe it paſſed through the midſt of his lungs, and beſides had caſt forth a great quantity of knotted blood into the hollowneſs of his breſt.

There was found at that time a certain *Spaniard*, a notable Knave, and one of thoſe Impoſtors, who would pawn his life, that he would make him ſound; wherefore this Honorable Perſonage being in this deſperate caſe was committed unto his care. Firſt of all hee bid they ſhould give him the Patients ſhirt, which he tore into ſhreds and peeces, which preſently framing into a Croſs, he laid upon the wounds whiſpering ſome conceived or coined words, with a low murmure. For all other things he wiſhed the Patient to reſt content, and to uſe what diet he pleaſed, for he would do that for him, which truly he did. For he eat nothing but a few prunes, and drunk nothing but ſmall beer, yet for all this the wounded Prince died within two days; the *Spaniard* ſlipt away, and ſo ſcaped hanging. And whileſt I opened the body in the ſight of the Phyſitians and Chirurgeons to embalm him, the ſigns and accidents of the wound did evidently and plainly appear to be as we had pronounced before.

And there be alſo other Jugling companions of this tribe, who promiſe to cure all wounds with lint, or Tents, either dry, or macerated in oyl or water, and bound to the wound, having murmured over ſome charm or other, who have had ſometimes good ſucceſs, as I can witneſs. But the wounds upon which tryall was made were ſimple ones, which only required union, or cloſing for to perfect the cure. So verily the bones of beaſts when they be broke, grow together by the only benefit of nature. But when the affect ſhal be compound by diverſity of Symptomes, as a wound with an ulcer, inflammation, contuſion and fracture of a bone, you muſt hope for no other from Tents or Lints, nor charms than death. Therefore the common ſort who commit themſelves to theſe Impoſtors to be cured do not only injure themſelves, but alſo hurt the Common-wealth, and the common profit of the Citizens; for whoſe good and juſtice ſake a prudent Magiſtrate ought to deprive Impoſtors of all freedome in a free and Chriſtian common-weal.

What wounds may be cured only by lint, or by tents and Water.

Witches, Conjurers, Diviners, Soothſayers, Magicians, and ſuch like, boaſt of curing many diſeaſes; but if they do or perform any thing in this kind, they do it all by ſkights, ſubtilties and forbidden Arts, as Charms, Conjurations, Witcheries, Characters, Knots, Magicall Ligatures, Rings, Images, Poyſons, laces tyed acroſs, and other damnable tricks, with which they pollute, pervert and defame the prime and ſacred Art of

Phyſick, and that with the danger of mens lives. Who certainly are to be baniſhed by the laws of our Country, eſpecially ſeeing it is decreed in *Moſes* law, *Let none be found among you that uſeth witchcraft*, or a regarder of times, or a marker of the flying of Fowls, or a Sorcerer, or a Charmer, or that counſelleth with Spirits, or a Soothſayer, or that asketh counſell at the dead; for all that do ſuch things, are abomination to the Lord, and becauſe of theſe abominations the Lord thy God doth caſt them out before thee. But the Miracles of our Lord Jeſus Chriſt the Son of God, and of his Saints and Apoſtles in curing diſeaſes beyond nature and all Art, are of another kind, which we ought to beleeve ſo firmly and conſtantly, that it ſhould be counted an impiety for a Chriſtian to doubt of them. All holy Writings are full of theſe; as to give ſight to the blinde, hearing to the deaf, power to go to thoſe ſick of the Palſie, to drive forth Devils, to cure the Leproſie, to give fruitfulneſs to women, to raiſe the Dead, and perform by the holy Ghoſt other Miracles which exceed the condition and law of Nature; whom here we earneſtly intreat to free and protect us from unclean Devils, and the ſpirits of diabolicall deceit, and to give us the mind that we may will and be able always to aſpire to Heaven, and faſten the hope, ſafety, and anchor of all our fortunes in God alone. *Amen.*

Deut. 18.

The End of the firſt Book.

The second Book, OF LIVING CREATVRES, And of the Excellency of MAN.

BEfore I come to ſpeak of the Anatomy of Mans body, I have thought fit to ſay a little of the nature of brute Beaſts. There is between Beaſts a great deal of difference by nature; for of theſe, ſome are hardy and bold, others fearfull; ſome wilde and ſavage, others tame; ſome walking in herds, others wandring alone; ſome covered and defended with ſhels and ſcales, as the Crocodile, the Tortois, and many kinds of fiſh; others have ſtings and prickles. The difference of brute beaſts.

The Horſe hath his hard and ſtrong hoofs, his creſt (as being a generous beaſt) beſet with a thick and harſh mane. The defence of the magnanimous Lion, are his teeth, his crooked paws and tail. Buls are formidable by their horns. The Boar by his tusks ſtanding out, as it were naturall hunting ſpears. The Hare being a timerous creature, is naked and unarmed; but in recompence thereof Nature hath made her nimble and ſwift of foot. For what the more noble and courageous beaſts have in arms, is ſupplyed in the fearfull by nimbleneſs and celerity. Infinite are the other endowments of brute beaſts, and ſuch as can hardly he imagined or deſcribed. For if we diligently ſearch into their nature, we ſhall obſerve the impreſſions and ſhadows of many vertues, as of magnanimity, prudence, fortitude, clemency, and docility: for they entirely love one another, follow thoſe things that are good, ſhun thoſe that are hurtfull, and gather and lay up in ſtore thoſe things that are neceſſary for life and food. Laſtly, they give undoubted preſages of the weather and air. They have taught men many things, and are of a moſt exquiſit and quick ſenſe; of rare art in vocall muſick, prudent and carefull for their young, and faithfull lovers of their native ſoil. They are religiouſly obſervant of the rights of friendſhip and chaſtity. They have their weapons whereby they are prepared, both to invade, and to defend themſelves being invaded. They ſubmit themſelves to the diſcipline of man, practiſe and imitate his ſpeech, and mutually prattle and chant one to another. They have a kind of weal-publick amongſt themſelves, and know how to preſerve their preſent welfare, and to depell the contrary, being in this their own counſellors, and not tutored by man. Yea, man is beholden to them for the knowledg of many wholſome things. The conſideration of which bred ſo great a doubt amongſt the ancient Philoſophers, that it was a queſtion amongſt them, whether beaſts had uſe of reaſon, or no? Therefore alſo the wiſe *Solomon* ſends us for examples of parſimony and diligence unto the Ant or Piſmire; and *Eſaias* in exprobration of the people of Iſrael for their ingratitude and rebellion againſt God, ſends them to the Ox and Aſs; for they do not only know, but reverence their maſters. Some ſhadow of vertue in beaſts.

But from whence is the knowledg of theſe Medicins, wherewith the Art of Phyſick is ſo richly adorned, but from brute beaſts, as *Pliny* affirmeth? The infallible vertue of the herb *Diſtamus*, in drawing darts out of the fleſh, was taught us by the Hart, who wounded with the Huntſmans darts or arrows, by means hereof draws out the weapons which remain ſticking in her. Which is likewiſe practiſed by the Goats of *Candie*, as *Ariſtotle* writeth. The wonderfull effect which *Celandine* hath upon the ſight, was learnt by the practiſe of Swallows, who have been obſerved with it to have beſmeared, and ſo ſtrengthened the eys of their young. Serpents rub their ey-lids with fennell, and are thought by that means to quicken and reſtore the decaying ſight of their eys. The Tortois doth defend and ſtrengthen her ſelf againſt the biting of Vipers, by eating of ſavorie. Bears by eating of Piſmires, expell that poiſon that they have contracted by their uſe of Mandrakes. *Lib.8.cap.27.*

Mandrakes. And for correction of that drouzineſs and ſloth which growes upon them by their long ſleep in their dens, they eat the hearb of *Aron* (i.) Cuckopint. But the Art they uſe in the enticing and catching of Piſmires is very pretty, they go ſoftly to the holes or hils of the Piſmires, and there lay themſelves all their length upon the ground, as if they were dead, hanging out their tongue wet with their foam, which they draw not again into their mouth, before they feel them full of Piſmires, which are enticed by the ſweetneſs of the foam: And having taken this as a purging medicine, they expell by the guts, thoſe ill humors wherewith they were offended. We ſee that Dogs give themſelves a vomit, by eating a kind of graſs, which is from thence called Dog-graſs. Swine, when they find themſelves ſick, will hunt after ſmalt, or river lobſters. Stockdoves, Blackbirds, and Partridges, purge themſelves by Bay leaves. Pigeons, Turtles, and all ſort of Pullen, disburden themſelves of groſs humors, by taking of Pellitory of the wall. The bird Ibis (being not much unlike the Stork) taught us the uſe of Clyſters. For when he finds himſelf oppreſſed with a burden of hurtfull humors, he fills his bill with ſaltwater, and ſo purgeth himſelf by that part, by which the belly is beſt diſcharged. The invention of the way of removing the Cataract of the eye, we muſt yeeld unto the Goat, who by ſtriking by chance againſt the thorny buſhes, pulls off the Cataract which hinders the ſight, and covers the ball of the eye, and ſo recovers his ſight. The benefit of Phlebotomie, we owe unto the Hippotamus or River-horſe, being a kind of horſe, and the Inhabitant of the River *Nilus*; who being a great devourer, when he finds himſelf ſurcharged with a great deal of blood, doth by rubbing his thigh againſt the ſharp ſands on the bankſide, open a vein, whereby the ſuperfluous blood is diſcharged, which he ſtoppeth likewiſe when it is fit, by rowling himſelf in the thick mud. The Tortois having chanced to eat any of the fleſh of a Serpent, doth make origanum and marjoram her Antidote. The Ancients found help from brute beaſts, even againſt the dreadfull and non-ſparing force of lightning; for they were of opinion that the wings of an Eagle were never ſtruck with lightning, and therefore they put about their heads little wreaths of theſe feathers. They were perſwaded the ſame thing of the Seal, or Sea-calf, and therefore were wont to encompaſs their bodies with his skin, as a moſt certain ſafeguard againſt lightening. It were a thing too long, and laborious, to ſpeak of all thoſe other muniments of life and health (obſerved here and there by *Ariſtotle* and *Plinie*) which we have learnt of brute beaſts. I will therefore end this Chapter, after that I have firſt added this; That we are beholding to beaſts not only for the skill of curing diſeaſes, and of preſervation of health, but for our food, our rayment, and the ornament and beautifying the bodies.

The craftineſs of Bears.

The bird Ibis the firſt inventer, or ſhewer of Clyſters.

The invention of removing a Cataract.

The invention of Phleboromy.

A preſervative againſt thunder.

Of the Faculty of brute Beaſts in preſaging.

THe firſt knowledg and skill of Prognoſtication, and obſervation of weather by the Air, was firſt delivered unto us from beaſts of the land and water, and from fowl. For we ſee in dayly obſervation, that it is a ſign of change of weather, when Lambs and Rams do butt at one another with their horns, and playing wantonly do kick, and keep up their heels. The ſame is thought to be preſaged when the Oxe licks himſelf againſt the hair, and on the ſodain fils the Air with his lowing, and ſmels to the ground, and when he feeds more greedily than he uſed to do. But if the Piſmires in great multitudes fetch their prey ſo haſtily, that they run and tumble one upon another in their narrow paths, it is thought a ſign of rain; As is alſo the buſie working of Moals, and the Cats rubbing and ſtroaking of her head and neck, and above her ears, with the bottome of her feet. Alſo when Fiſhes play and leap a little above the water, it is taken for a ſign of rain. But if the Dolphins do the ſame in the ſea, and in great companies, it is thought to preſage a ſodain ſtorm and tempeſt. Whereby the Mariners forewarned, uſe all care poſſible for the ſafety of themſelves and their ſhips, and if they can caſt Anchor. And it is ſufficiently known what the louder croaking of Frogs than ordinary portends.

What the butting of Rams ſignifies.

Preſages of rain.

The ſign at ſea of a ſtorm at hand.

But the facultie of birds in this kind of preſaging is wonderfull. If Cranes flie through the air without noiſe, it is a ſign of fair weather, and of the contrary, if they make a great noiſe and flie ſtragglingly. As alſo if Sea fowl flie far from the Sea, and light on the land. The cry or ſcrieching of Owls portends a change of the preſent weather, whether foul or fair. *Plutarch* ſaith, that the loud cawing of the Crow betokens winds and ſhowers, as alſo when he flaps his ſide with his wings. Geeſe and Ducks, when they dive much, and order, and prune, and pick their feathers with their beaks, and cry to one another, foretell rain; and in like manner Swallows, when they flie ſo low about the water, that they wet themſelves, and their Wings. And the Wren, when he is obſerved to ſing more ſweetly than uſuall, and to hop up and down. And the Cock when he chants, or rather crows preſently after the ſetting of the Sun. And Gnats, and fleas, when they bite more than ordinary. If the Hern ſoar aloft into the air, it betoketh fair weather, if on the contrary he flie cloſe by the watter, rain. If Pigeons come late home to the Dove-houſe, it is a ſign of rain. If Bats flie in the evening, they foreſhew wet weather. And laſtly the Crocodile layes her egs in that place, which muſt be the bounds of the overflowing of the River *Nilus*; And therefore he that firſt meets with

The Crocodile by laying her egs, ſhews the bounds of the increaſe of the River *Nilus*.

with theſe eggs, tels the reſt of the Countrey people, and ſhews them how high the flood will riſe, and what inundation it will make upon their grounds: A thing moſt worthy of admiration, that in this monſter there ſhould be that ſtrong faculty of preſaging.

Of the induſtry of Fiſhes.

MAny ſea-Fiſhes, when they feel a tempeſt coming, do gravell or balaſt themſelves, to the end they may not be toſſed up and down at the pleaſure of the waves. Others when the fury of the ſea is at the height, hide themſelves in the holes of rocks. But in that they ſwim againſt the ſtream, they do it for this cauſe and reaſon, that the force of the ſtream and the flood may not take from them, and ſtrike off their ſcales, and that their gills may not fill with water which would hinder their ſwimming, and intercept their reſpiration. As by the ſame advice Cranes fly againſt the wind; whereas if they ſhould fly down the wind, their feathers would be diſplaced and broken, and they would not be able to fly.

How Fiſhes provide for their ſafety againſt a ſtorm.

How they ſwim againſt the ſtream.

Of the induſtry of Birds in the building of their Neſts.

THe induſtry of Birds in the building of their neſts is ſuch, that it doth far exceed the art and skill of all Maſons and Architects. From whence it is become a Proverb, *That men know, and can do all things but make Birds-neſts.* They are built within with wooll and feathers, and ſuch kind of ſoft things, which are as a kind of a pallet for the young ones. Swallows build their neſts in a round form, that they may be the more firm, and leſs ſubject to be hurt by any thing that ſhall ſtrike againſt them, and likewiſe more capacious. They chooſe their matter out of dirt and chaff, (interlacing it with many ſtraws) as it were their plaſter or lime. Thoſe that build in trees, do make choice of the ſoundeſt boughs, as if they meant to have them as a ſure foundation for the building which they ſhould erect thereon. The Cock and the Hen do by turns ſit over their eggs, and likewiſe fetch their meat, interchanging each others labor; neither do they ever forſake their young, before they are able to get their own living. I had at my houſe a great number of Sparrows neſts in earthen pots; and when the young ones begun to wax pretty big, and to be covered with feathers, I made the whole neſt be taken down and ſet upon the ground, that I and my friends might delight our ſelves in beholding the care of the old ones in the feeding of their young; for they feed them every one in order, skipping none, neither will they (to the wrong of the reſt) give one two parts, although he gape, and be importunate for it; dividing moſt juſtly to every one his own ſhare, according to the exact rule of diſtribution. And oftentimes for experiment, I would make triall with a ſtrange Sparrow of the ſame age, laid near, or put among the reſt of the young ones, whether the old ones would feed the ſtranger, as if it were legitimate. But this as a ſtranger and a baſtard they would ſuffer to ſtarve, skipping it when it gaped after the meat. And in like manner Lambs and young Kidds do in the fields, in the midſt of a great flock, run every one to his own dam; who being moſt certainly able to diſtinguiſh between the legitimate and a baſtard, will not ſuffer her ſelf to be ſuckt but by her own young.

Of what things birds build their neſts.

In what ſhape.

With what care Sparrows feed their young.

Of the induſtry of Spiders.

THe Spider ſpins her web with wonderfull artifice, hanging and faſtening it to every tack or ſtay that is nigh, drawing of his thread, and running upwards and downwards, and every way. And although the diligence of the chamber-maid beats down and mars this pendulous and new-begun work, yet her ſeat and her hold, the Spider keeps ſtill, neither is ſhe, or will ſhe deſiſt from the work ſhe hath begun, but in a very ſhort time weaves a great deal more unto the ruins of her former work, than can be unweaved again with much labor. So that from hence all cloth and linnen Weavers, all Embroiderers and workers with the needle (you will eaſily think) have learnt their Arts, if either you obſerve the exactneſs of the weaving, the fineneſs of the thred, or the continuation and indiſſoluble knitting together of the whole web; for being abrupt, and troubled with no ends of threds at all, it reſembles a thin membrane, anointed with a kind of glew, wherewith, when the prey is entangled, the Spider runs preſently in, and, as it were, draws her nets, and infolds, and takes the captive after the manner of huntſmen. If this were not daily ſeen with our eys, it would be thought fabulous.

How the Spiders weave.

How they catch their prey.

Of Bees.

I Cannot paſs in ſilence the great induſtry of Bees: For having eſtabliſhed a kind of Weal-publick, they make election of a King, who is ſuch a one, as in procerity of body, and excellency of feature exceedeth all the reſt. He is remarkable by his ſhort wings, his ſtreight legs, his grave gate; and in ſtead of a Diadem or regall Crown, either he hath no ſting, or elſe doth not uſe it, which is the Artillery of the reſt. He never goeth unattended out of the hive, but always invironed with a Princely retinue, the reſt of his train following after neither goes he at any time abroad, but upon urgent affairs which concerns

Bees chooſe themſelves a King.

concerns the whole ſtate. His progreſs is forewarned by the voice and ſound of trumpets, and as it were with ſinging, and they all draw nigh. Every one gets as near to his perſon as he can, and when he is weary with flying, they all bear him up with their own bodies.

Their pitching their tents.

On what place ſoever he alighteth, there they forthwith pitch their tents. If he chance to die, they go not abroad to feed, but ſtand all mourning round about the corpſe; then carry him out of the hive, and (as it were) follow his hearſe and bury him: and laſtly, having with ſolemnity performed all the ſeverall rites and obſequies, they chooſe themſelves another King, for without a King they cannot live. He then taketh care of all things, having his ey every where, whilſt that the reſt intend the performance of the work. And ſuperviſing all, giveth them encouragement, and chaſtiſeth negligence. For their time of going forth for food, they chooſe a clear and fair day; for they have a naturall faculty of preſaging of the weather. They are ſuch obſervers of juſtice and equity, that never, either with their ſting, or by any other way, do they moleſt any creature, neither do they exerciſe and prepare their ſpears againſt any, but for the ſafegard of themſelves and their hives.

Their obſequies for their dead King.

Their juſtice.

Of the care of Bees.

Their watch.

THey manage and order their affairs in this manner; in the day-time they appoint before their gates a ſtation of watchmen and guarders. In the night they reſt from their labors, ſo long, till that one (who is appointed to this charge) by one or two humms, as by a ſound of a Trumpet, rowſeth all the reſt. Then come they together to obſerve what is the ſtate of the weather, which if they foreſee will be fair, then abroad go they into the fields and paſtures. Some therefore bring into the hive little faſcicles of flowers on their thighs; others water in their mouth, and others a dewie moiſture gathered on their bodies. Theſe are met by others, who receive their burdens, which they diſpoſe in their due and proper places. Thoſe that are ſent out into the fields for food, are the youngeſt and the ſmalleſt; And therefore if the wind chance to riſe any thing high, they expect untill it ceaſe, and that the force and violence thereof be over. But if it continue violent, then do they ballaſt themſelves with a little ſtone flying cloſe by the ground, to prevent their being driven to and fro by the force of the wind. They are exceeding diligent in all their buſineſs, and do puniſh the ſloth of the lazie oftentimes with death. Some of them are the builders, others poliſh the building, and the reſt bring in their materials.

Their divers employments.

The building in their arched hives is with wonderfull artifice, being made with two doors, one to come in, and the other to go out at. They have all things alike, leſt that the inequality, either of their food or labor, ſhould give occaſion of diſſention. Their care is, that their houſes may ſhew both ſtate and handſomneſs. Idle drones, born for nothing but to eat, and conſume the fruits of their labors, they chaſe from their hives. Thoſe that chance to loſe their ſtings, are utterly diſabled, and in a ſhort time their guts come out that way, and they die. They bring to their owners wonderfull increaſe of wax and honey.

They puniſh ſloth with baniſhment.

Ariſtomachus a diligent obſerver of Bees.

Ariſtomachus the Philoſopher doth boaſt, that for fifty eight years together, he had with great care been a nouriſher of Bees, only that he might the better attain to the knowledg of their ſtate and condition.

Of Piſmires and Ants.

NEither truly is the induſtry, diligence, and experience of the Piſmire leſs worthy of admiration, than that of the Bees. Inſomuch as that *Solomon* bids the ſluggard to take an example of diligence from the Piſmire. Truly, if experience did not witneſs it, it would ſeem incredible, that ſo ſmall a creature ſhould be able to ſtore up ſuch abundance of corn, to diſpoſe and manage her affairs in that good order that we ſee ſhe doth. *Pliny* ſaith, that they have among them the form of a wel-govern'd and wel-order'd Common-weal. For how pretty a ſight is it to ſee them, when they ſeiſe upon a grain they have a mind to carry away, how they ſet to it, and lift it with head and ſhoulders. And how leſt the corn which they carry to their ſtore-houſe, ſhould put forth and grow, they bite it at one end. If it be ſo bigg that they cannot carry it into their little hole, they divide it in the middle. If it be dampiſh, they lay it out to dry in the Sun and open air. When the Moon is at the full, they follow their work in the night; when ſhe doth not ſhine, they take their reſt, whereby they ſhew themſelves to have ſome knowledg of heavenly things. *Pliny* affirmeth that they have their ſet Fairs and Markets, whither they come in great companies, and where they uſe to eſtabliſh leagues of amity and friendſhip one with another. And when one marks them well, would he not think that they were in conference one with another, and that they did diſcourſe among themſelves of their buſineſs? Do we not ſee that the often trampling of their little feet doth wear a path even upon hard flint ſtones?

Lib. 11. *&* 30.

Wonderfull care.

There is nothing but may be attained by diligence.

From whence we may note, what in all kind of things is the effect of aſſiduity. They ſay alſo that they perform the rites of buriall one unto another, after the manner of men.

What

What words ſhall I uſe (ſaith *Plutarch*) to expreſs ſufficiently the diligence and induſtry of the Piſmires? There is not among all the great things in nature, a ſight of greater wonder than theſe: For in the Piſmires are ſeen the marks of all vertue. Their great meetings argue that they maintain a kinde of friendſhip.

Their alacrity in the undergoing of their labors, ſeems to ſhew their fortitude and magnanimity; and laſtly, they are eminent examples of temperance, providence, and juſtice. Their mutuall charity appeareth in this, that if one of them that is not loaden meets another, (in one of their narrow paths) that is, he will give him the way, that he may the better go on in his intended journey. They ſay that the firſt entrance into their hole, is not ſtreight, but full of many diverticles and crooked paths, which all end, which will bring you to three little cels; in one of which they have their conventicles; in the other, they lay up their proviſions; and in the third they bury the carkaſſes of their dead. This doth *Plutarch* ſpeak concerning Piſmires.

The forms of all vertues expreſt in Piſmires.

Of Silk-Worms.

WIth the induſtry of theſe creatures, I ſhall not unfitly joyn that of the Silk-worms, of whoſe pains and care, both in the making of their neſts, and the ſpinning of their thred and bottoms (wherewith Kings are ſo magnificently adorned) Philoſophers have written very ſtrange things.

And who can chuſe but wonder at thoſe great endowments of skill and knowledg, and that exceeding induſtry, (the mother of ſo much wealth) in the little body of ſo ſmall a creature? The providence therefore of God, doth not only appear in this, that he hath adorned each creature with a peculiar and proper endowment, but in this eſpecially, that on the leaſt creatures of all, he hath beſtowed the greater portion of skill, induſtry, and ingenuity to ſupply their defect of bodily ſtrength.

Diligence the mother of wealth.

Of the love of Beaſts one towards another, and to their young.

PLutarch writeth, That all kind of creatures bear a ſingular love, and have a kind of care of thoſe that are generated of them, and the induſtry of the Partridges this way is much commended; for during the time that their young ones are weak and unable to fly, they teach them to lye upon their backs, and to hide themſelves among the clods on the ground, that ſo being almoſt of the ſame colour, they may not be diſcerned by the Faulkoner. But if notwithſtanding, they ſee any body coming, and that he is near them, they do with a hundred dodges and ſtoopings of themſelves, as if they were weary with flying, entice him away from their young to follow after them, and when they have their purpoſe, they then, as if they had recovered ſome freſh ſtrength, fly quite away; who can but wonder at this both affection and ſubtilty?

The induſtry of Partridg in preſerving their young.

In *Florida* part of the *Weſt-Indies*, they have a beaſt, which for the variety and deformity of it I cannot paſs over in ſilence; the natives call it *Succarath*, the Canibals, *Su-*

It keeps for the moſt part about the rivers, and the ſea-ſhore, and lives by prey. When he perceiveth that he is purſued by the Huntſman, he gets his young ones upon his back, and with his tail, which is very long and broad, he covereth them, and ſo flying, provideth both

both for his own and their ſafety; neither can he be taken by any other way but by pits, which thoſe ſavage men uſe to dig in the places near which he is to run, into which at unawares he tumbles headlong. This picture of him here, I drew out of *Thevets* Coſmographie.

Tom 2. lib. 23. cap. 1.

How Hares provide for themſelves and their young, for fear of hunters.

Neither are thoſe things leſs wonderfull that are reported of Hares, for when they would go to their ſeat, they ſever their young, and commit them to the truſt of divers places, it may be two acres aſunder one from another, leſt peradventure a Huntſman, a dog, or any man ſhould chance to come that way, and they might be in danger to be loſt at once. And then after they have traced up and down, hither and thither, and every way that the dogs may not trace them, nor the huntſman prick them, they take a leap or two, and leap into their forms.

Nor inferior to this is the craft of the Hedghog, for when the Fox purſueth him, and is now at his heels, he rowls himſelf up in his prickles like a cheſnut in the outward ſhell, ſo that every part being rounded and encompaſſed with theſe ſharp and dangerous pricks, he cannot be hurt: and ſo ſaves himſelf by this trick. For his young he provides in this manner:

The care of the Hedghog to provide for her young.

In the time of Vintage he goes to the vines, and there with his feet he ſtrikes off the boughs and the grapes, and then rowling his body makes them ſtick upon his prickles, and ſo doth (as it were) take his burthen upon his back, and then returns to his hole; you would think that the grapes did move of themſelves; the prey he divides between himſelf and his young.

Of the affection of Birds, and of Dogs towards their Maſters.

The piety of Storks.

THe young Stork provides for the old, which is diſabled by age; and if any one of their equals come to any miſchance, that he is not able to fly, they will give him their aſſiſtance, and bear him on their backs and wings. And therefore this affection and piety towards the old ones, and (as it were) brotherly love towards their equals, is commended in the Stork.

The Hen in any kind of danger gathers her chickens under her wings, and (as it were) with that guard, defends them as well as ſhe can. For their ſake ſhe expoſeth her ſelf to the cruelty of the fierceſt beaſts; and will fly in the eys of a Dog, a Wolf, or a Bear, that by chance offers to meddle with her chickens.

The fidelity of Dogs.

But who is there that doth not admire the fidelity and love of dogs towards their Maſters, whereby they recompence them for their keeping? A Dog will never forſake his Maſter, no, if he be never ſo hardly uſed. For there is no man can find a ſtick hard enough to drive that Dog clean away from him which hath once taken a love to him. There is no kind of creature that doth more certainly and readily remember his maſter; he will know the voice of all the houſhold, and of thoſe which frequent the houſe. There cannot be a truſtier keeper, (as *Cicero* himſelf ſaith) than a Dog is; I ſpeak not of their faculty of ſmelling, whereby they follow their Maſters by the foot, and find them, neither do I ſpeak of thoſe infinit examples of the fidelity of Dogs, which were too long to rehearſe.

Doves free from adultery.

Pigeons, as well the cock as the hen, although they are all very venereous, yet they know no adultery; yea, and the Hen will bear with the frowardneſs of the cock, neither will ſhe ever leave him, but reconciling him unto her by her officious diligence, bring him to his wonted dalliance and kiſſes, neither is the love of either of them leſs towards their young.

Turtles never couple twice.

There is the like mutuall bond of love between Turtles; for if one of them die, the ſurviver never ſolicits Hymen more, neither will he ever chuſe other ſeat than a dry withered bough.

Of the ſtrength, piety, docility, clemency, chaſtity, and gratitude of Elephants.

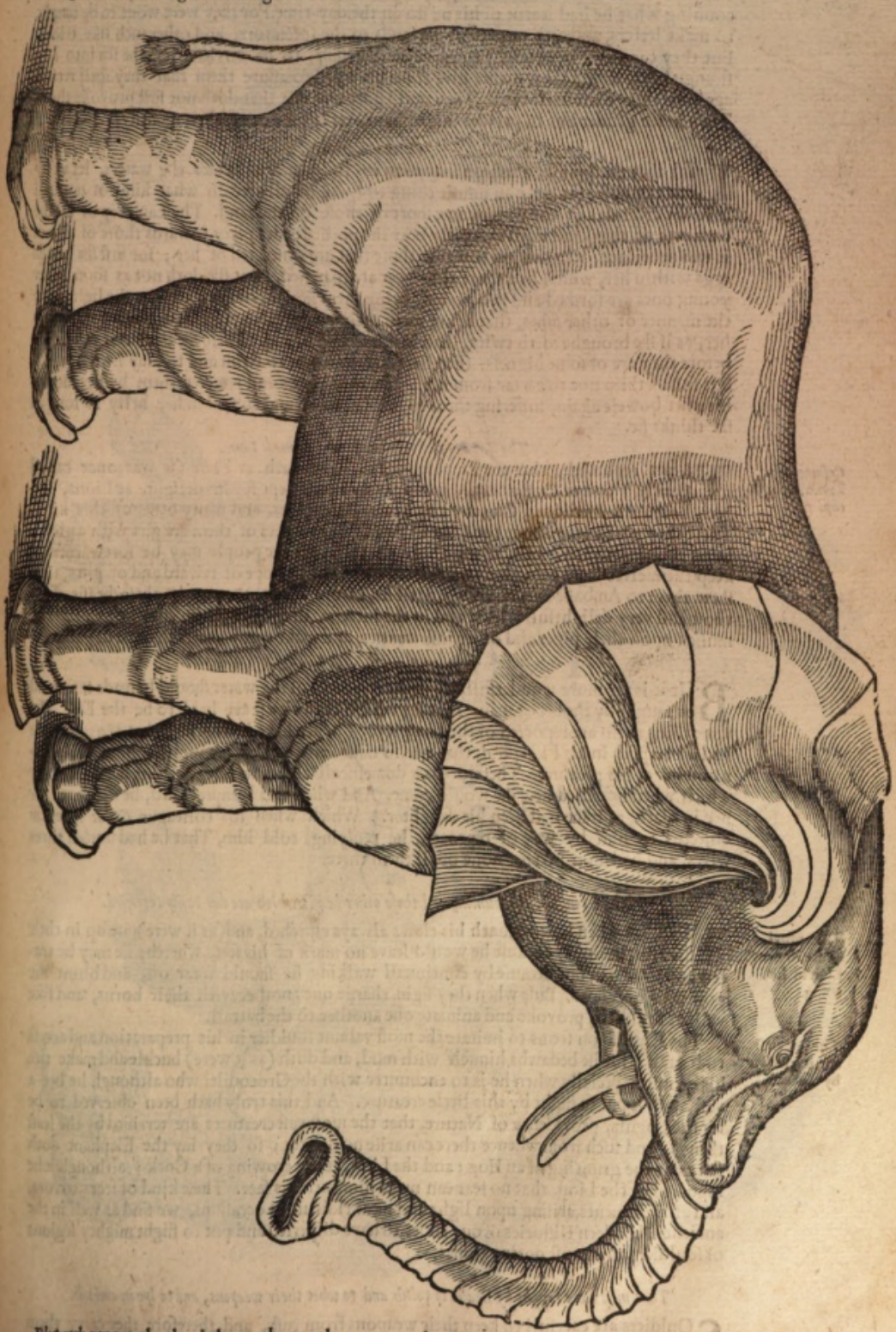
AMong the beaſts of the field, there is none more vaſt, more ſtrong, or more to be feared than the Elephant. His ſtrength is ſufficiently ſhown by thoſe towred Caſtles of armed men which he carries, and fiercely ruſheth with into the battail. The *Roman* ſouldiers, being otherwiſe of undaunted ſpirits, yet in that battail which they fought againſt *Pyrrhus*, being terrified with the vaſtneſs and immanity of theſe bodies, which they had never before ſeen, preſently turned their backs and fled; which notwithſtanding, it is a wonderfull thing what Stories naturall Philoſophers tell of the vertues of the Elephant.

Lib. 8. cap. 1.

Plinie writeth, that an Elephant cometh very near to the underſtanding that men have, and that he hath a rude kind of knowledg of language; that his facility and obſequiouſneſs is wonderfull, that his memory in the performance of his wonted duties, is no leſs wonderfull. And for Religion (*Plutarch* ſaith) that they pray unto the gods, and ſprinkle and purge themſelves with ſalt water, and that with great reverence they worſhip the Sun at his riſing, lifting their trunks up towards heaven for want of hands. *Plinie* addeth, that they do with the like reverence worſhip the Moon and the Stars. For it it related in the

The religion of the Elephant.

the Hiſtories of the *Arabians*, that at a new Moon the Elephants go by troops down unto the rivers, and there waſh themſelves with water; and being thus purged, kneel down and worſhip the Moon, and then return to the woods, the eldeſt going firſt, and the other following after according to their age.



Plutarch reporteth, that it hapned once, that among the Elephants which were taught at *Rome*

Rome againſt the Panegyrick ſhews, there was one that was ſomething dull, and not ſo docile as the reſt, which made him be deſpiſed by his fellows, and often beaten by his maſter. But that this Elephant, that he might ſupply by diligence what he wanted in wit, was oftentimes obſerved in the night, by the light of the Moon, to be practiſing and conning what he had learnt of his maſter in the day-time. For they were wont to be taught to make letters, and alſo to preſent garlands to the ſpectators, and other ſuch like tricks. But they can never be brought to go aboard a ſhip, to be carried over the ſea into any ſtrange land, unleſs their maſter give them his word to aſſure them that they ſhall return again to their own native ſoil. They never hurt any one that doth not firſt provoke them. They never gender but in private out of ſight, an argument of their modeſty.

Plin. lib. 8. cap. 5.

Of the Lamprey.

LEſt that the heat of affection may ſeem to lie quenched under the waters, let us by one example, (it were an infinit thing to ſpeak of all) ſee in what kind of mutuall love the creatures of the water come ſhort of thoſe of the land. The Lamprey of all the creatures of this kind doth worthily bear the praiſe for its piety towards thoſe of whom it was generated, its affection towards thoſe that are generated of her; for firſt ſhe breeds eggs within her, which in a ſhort time after are ſpawned. But ſhe doth not as ſoon as her young ones are formed and procreated, bring them ſtraight-way forth into the light after the manner of other fiſhes, that bring forth their young alive, but nouriſheth two within her, as if ſhe brought forth twice, and had a ſecond brood. Theſe ſhe doth not put forth before they are of ſome bigneſs, then ſhe teacheth them to ſwim and to play in the water, but ſuffers them not to go far from her; and anon gapes and receives them by her mouth into her bowels again, ſuffering them to inhabit there, and to feed in her belly ſo long as ſhe thinks fit.

The ſavage or brute beaſts may be made tame.

THevet reporteth, that the Emperor of the Turks hath at *Caire* (it was once called *Memphis*) and at *Conſtantinople*, many ſavage beaſts kept for his delight, as Lions, Tigers, Leopards, Antilopes, Camels, Elephants, Porcupines, and many other of this kind. Theſe they uſe to lead about the City to ſhew. The maſters of them are girt with a girdle hung about with little bels, that by noiſe of theſe bels the people may be forewarned to keep themſelves from being hurt by theſe beaſts. But in hope of reward and of gifts, they ſhew them to Ambaſſadors of ſtrange nations, before whom they make theſe beaſts do a thouſand very delightfull tricks, and in the interim they play their countrey tunes and muſick upon their pipes and other inſtruments, and make many ſports in hope of gain.

Coſmograph. Tom. 2. lib. 19. cap. 7.

That Fiſhes alſo may be tamed.

BUt it is far more wonderfull, that the creatures of the water ſhould be made tame, and be taught by the art of man. Among which, the chiefeſt are held to be the Eel. The ſame things alſo are reported of the Lamprey. For we have it recorded, that *Marcus Craſſus* had a Lamprey in his Fiſh-pool, that was ſo tame, and ſo well taught, that he could command her at his pleaſure. Therefore as a domeſticall and tame beaſt he gave her a name, by which when he called her, ſhe would come. And when this Lamprey died, he mourned for her in black, as if ſhe had been his daughter. Which when his colleague *Cneus Domitius* objected to him by way of reproach, he replying, told him, That he had buried three wives, and had mourned for none of all them three.

Of the Lion, the Ichneumon, and thoſe other beaſts which are not eaſily terrified.

The providence of the Lion in his going.

THe Lion when he goes, hath his claws always clutched, and (as it were) put up in their ſheaths, not only becauſe he would leave no mark of his feet, whereby he may be traced and ſo taken, but becauſe by continuall walking he ſhould wear off, and blunt the points of his claws. Buls when they fight charge one another with their horns, and like valiant ſouldiers, provoke and animate one another to the battail.

The greateſt are terrified by the leaſt.

The Ichneumon ſeems to imitate the moſt valiant ſouldier in his preparation and acceſs to battail; for he bedawbs himſelf with mud, and doth (as it were) buckle and make tite his armor, eſpecially when he is to encounter with the Crocodile; who although he bee a vaſt beaſt, is put to flight by this little creature. And this truly hath been obſerved to be by the ſingular providence of Nature, that the moſt vaſt creatures are terrified by the leaſt things, and ſuch from whence there can ariſe no danger; ſo they ſay the Elephant doth ſtartle at the grunting of an Hog; and the Lion, at the crowing of a Cock; although it be reported of the Lion, that no fear can make him turn his face. Theſe kind of fears, terrors, and affrightments, ariſing upon light and moſt ridiculous occaſions, we find as well in the ancient as modern Hiſtories of our times, to have diſperſed and put to flight mighty legions of ſouldiers, and moſt potent armies.

That men were taught by Beaſts to poliſh and to whet their weapons, and to lye in ambuſh.

SOuldiers are carefull to keep their weapons from ruſt, and therefore they carry them to the Armorers to be poliſhed. But in this care, many beaſts are nothing inferior unto

to them; for Boars whet their tusks against they fight. And the Elephant knowing that one of his teeth is doubled with digging at the roots of trees to get meat, keepeth the other sharp, and touches nothing with it, preserving it for his combat with the *Rhinoceros* his

The craft of the Rhinocerot about to fight with the Elephant.

enemy; but the craft of the Rhinocerot is very remarkable, that being in continuall enmity with the Elephant, at the time when he prepares for the battail, he whets his horn against a rock, as if it were with a whetstone; nor (if he can chuse) will he strike any other part of the Elephant but the belly, because he knows that part of the Elephant is so tender, that it may be easily pierced. This beast is in length equall to the Elephant, but in height he is inferior unto him, by reason of the shortness of his feet; he is of a palish yellow colour, and full of many spots.

Of Cocks.

Cocks are kingly and martiall Birds.

COcks are kingly Birds, and therefore Nature hath adorned them with a comb, as with a princely Diadem; and wheresoever they come, their magnanimity and courage makes them kings. They fight with their beaks and their spurs, and with their martiall voice they fright the Lion, who is otherwise the king of beasts.

Of Conies.

Conies have taught us undermining.

COnies have taught us the art of Undermining the earth, whereby the most lofty Cities and structures reaching the very skies, are by taking away their foundation levelled with the ground.

Marcus Varro writes, that in Spain there was a town, and that no mean one, which standing on a sandie ground, was so undermined by a company of Conies, that all the houses tumbling and falling down to the ground, the inhabitants were fain to depart aud seek new dwellings.

Of Wolves.

The deceits and ambushes of Wolves.

MEn have learnt the arts of waging War from the Wolves, for they come out by troops, and lye in ambush near the towns which they have appointed, and then one of them runs unto the town and provokes the dogs. And making as if he run away, incites the Dogs to follow him, untill he hath gotten them unto the place where their ambush lyeth, which on a sodain appeareth, and rusheth out upon them. And so they kill and eat all, or as many of the dogs as they are able to catch.

Of the Fox.

The craft of the Fox.

IN subtilty and craft the Fox exceedeth all other beasts: when in the chase the Dogs are at his heels, he berays and bepisses his tail, and swings it in the face and eys of the Dogs that follow him, and so blinding them, in the mean time gets ground of them. To fetch the Hens down from their pearch, he hath this devise, he shakes and swings his tail upwards and downwards, as if he meant to throw it at them; which they fearing tumble down, and he takes up one of them for his prey. His wariness when he passeth over a River that is frozen, is wonderfull; for he goes softly to the bank, and lays his ear to listen, if he can hear the noise of the water running under the ice. For if he can, back he goes, and will not venture to pass over. The knowledg of which thing he could never meerly by his subtilty and craft attain unto, but that of necessity he must have some faculty of reasoning joined with it; which by discourse, and by proving one thing by another, arrives at this Conclusion: whatsoever is liquid and maketh a noise, is in motion; whatsoever liquid is in motion, is not concrete and frozen; that which is not concrete and frozen, is liquid; whatsoever is liquid, will not bear a heavier body; whatsoever will not bear a heavier body, cannot with safety be adventured on; and therefore back again must I go, and not pass over this River.

The Fox seems to reason with himself.

His *Sorites.*

Of Swine.

SWine, if in the woods, they hear any one of the same herd with them crying out, they straight make a stand; and marshalling their forces, haste all, as if they had been warned by the sound of a martiall trumpet, to the assistance of their fellows.

Of the fishes Scarus *and* Anthia.

The love of Fishes one to another.

PLutarch reports of the *Scari*, that when one of them chances to swallow a hook, and be taken, the rest of the same kind come to his rescue, and shearing the Line with their teeth, set him at liberty. But the readiness of the *Anthia* to the mutuall assistance of one another, is yet more manifest; for by casting the Line upon which the hook hangeth on their back, with the sharpnese of their fins they cut it asunder, and so set free themselves and their captived fellows.

Of the Pilot-*fish.*

THere is great kindness between the Pilot-fish and the Whale; For although in bulk of body the Whale so far exceed him, yet he leads the Whale, and goes always before him

him as his Pilot, to keep him from running himself into any straight or muddy place, whence he might not easily get out. And therefore the Whale always follows him, and very willingly suffers himself to be led by him, it being for his own good. And in like manner he gets into the Whales mouth, and there lodging himself, sleeps when he sleeps, and leaves him not either by day or night. The Whales pilot or guide.

Of Cranes.

CRanes when they are to take a long journey into some Countrey cross the seas, put their company in so good order, that no Captain can put his souldiers in better. For before they stir out of any place, they have (as it were) their trumpets to call them together, and encourage them to fly. They come together, and then fly up on high, that they may see afar off, choosing a Captain whom they are to follow. They have their Serjeants to take care of their ranks, and keep their nightly watches by turns. *Plutarch* tels us that the Crane, which is appointed to stand Sentinell for all the rest, holds a stone in her foot, to the end, that if she chance to give way to nature and sleep, she may be waked by the noise of the falling stone. The leader lifting up his head, and stretching out his long neck, looks about him far and wide, and gives warning to the rest, of any danger that may befall them. The strongest lead the way, that they may the better with the flapping of their wings break the force of the air, and this they do by turns. And that they may the easilyer prevail against the force and opposition of the winds, they dispose their company into a wedg in the form of the Greek letter Δ or a triangle; and being skilfull in the stars, they foresee when tempests are coming, and fly down to the ground to keep themselves from the injury of the approaching storm. Cranes order themselves in ranks. The sentinell Crane.

Of Geese.

THe Geese of *Sicilie* do with great wariness take care, that by their keeking and their noise, they do not expose themselves to the rapacity of Birds of prey: for *Plutarch* saith, that when they are to fly over the hill *Taurus*, for fear of the Eagles that are there, they hold stones in their mouths to keep themselves from gagling, untill that they come unto a place where they may be secure. The care of the Geese that their gagling do them no harm.

Of Dragons.

NEither are the Dragons less crafty; for thus do they overcome those vast and otherwise invincible beasts the Elephants. They lye in ambush, and sodainly set upon the Elephants where they fear no such matter, and involve their legs with the twines of their tail, in such sort, that they are not able to go forward; and stop their nostrils with their heads, so that they cannot fetch their breath, they pull out their eys, and whersoever they find the skin most tender, there they bite and suck the blood untill they make them fall down dead. *Pliny* saith, that there are Dragons found in *Æthiopia* of ten Cubits long, but that in *India* there are Dragons of an hundred foot long, that fly so high, that they fetch Birds, and take their prey even from the midst of the clouds. The craft of Dragons fighting against the Elephant. *Lib* 8. *cap.* 11. & 12.

Of the Fish called the Fisherman.

THis fish is called the Fisherman, because he hunts and takes other Fishes, which he doth almost by the same cunning which the Cuttell uses; for he hath hanging at his throat a certain bag, like the Wattels of a Turky-cock. This when he lifteth he casteth out, and layeth before the little Fishes for a bait, and then by little and little draws it up again, untill he catch for food the little Fishes seising upon it as a prey. The craft of the Fisherman-fish in taking her prey.

Of the Cuttell Fish.

VVOnderfull is the craft of the Cuttell-fishes, for they carry a bladder at their neck full of a black juice or ink, which they pour forth as soon as they feel themselves taken; that so they may blind the eys of the Fishermen, as *Plutarch* saith, and as *Aristotle* witnesseth, they with their long fangs do not only hunt and take little Fishes, but oftentimes also Mullets. The craft of the Cuttell to save her self. *Lib.* 9. *de Hist. animal. cap.* 37.

Of the arms or weapons of brute Beasts.

BRute beasts are naturally so furnished with arms, that they have no need to get, make or borrow in any other place.

And some of them nevertheless are so furnished with such arms, that they captivate those which hold them prisoners; an example of this is the *Torpedo*, which doth not only hurt by touch, but also by the net being between, he breaths such a quality from him, as stupifies the hands of the Fishermen, so that they are forced to let go their nets, and so let him go; moreover if it touch a ship it makes it stay. *Thevet* writes, that the *Persian* bay towards *Arabia*, nourishes a fish equal in length and thickness to a Carp, on every *Cosmogr. tom.* 1. *lib.* 10. *cap.* 19.

ſide encompaſſed with ſharp and ſtrong pricks, like our Porcupine, with which he fights againſt all kinds of fiſh. If a man chance but to be lightly hurt either with theſe or his teeth, he will die within 24 hours.

Of the fiſh Vtelif.

HE ſaith moreover, That as he was carryed by force of tempeſt through the Atlantick Ocean, he ſaw this fiſh, having (as it were) a Saw in his forehead of three foot long, and four fingers broad, armed on each ſide with ſharp ſpikes; they call it *Vtelif* in their Countrey ſpeech.

Of the fiſh Caſpilly.

THere is another fiſh to be ſeen in the Arabian-gulf, which the Arabians call Caſpilly, it's two foot long, and as many broad, it hath a skin not much unlike a Dogfiſh, but armed with ſpikes, one whereof he carries in his forehead a foot and half broad, in ſharpneſs and force of cutting not much ſhort of a graver or chiſſell: with this weapon, when ſhe is oppreſt with hunger, ſhe aſſails the firſt fiſh ſhe meets, neither doth ſhe give over, before ſhe carry her as a prey whither ſhe pleaſe, as *Thevet* ſaith he hath ſeen.

Tom. 1. lib. 5. cap. 2.

Of Crabs.

CRabs and Lobſters, though in the quantity of their body they be but ſmall, yet they uſe their forked claws before, not only in feeding but alſo in defending themſelves and aſſailing others.

Of the docility of Beaſts, and firſt of the Dog.

BEaſts are apt to learn thoſe things which men deſire, whereby they ſhew themſelves not wholly void of reaſon. For Dogs, Apes, and Horſes learn to creep through the Juglers hoops, and riſe on their hinder feet, as though they would dance. *Plutarch* tels, that a Jugler had a Dog which would repreſent many things upon the ſtage befitting the occaſion and argument of the Play; amongſt the reſt, he exceeded all admiration in that, that taking a ſopotifick medicin, he excellently feigned himſelf dead; for firſt, as taken with a giddineſs in his head he begun to tremble, then preſently fell down, and lying on the ground, as it were contracted his dying members, and laſtly, as if truly dead he wax'd ſtiff; and moreover ſuffered himſelf diverſly to be fitted according to divers parts of the Theater, the fable ſo requiring. But when he, by thoſe things that were ſaid and done, knew it was time to riſe, he firſt begun to move his legs by little and little, as if he had been wakened from a ſound ſleep; then preſently with his head a little lifted up, he looked this way and that way, to the great admiration of all the beholders; and finally riſe up and went familiarly and chearfully to him he ſhould; the which ſight the Emperor *Veſpaſian* (who was then preſent in *Marcellus* his Theater) never ſaw any which more delighted him.

The wonderfull docility of Dogs.

A ſpectacle full of admiration and truth.

Of the Ape.

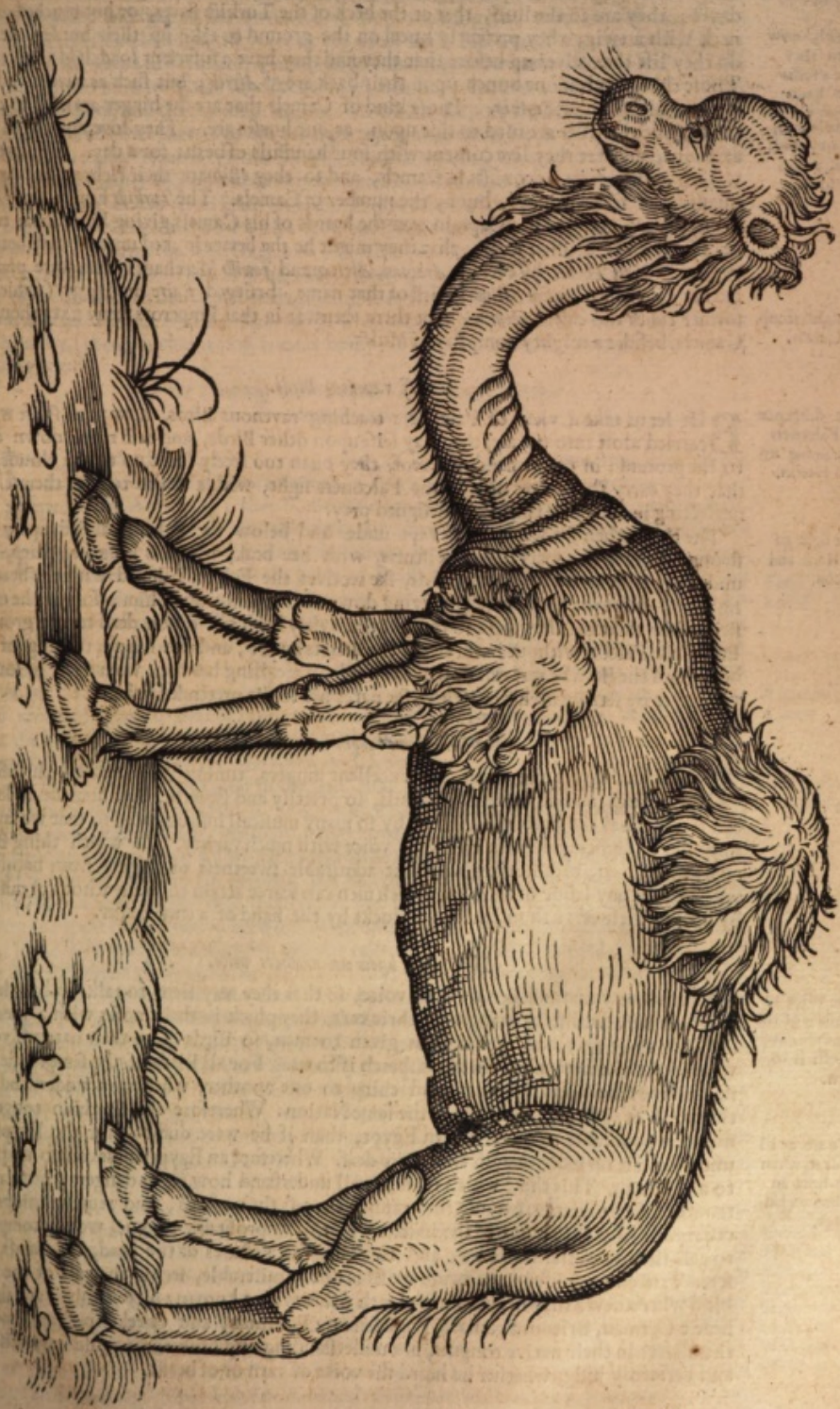
AN Ape is a ridiculous Creature, and which makes men much ſport in imitating their actions. There hath been ſeen an Ape which would pipe and ſing, and beſides dance and write, and endevour to perform many other things proper to men. I remember I ſaw in the Duke of *Somes* houſe a great and curſt Ape, who becauſe he much troubled many, had his hands cut off, who ſuffering himſelf to be cured, when the wound was cicatrized, he grew more milde and docile. Wherefore cloathed in a green coat, and girt over his loins with a girdle, he carried hanging thereat a caſe of ſpectacles, a pair of knives, and a childs handkerchief. He was committed to the charge of the Maſter-cook to teach, becauſe he had taken up his lodging in the Chimney-corner, he was taught many tricks and feats. If at any time he ſwerved from his doctrine and precepts, in a trice the whip was upon his back and loins, and much was abated of his daily allowance; for as *Perſius* ſaith, The belly is the Maſter of Arts, and ſharpener of wit. By theſe means he profited ſo in a ſhort time, that he much exceeded all the Apes of his time in the glory of his wit; and there was none counted more skilfull in leaping and dancing to the pipe, running up a pole, and nimbly leaping through his Maſters legs. To conclude, he performed all the actions of a ſtrong Ape, and very reverently carried up diſhes with the waiters and ſerving-men, and made clean the diſhes and platters by licking, and did much other drudgery, ſo that he was commonly called, Maſter *John Do-all*. At dinner and ſupper ſitting in a chair, he ſaid grace, and caſt his eys up towards heaven, and rouled them this way and that way, and ſmote his breaſt with the ſtumps of his hands with much lamentation, and imitated prayer by the gnaſhing or beating together of his teeth. He would turn up his tail to any that offended him, (for his coat ſcarce covered half his buttocks leſt he ſhould have ſiled it) he made much other paſtime, always going upright by reaſon of the cutting away of his hands, unleſs at any time through wearineſs he were forced to ſit on his buttocks.

Gal. lib. 1. de uſu partium.

Of

Of the Camels.

THe *Camell* is a very domeſticall and gentle beaſt, and which is eaſily tamed and taught all kind of obedience and ſervice; although ſome of them are cruel, wilde and



trouble-

Camels both tame and wilde.

troublesome by biting and striking such as they meet, no less than untamed horses. There is no need to house them in the night, for they may be left in the plain fields in the open and free air, feeding upon the grass and trees and cropping the tops of the thistles, neither in the morning do they any whit the worse undergoe or carry their burdens. They

The easie and not chargeable keeping of Camels.

are not put to carry burdens before they be four year old. The *Arabians* geld them young, that they may enjoy their labour the longer, neither being gelt do they rage for love or desire of Venery. At the putting in of the Spring they endure hunger and thirst for eight dayes; they are so dutifull, that at the beck of the Turkish slaves, or but touched on the

Camels know when they have a sufficient load.

neck with a twig, they presently kneel on the ground to take up their burden, neither do they lift themselves up before that they find they have a sufficient load laid upon them. Those that have but one bunch upon their back are of *Africk*; but such as have two bunches are of *Asia*, or *Scythia*. Those kind of Camels that are the bigger are used to carry

Camels both to carry burdens, and to ride upon.

packs, but the lesser are used to ride upon, as our horses are. They love nothing so well as beans, and yet they live content with four handfuls of beans for a day. The greatest wealth of the *Arabians* consists in Camels, and so they estimate their riches, not by the quantity of silver, or gold, but by the number of Camels. The *Turkish* Emperour (*Thevet* being the reporter) made a Captain over the heards of his Camels, giving him a great troop of *African* and Christian slaves, that they might be the better looked unto. I have heard it reported (saith *Thevet*) by certain *Arabian*, *African* and *Jewish* Merchants who were present, at that time when *Sultan Selim* the first of that name, besieged *Caire* in *Ægypt* (which in former times was called *Memphis*) that there then was in that Emperors army sixty thousand

A mighty troop of Camels.

Camels, besides a mighty company of Mules.

Of ravenous Birds.

The diligence of Falconers in training up their Hawks.

BUt let us take a view of Falconers teaching ravenous Birds, how with swift wings carried aloft into the air, they may seise upon other Birds, and cast them down dead to the ground; in performance whereof, they often too freely soare up to the clouds, so that they carry themselves out of the Falconers sight, with a desire to sun themselves, neglecting in the mean time their designed prey.

The fight of the Hern and Falcon.

The Hern when she sees her self kept under and below the Falcon carried up by his strong wings with a marvailous swiftness, with her beak, which is long and sharp, hid under her wings, and turned upwards, she receives the Falcon blinded with the heat of sight and desire of prey, carelesly flying down and rushing upon him; so that he often strikes him through the gorge, so that oft times they both fall down dead to the ground. But if the Falcon without harm escape the deceits by art, and the happy turning of his body, and the Hern be not cast down, the Faulconer calling her back with never so loud a voice, yet by setting up her Feathers she dares her to the pretended fight.

That Birds have taught us musicall tunes.

To sing like a Nightingale.

THe Nightingales are sweet and excellent singers, tuning their notes with infinite quaverings, and diversities of sounds, so prettily and sweetly, that humane industry can scarce equal the sweetness thereof, by so many musicall instruments; so that we say, he sings like a Nightingale, who varies his voice with much variety. In which thing Birds much excell men, because they have that admirable sweetness of singing from nature it self without any labor of learning; which men can scarce attain to in any school of musick, by having their ears a thousand times pluckt by the hand of a curst master.

That Beasts know one anothers voice.

The voice to beasts is of the same use, as speech is to men.

BEasts know one another by their voice, so that they may seem to talk and to laugh together, whilst flattering with their ears, they pluck in their noses with a pleasant aspect of their eys; and as speech is given to men, so Birds have their naturall voice, which is of the same use to them, as speech is to us. For all Birds of the same species, as men of the same countrey, chant and chirp to one another, when men understand not the speech of other men, unless of the same Nation. Wherefore the Scythian tongue is

We are as ill as deaf, when we hear an unknown language.

no more profitable to one living in Egypt, than if he were dumb; nor the Egyptians understand it no more than if they were deaf. Wherefore an Egyptian is dumb and deaf to a Scythian. This those which travail well understand how many dangers, how many troubles they undergo, because they cannot express their minds, and require things necessary for life. Wherefore to the assistance of this unprofitable tongue, we are compelled to call the rest of the members, and to abuse the gestures of the head, eys, hands, and feet. Truly the condition of brute beasts is not so miserable, seeing that all of the same kind whersoever they be, may answer each other with a known voice. Truly if any should hear a German, Briton, Spaniard, Englishman, Polonian, and Greek, speaking amongst themselves in their native tongues, not understanding any of them, he could scarce discern, and certainly judg, whether he heard the voice of men or of beasts.

That

That Birds may counterfeit Mans voice.

Parrets are wonderfull imitaters of mans voice.

Inets, Larks, Pies, Rooks, Daws, Crows, Stares, and other such like Birds, speak, sing, whistle, and imitate the voices of men, and other creatures. In this Parrats excell all other, being wonderous skilfull imitaters of mens voices, and very merry, but specially when they have drunk a little wine.

A talking Pie.

Plutarch reports that there was a Barber at *Rome*, who kept a Pie in his shop, which spoke exceeding well, and that of her own accord, none teaching her, when she first heard men talking together; shee imitated the voice or cry of all beasts shee heard, as also the sound of Drums, and the sound of Pipes, and Trumpets; to conclude, there was nothing which she did not indevour to imitate. There have been Crows that have spoken and articulately sung songs and Psalmes, and that of some length. To which purpose the History of *Macrobius* is notable; for he tels that there was one amongst those, who went forth for luck sake to meet with *Augustus Cæsar*, returning from the was against *Antonius*, who carried a Crow, which he had taught plainly to pronounce this salutation, *Salve Cæsar Imperator Augustissime*, that is, *God save thee, O most sacred Emperor Cæsar.* *Cæsar* taken with the novelty of this spectacle, bought this obsequious bird with a thousand peeces of silver. *Pliny* and *Valerius* have reckoned up amongst prodigies, Oxen and Asses that have spoken. I omit infinit other things recorded by the ancients, *Plato*, *Aristotle*, *Pliny*, *Plutarch*, and other Philosophers of great credit, of the docility of beasts, and their admirable felicity of understanding. Which things, if untrue, these learned men would never have recorded in writing, lest so they might brand with vanity, (then which nothing is more base) the rest of their writings to posterity in all ensuing ages.

Lib 2. Saturn. cap. 4.

Of the Sympathy and Antipathy of Living Creatures amongst themselves.

HAving briefly described the understanding of brute beasts, it seems not impertinent to set down some things more worthy of knowledg, happening unto them by reason of Sympathy and Antipathy; that is, mutuall agreement and disagreement, which happens not only to them living, but also dead, by a certain hidden property, through occasion whereof some desire, other shun, and others prosecute one another even to death. In testimony whereof; The *Lyon* the King of Beasts excelling all other in courage and magnanimity, fears the Cock, for he is not only terrified by his presence, but also by his crowing being absent. So an Elephant fears a Hog; but he is so afraid of Mice and Rats, that he will not touch the meat that is given him, if he smelt that it hath been defiled with such creatures. There is deadly hatred between the Elephant and Rhinocerot; yet when the Elephant is furious and angry, he becomes quiet and calm at the sight of a Ram. A Horse is so afraid of a Camel, that he cannot indure his sight. The Dog hates the Wolf, the Hart flies the Dog. The Snake flies from and fears a naked man, and followes him being clothed. There is deadly hatred between the Aspis and Ichneumon, for he when he hath cowled himself in the clay, dries himself in the Sun, and so being covered over (by doing thus divers times) as it were with shells, or armour, he enters into combat, stretching out his tail, and presenting his back, untill he get opportunity to choak his adversary, by leaping and fastening on her jaws, by which stratagem he also kils the Crocodile. The green Lizard is a capitall enemy to the Serpent, but most friendly to man, as *Erasmus* witnesseth by many Histories concerning that matter, in his Dialogue of Sympathy and Antipathy. There is a great deal of hatred between a Man and a Wolf, which is most manifest by this, that if the Wolves first see a man, his voice is taken away, and his intended cry hindered. If the Weasell intend to set upon the Aspis that most venemous Serpent, shee arms her self by eating Rue, as a most certain Antidote. The Ape fears the Torpedo, as *Erasmus* manifests by a pleasant history in the forementioned Dialogue; where also he prettily shews the deadly hatred between the serpent called Areus and the toad. The like hate is between the Owl and Crows, so that the Owl dares not go out, fly abroad, or seek her food unless by night. The water or River fowl are afraid of the Falcon; that if they but hear her bells, they had rather be killed with staves and stones, than take wing to flie into the air. So the Lark yeelds herself to be taken by a man, lest shee fall into the talons of the Hobby. The Castrill, or Merlin is naturally a terror to Hauks, so that they both shun his voice and presence.

The Lion fears a cock.

A horse fears a Camell.

What foul fear the Falcon.

The Kites are all at perpetual enmity with the Crows, wherefore the Crow alwayes gets away the Kites provision. All kind of Pullen fear the Fox. The Chicken fears neither a Horse, or an Elephant, but scarce hatched, it presently runs away at the voice or sight of a Kite, and hides it self under the hens wings. The Lambe and Kid flie from the Wolf when they first see him, neither doth death give an end to that hatred, but it supervives their funerall. An Experiment whereof (they say) is, that if one Drum be headed with Wolves skins and another with Sheeps, and beaten up togethar, you shall scarce hear the sound of the Drum covered with sheeps skins. And besides, if you string one Harp with strings made of sheeps guts, and another with strings of Wolves guts, you cannot bring it

The enemity between the Kites and Crows.

The discord between the Lamb and Wolf is not ended by death.

it to paſs, by any art, to make them agree and go in one tune. It is reported from the experiments of many men, that if a Wolves head be hanged up on high in the place where Sheep are, that they will not touch the graſs how good and freſh ſoever it be, nor reſt quiet in any place, but tumultuouſly run up and down, untill all ſuch kind of terror be taken away. The hate betwixt Mice and Weaſels appears by this, that if you mix never ſo little of the brains of a Weaſell in the rennet, with which you crudle you Cheeſe, the Mice will never gnaw or touch that cheeſe. The Linnet doth ſo hate the bird *Florus*, that both their bloods put into one veſſel cannot be mixed together. A Wolves head hung up in a dove-houſe, drives away Poll-Cats and Weaſels. The Panther and Hyæna burn with ſo great hatred, that if both their skins be laid one againſt the other, the Panthers will ſhed the hair, the hairs of the Hyæna remaining entire and not moved; which thing, they ſay, happens to the feathers of other birds if any one chance to tye them up in a bundle with the Eagles. Let theſe ſuffice for ſome few examples of many, of the Antipathy amongſt beaſts. But of the Sympathy and conſent of beaſts amongſt themſelves, I think needleſs to write any thing, being it is ſufficiently known to all, that one Jay aſſociates another, and the cruel Bears agree amongſt themſelves; and beaſts of the ſame ſpecies do wonderfully conſent one with another.

How to make cheeſe that Mice will not gnaw.

That Man excells all beaſts.

I Now think it fit to aſſay to write of that excellency of man over beaſts, which I have ſo long intended. Neither would I that Epicures and other too much naturall and materiate Philoſophers, ſo take thoſe things I have written of the endowments of beaſts, as though we ſhould think, there were no difference between man and beaſt. I had no ſuch meaning, no ſuch intention; but only that man ſhould not become too ſtately, or too ingrate in leſs acknowledging God to be the Author of ſo many benefits with which he abounds. For whatſoever we have largely ſpoken of beaſts, yet there is no compariſon between beaſts and man, for there is too great a difference between them. For mans mind is adorned with religion, juſtice, prudence, magnanimity, faith, piety, modeſty, clemency, fortitude, and other vertues as lights, which ſhine much more bright in man than in beaſts. For they are ſometimes all in ſome one man, each whereof are thought great in beaſts. For ſeeing that man is made to the Image of God, it cannot be, how much ſoever he defile himſelf with the pollution of vices, that he can ſo obſcure that inbred light, but that alwaies ſome beam of the divine wiſdome will be inherent & ſhine in him. But although by collation to ſome beaſts, he may ſeem a defective and weak Creature; yet no fortitude nor ſtrength of beaſts can be ſo great as to equall the fortitude of man. For God hath ingraven in man the character of his divine vertue, by the aſſiſtance whereof, he might have all beaſts under and obedient to him. And though by that we have formerly ſaid, beaſts may ſeem to have a certain ſhadow of reaſon, yet that ſmall light is not fit for many and divers uſes, but there is only given them ſo much providence, as ſhould be ſufficient for them and the preſervation of their bodies. But men have reaſon given them to crop or gather the fruits of eternall life, (as *Lactantius* ſaith) whereby it comes to paſs, that man only, amongſt ſo many creatures, hath ſenſe and underſtanding of divine things. Which *Cicero* thought to be known by that, becauſe man only had a certain knowledg of God in his mind. Wherefore he was inriched by God with reaſon, ſpeech and hands as helps for the performance of all his actions; moreover by his ſingular and almoſt divine wit he eaſily excels all brute beaſts. For firſt, reaſon being his guide, he invented things neceſſary for life, 2dly impoſed names on the things invented befitting their natures, framed letters and Characters, invented all liberall Arts and handy-crafts, and found means to meaſure the Land and Sea. He hath obſerved and drawn into an Art the ſpaces of the Celeſtiall Globe, the diſtinctions of the Stars, the changes and orders of dayes and nights, of times and ſeaſons, the riſing and ſetting of Stars, and their power and effects over theſe lower bodies. Laſtly, he records in writing to perpetuall memory that which concerns his own nature, or the nature of other things, the precepts and ordinances of life and manners: by which ſingular gift, we can now confer with *Socrates*, *Plato*, *Ariſtotle*, and other Philoſophers of ancient times, as if they were living.

Mans body Gods image.

Man hath given names to things.

What benefit man hath by reaſon of his native nakedneſs and ignorance.

BUt as Mans body is by nature naked and unarmed, ſo is his mind like a ſmooth table in which nothing is painted, nothing graven; but for help of his nakedneſs he hath hands, and for ſupply of his ignorance, reaſon and ſpeech. And by theſe three being as it were the miniſters of infinite variety of things, he clothes and defends his body with all things needfull: and inriches his mind with the knowledg of Arts and Sciences. Now if he had certain weapons born with him, he ſhould uſe them only; if he ſhould be born skilfull in any Art, he would meddle with none elſe. Therefore becauſe it was more expedient to uſe all ſorts of weapons with the hand, and be skilfull in all Arts; therefore he muſt be born wanting and ignorant of all. *Ariſtotle* very wittily called the hand the inſtrument of inſtruments: in imitation of which ſpeech, one may rightly affirm, that reaſon is the

Gal. cap. 4. lib. 1 de ſa partium.

As the hand is the inſtrument of inſtruments ſo reaſon is the art of arts.

Art

Art of Arts: for as the hand in worth exceeds the other instruments, because it can make, handle and fit them for use; so reason and speech, though names of no Art, yet comprehend and encrease all Arts. Therefore man seeing he hath his mind instructed by Art, that is, by reason; it is fit he should have his body defended with a weapon, or instrument, that is, the hand, which in agility and excellency should excell all other instruments. For so Man hath of his hands in stead of all weapons, which he may use in war and peace as the instruments of all Arts; he wants not the Buls horns, the Boars tuskes, the horses hoofs, nor to conclude, any arms of any other Beast. For by the benefit of his hands he can handle other arms far more profitable and safe; as a Lance, Sword, Spear, halberd; but man also can use at some distance the bow, sling and handgun, when the horn and the hoof cannot be used but neer at hand. But some may say; A Lyon exceeds a man in swiftness of foot; what then? is man therefore inferiour to him? no, for by the means of his hands and the guidance of his reason he bridling and riding upon a horse, out runs the Lyon, and being victor follows him to and again as he himself pleases, or vanquished flies away, and from the horses back as from a tower wounds the Lyon with what weapons he pleases. To conclude, man is aboundantly provided with means, to defend himself from the violence of all other beasts. For this purpose he doth not only harness himself as with brasen wals, but also makes ditches and Bulwarkes, he makes by the ministery of his hands all kind of weapons, weaves himself garments, casts into the water and draws forth nets to catch fish; and to conclude, he performs all things to his own contentment, and having that priviledge granted him by God, he rules over all the earth; all things which lye hid in the bowels of the earth, which go, or creep upon the earth, which swim in the Sea, and flie through the air, or are any where shut up in the compass of the skie, are in mans dominion.

Man under God is the king and Emperour of the world.

How wonderfull God hath shewed himself in making man.

GOds Deity and providence hath principally shewed it self in the creation of man; neither his so admired light hath so shone in the production of other creatures, seeing that God would have them to live and have their being, only for mans sake, that they might serve him. Therefore man is, if we diligently consider all his endowments, a certain pattern and rule of the divine majesty and (if I may so say) Artifice. For being made to Gods image, he is as it were his coin, exceeding the capacity of all humane understanding. Which seemed a just reason to the ancient Philosophers, that he should be called *Microcosmos*, or a little world, because the particles of all things contained in the compass of heaven and earth, are contained in his mind and body, that in the mean time I may in silence pass over his soul more great and noble than the whole world.

Man is the end of all mundane things.

Man a little world, yea almost a great world.

Why Nature hath not given Man the faculty of presaging.

THis seems the reason, that men by the instinct of nature do not foresee the future seasons & dispositions of the heaven & air; because, seeing they have received certain sparks of prudence from God, by whose care and guidance they are led to the knowledg of things by no deceitfull but certain judgment, being not obnoxious to the conditions and changes of times and seasons, as beasts are. Wherefore knowing all these airy changes to be placed under them, that is to say, their minds, according as occasion serves, and their minds desire, they give themselves to mirth when the air is wet, stormy and dark, and on the contrary, in a clear and fair season, to a sincere and grave meditation of things sublime and ful of doubt. But beasts accommodating themselves to that disposition of the air which is present and at hand, are lively, or sad, not from any judgment as men, but according to the temper and complexion of their bodies following the inclinations of the air, and of the humors one while diffused, another while contracted. Neither ought we to blame man, because he can imitate the voice of beasts, but rather much commend him, that he can infinitely wrest and vary one thing, that is, his voice; for men can barke like Foxes and dogs; grunt like hogs; whet and grind their teeth like boars; roare like Lyons; bellow like bulls; neigh like horses; knack their teeth like Apes; houl like Wolves; bray like Asses; bleat like Goats and Sheep; mourn like Bears, Pigeons, and Turtles; Keeke and gaggle like geese; hiss like Serpents; cry like Storks; caw like a Crow, and crow like Cock; clock like hens; chatter as Swallows and Pies; sing like Nightingales; croak like Frogs; imitate the singing of Waspes, and Humming of Bees; mew like Cats. The singing of Birds scarce seems to merit the name of Musicall, compared to the harmony of men fitted and tuned with infinit variety of voices. For with this they possess the ears of Kings and Princes; provoke and temper their wrath, and carry mens minds beyond themselves, and transforme them into what habits they please. But if those cruell beasts have any humanity, they owe it all to man. For he tames Lyons, Elephants, Bears, Tigers, Leopards, Panthers, and such other like.

Man is not obnoxious to the air and stars.

One man will counterfeit the voices of infinite varieties of beasts.

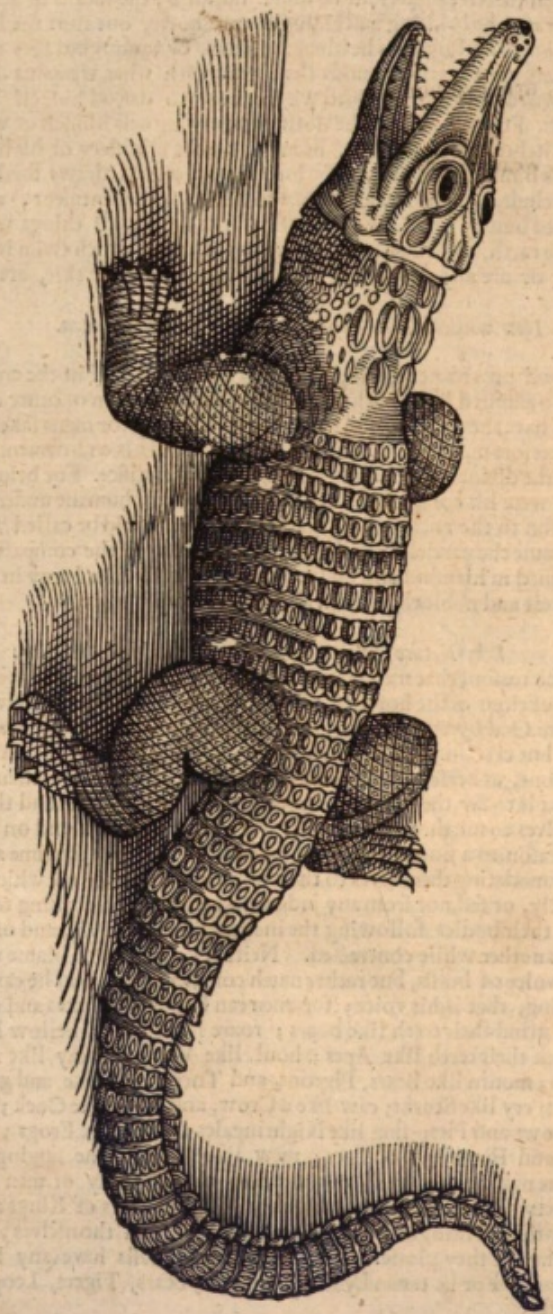
The power of Musick.

of

Of the Crocodile.

A tame Crocodile.

PLutarch reports of the Crocodile (whose figure is delineated) that being tamed, and taught by man, he doth not only hear mans voice, and answers to his call, but suffers himself to be handled, and opening his throat, lets his teeth be scratched and wiped with a towell. How small a part of Physick is that, which beasts are taught by nature? Certainly nothing in comparison of man, who by the study and practise of a few years can learn at his fingers ends all the parts of Physick: and practise them not only for his own, but also for the common good of all men. But why cannot beasts attain unto the know-



ledg of Physick so well as men? I think, because so great an Art as Physick is, cannot be attained unto by the dull capacities of Beasts.

But

But for that I have written of the Religion of Elephants, if I muſt ſpeak according to the truth of the matter, we cannot ſay they worſhip God, or have any ſenſe of the divine Majeſty. For how can they have any knowledge of ſublime things or of God, ſeeing they wholly following their food, know not how to meditate on celeſtiall things? Now for that they behold and turn themſelves to the Moon by night, and to the Sun in the morning, they do not that as worſhipping, or for that they conceive any excellency or divinity in the Sun; but becauſe nature ſo requiring and leading them, they feel their bodies to rejoyce in that light, and their entralls and humors to move and ſtir them to it. Therefore when we attributed religion to Elephants, we ſaid it rather popularly, than truly, and more that we might exhort men to the worſhip of God, than that we thought Elephants had any knowledg of divine worſhip implanted in their minds.

In what ſenſe we ſaid Elephants had religion.

That man may attain unto the knowledg of all voices and tongues.

THe docility of mans wit is ſo great, and facility of the body obeying that divine gift of wit ſuch, that he is not only able to learn to underſtand and ſpeak the tongues of divers nations differing in ſo many peculiar languages; and not only to imitate and counterfeit the voices of all beaſts though ſo much different from man, which many flattering and jugling companions, followers of other mens tables, will do; but alſo may be able to know and underſtand both what they pretend and ſignifie. In confirmation of which thing they cite the Philoſopher *Apollonius* moſt famous in this kind of ſtudy and knowledg. He walking on a time amongſt a company of his friends through the field, and ſeeing a Sparrow come flying and chirping much to divers other Sparrows ſitting upon a tree, is reported to have ſaid to thoſe which were with him: That bird which came flying hither, told the other in her language, that an Aſs laded with corn was fallen down at the City gate, and had ſhed the wheat upon the ground. Wherefore *Apollonius* and all his friends which minds were with him went thither to ſee whether it were ſo, and found that it was ſo, as he had told them, and obſerved that the Sparrows moved thereto by the coming of the other, were eating up the grains of Corn ſhed on the ground.

Man not only the imirater, but the interpreter of the voices of beaſts and birds.

But for Crows and Pies artificially taught to counterfeit mens voyces, it is too ſmall a thing, that for that cauſe they ſhould contend with men. For they have quickly babled all they have learnt with longer coſt and labour, tediouſly ſinging ſtill the ſame ſong, and whatſoever they prate they do it without ſenſe, underſtanding or any reaſon for what they ſay. But man alwayes contemplating ſomewhat more high, ſtill thinks of greater things than theſe preſent, and never reſts. But burning with an infinite and endleſs deſire of knowledg, he doth not only covet to know theſe things which appertain to food and cloathing, but by caſting up his eyes towards heaven, and by the light of his mind, he learns and underſtands things divine. Which is ſo certain an argument of the celeſtiall originall of our ſoul, that he which conſiders thoſe things can no wayes doubt, but that we have our minds ſeaſoned, by the univerſall divine underſtanding. But now it is time for us to ſet thait upon the deſcription of the body, the habitation and fit inſtrument of al the functions of divne mind.

The unquenchable deſire of learning in man.

The End of the ſecond Book.

The third Book,
TREATING
Of the Anatomy of MANS BODY.

IFollowing the custom and the manner of such as before me have written of Anatomy, will first, (that I may make the minds of the Readers more attentive and desirous of these studies) declare how necessary it is, and also how profitable, and then shew the order to be observed in it, before I come to the particular description of mans body.

The necessity of the knowledg of Anatomy.

Furthermore how Anatomy may be defined, and the manner of the definition of the parts. For the first, the knowledg of Anatomy seems in my judgment very necessary to those that desire to excell, or attain to perfection of Physick; that is, whereby they may be able to preserve the present health of the body, and the parts thereof, and drive away diseases. For how can either Physitian or Chirurgeon preserve health by the use of the like things, which consists in the temperament, conformation, and naturall union of the parts; or expell the disease which hurts those three; by the like use of their contraries, unless he shall know the nature and composure of the body, and understand as by the rule of this knowledg, how much it swerves from the nature thereof? Wherefore it is excellently said of *Hippocrates*; that the Physitian called to cure the sick Patient, ought diligently to consider, whether those things that are in him, or appear to be in him, be like or unlike, that is, whether the Patient be like himself and his own nature in all his parts and functions, temperature, composure and union; that he may preserve those which are yet contained in the bounds of nature, and restore those that are gone astray. Which thing *Galen* hath also confirmed, specially where he saith, he must wel know the nature and structure or composure of the bones, who takes upon him to restore them broken or dislocated to themselves and their proper seats or places. Moreover seeing that healing doth not only consist in the knowledg of the disease, but as well in prescribing fit medicines and like application of them to the body and the parts thereof, all which by their naturall dissimilitude, do require unlike medicines, according to *Galens* opinion: I prethe tell mee, who can perform this, which is ignorant of the description of the whole and the parts thereof, taught by Anatomy? We may say the like of the Apothecary, who ignorant of the situation of the parts in the body cannot apply Emplaisters, Ointments, Cataplasms, Fomentations, Epithemes, bags to the fit places, as to the sutures of the skull, to the Heart, Liver, Stomach, Spleen, Reins, Wombe or Bladder. For example, let us imagine the Liver to be troubled with a hot distemperature, but on the contrary, the stomach with a cold (which commonly happens, seeing the Liver hotter than it ought to be, sends up many vapours to the head; from whence cold humors fall into the stomach) if hot things to be applied to the stomach by the Physitians prescription, be by the Apothecary making no difference, applied both to the stomach and neighboring Liver (which may chance if he be ignorant that the stomach bends somewhat to the left side under the breast-blade; but the liver so takes up the right side of the body that with a great part thereof, it covers almost all the stomach) will not he much offend by increasing the hot distemper of the liver, and not thereby giving ease, or help to the disease? Shall not by this his ignorance, the Patient be frustrated of his desire, the Physitian of his intent, and the medicine of its effect? By these examples I think it most manifest, that the Anatomicall knowledg of the parts of the body is exceeding necessary to all Physitians, Chirurgeons, and Apothecaries, who will practise Physick with any praise to the glory of God, and the benefit and good of man, for whose sake we have writ these things, and illustrated them by figures, subjecting the parts to the eye, and fitly put them in their proper places.

Initio lib. de Offic. medici.

Lib. de offibus.

1. de loc. affect. & lib. 3. Meth.

Why when the liver is hot the stomach is commonly cold.

The Knowledg of Anatomy, is commodious four manner of wayes.

But Anatomy is commodious four manner of wayes; the first is, because thus we are led to the knowledg of God the Creator, as by the effect to the cause; for as we read in St. *Paul*, The invisible things of God are made manifest by the visible. The second is, that by means hereof we know the nature of mans body, and the parts thereof, whereby we may more easily and certainly judg and determine of sickness and health. The third is, that by the knowledg of the body and its parts, and together therewith its affections and diseases, we may prognosticate what is to come, and foretell the events of diseases. Lastly, the fourth is, that considering the nature of the diseased part, we may fitly prescribe medicines, and apply them in their due places.

There is a threefold method.

Now we must declare in what order Anatomy may be fitly delivered; but first we must observe there is a threefold Method; The first is called of Composition, being very commodious for the teaching of Arts, which *Aristotle* hath used in his Works of Logick, and naturall Philosophy, the order and beginning taken from the least and most simple to the more compound. The second of Division, fit for the inventing or finding out of sciences. *Galen* hath followed this order in his Books of Anatomicall Administrations, and

and of the uſe of the parts. The third of Definition, which ſheweth the nature and eſſence of things, as appears by *Galen* in his Book *De Arte Parva*. And becauſe this order doth alſo proſecute the diviſions, therefore it is commonly accuſtomed to be comprehended in the compaſs of the ſecond. Therefore I will follow this in my Anatomicall Treatiſe, dividing mans body into its parts, which I will not only ſubject to the eye in the way of knowing them, but alſo to the mind in the faithfull underſtanding them. For I will adjoyn thoſe things that are delivered of them by *Galen* in his Book of Anatom. Adminiſtrations, with thoſe which he hath taught in his Books of the uſe of the parts. For there he fitly laies the parts of mans body before our eyes, to the ſenſe. But here he teaches to know them, not to ſee them; for he ſhews why, and for what uſe they are made. Having briefly handled theſe things, we muſt declare what Anatomy is; that as *Cicero* ſaith out of *Plato's Phædro*, it may be underſtood of what we diſpute. And becauſe we attain that by definition (which is a ſhort and plain ſpeech, conſiſting of the *Genus* and difference of the things defined, being the eſſentiall parts, by which the nature and eſſence of the thing, is briefly and plainly explained) firſt we define Anatomy, then preſently explain the particular parts of the definition.

The Authors intent.

Wherefore Anatomy, (if you have regard to the name) is a perfect and abſolute diviſion, or artificiall reſolution of mans body into its parts, as well generall as particular, as well compound as ſimple. Neither may this definition ſeem illegitimate, ſpecially amongſt Phyſitians and Chirurgeons. For ſeeing they are Artizans humiliated to the ſenſe, they may uſe the proper and common qualities of things for their eſſentiall differences and forms. As on the contrary, Philoſophers may refuſe all definitions as ſpurious, which conſiſt not of the next *Genus* and the moſt proper, and eſſentiall differences. But ſeeing that, through the imbecillity of our underſtanding, ſuch differences are unknown to us, in their places we are compelled in defining things, to draw into one many common and proper accidents, to finiſh that definition which we intend, which for that cauſe we may more truly call a deſcription, becauſe for the matter and eſſentiall form of the thing, it preſents us only the matter adorned with certain accidents. This appears by the former definition, in wich *Diviſion* and *Reſolution* ſtand for the *Genus*, becauſe they may be parted into divers others, as it were into *ſpecies*. That which is added over and beſides, ſtands in place of the difference, becauſe they ſeparate and make different the thing it ſelf from all other raſh and unartificiall diſſections. We muſt know an artificiall diviſion, is no other than a ſeparation of one part from another, without the hurt of the other, obſerving the proper circumſcription of each of them; which if they periſh or be defaced by the diviſion, it cannot be ſaid to be artificiall; and thus much may ſuffice for the parts of the definition in generall.

What Anatomy is.

How a definition differs from a deſcription.

For as much as belongs to the explication of each word; we ſaid *of Mans body*, becauſe as much as lies in us, we take care of, preſerve the health, and depell the diſeaſes thereof, by which it may appear that mans body is the ſubject of Phyſick, not as it is mans, or conſiſts of matter and form, but as it is partaker of health and ſickneſs.

The ſubject of Phyſick.

We underſtand nothing elſe by a part, according to *Galen*, than ſome certain body, which is not wholly disjoined, nor wholly united with other bodies of their kinde; but ſo that, according to his opinion, the whole being compoſed therewith, with which in ſome ſort it is united, and in ſome kind ſeparated from the ſame, by their proper circumſcription. Furthermore by the *parts in generall*, I underſtand the head, breaſt, belly, and their adjuncts. By the particular parts of thoſe, I underſtand, the ſimple parts, as the ſimilar, which are nine in number, as a griſtle, bone, ligament, membrane, tendon, nerve, vein, arterie, muſculous fleſh; ſome add fibers, fat, marrow, the nails and hairs; other omit them as excrements; but we muſt note that ſuch parts are called ſimple, rather in the judgment of the ſenſe, than of reaſon. For if any will more diligently conſider their nature, they find ſhall none abſolutely ſimple, becauſe they are nouriſhed, have life and ſenſe, either manifeſt or obſcure, which happens not without a nerve, vein, and artery.

Gal. lib. 1. de uſu part. lib. 1. Meth.

The ſimilar parts are nine.

But if any ſhall object, that no nerve is communicated to any bone, except the teeth; I will anſwer, that nevertheleſs the bones have ſenſe by the nervous fibers, which are communicated to them by the *Perioſteum*, as by whoſe mediation the *Perioſteum* is connext to the bones, as we ſee it happens to theſe membranes, which involve the bowels. And the bones, by this benefit of the animall ſenſe expell the noxious and excrementitious humors from themſelves into the ſpaces between them and the *Perioſteum*, which as indued with a more quick ſenſe, admoniſheth us, according to its office and duty, of that danger which is ready to ſeiſe upon the bones, unleſs it be prevented. Wherefore we will conclude according to the truth of the thing, that there is no part in our body ſimple, but only ſome are ſo named and thought, according to the ſenſe; although alſo otherwiſe ſome may be truly named ſimple, as according to the peculiar and proper fleſh of each of their kinds. Thoſe parts are called compound which are made or compoſed by the mediation, or immediately of theſe ſimple, which they term otherwiſe organicall, or inſtrumentall; as an arm, leg, hand, foot, and others of this kind.

How the bones come to feel.

The compound, or organicall parts.

And here wee muſt obſerve, that the parts are called ſimple and ſimilar, becauſe they cannot be divided into any particles but of the ſame kind; but the compound are called

dissimilar from the quite contrary reason. They are called instrumentall and organicall, because they can perform such actions of themselves, as serve for the preservation of themselves and the whole; as the eye of it self, without the assistance of any other part, seeth, and by this faculty defends the whole body, as also it self. Wherefore it is called an instrument or organe, but not any part of it, as the coats, which cannot of it self perform that act.

Four particles to be observed in each organicall part.

Whereby we must understand, that in each instrumentall part we must diligently observe four proper parts. One by which the action is properly performed, as the Crystalline humor in the eye; another without which the action cannot be performed, as the nerve and the other humors of the eye. The third, whereby the action is better and more conveniently done, as the tunicles and muscles. The fourth, by which the action is preserved, as the eye-lids and circle of the eye. The same may be said of the hand, which is the proper instrument of holding; for it performs this action, first, by the muscle, as the principall part; Secondly, by the ligament, as a part without which such action cannot be performed; Thirdly, by the bones and nails, because by the benefit of these parts, the action is more happily performed; Fourthly, by the veins, arteries and skin, for that by their benefit and use, the rest, and so consequently the action it self is preserved.

Four sorts of instrumentall parts.

But we must consider, that the instrumentall parts have a fourfold order. They are said to be of the first order, which are first and immediately composed of the simple, as only the authors of some one action, of which kinds are the muscles and vessels. They are of a second which consist of these first simple, and others besides, as the fingers. They are counted of the third rank, which are composed of parts of the second order and some besides, as the hand taken in generall. The fourth order is the most composed, as the whole body, the organ and instrument of the soul. But you must observe, that when we say the muscles and vessels are simple parts, we refer you to the sense and sight, and to the understanding, comparatively to the parts which are more compound; but if any consider their essence and constitution, he shal understand they are truly compound, as we said before. Now it remains, that we understand,

Nine things to be considered in each part.

that in each part, whether simple or compound, nine things are to be considered, as substance, quantity or magnitude, figure, composition, number, connexion, (by which name, we also understand the originall and insertion) temperature, action, and use; that by the consideration of these things, every one may exercise the art of Physick, in preserving health, curing diseases, or foreseeing their events and ends.

Why the three principall parts are so called.

But also we must note, that of the organicall parts, there be three, by whose power the body is governed; which for that cause they call regent and principall, because they govern all the rest; they are the liver, heart, and brain. But they are called principall, not only, because they are necessary for life, (for the stomach, wind-pipe, lungs, reins, bladder, and such like parts perhaps are equally as necessary for life) but because from each of these three, some force, power, and faculty, or also matter necessary for the whole body, flow over all the body, when no such thing proceeds from the rest of the parts. For from the liver a matter fit for nourishment, is distributed by the veins through all the body; from the heart the vitall force diffused by the arteries, imparts life to the whole body; from the brain by the nerves a power or faculty is carried through all the parts of the body, which gives them sense and motion.

Lib. de Arte medica.

Galen would have the Testicles to be of this kind, not for the necessity of the individuall, or peculiar body, but for the preservation of the *Species* or kind. And moreover in his book *de Semine* comparing the Testicles with the Heart, hee makes them the more noble by this reason, that by how much it is better to live wel and happily, than simply and absolutely to live, by so much the testicles are more excellent than the heart, because with them we may live well & pleasantly, but with this simply live, as we see by the example of Eunuches, and such as are gelt, by which the Testicles seem rightly to be accounted amongst the principal parts; for nature seeing it desired, that this its work should be immortal, for the attaining of that immortality which it intends, frames those parts, like as prudent founders of a City, who do not only procure to furnish their City with many Inhabitants, so long as they are in building it, but also that it may remain in the same state and condition for ever, or at

The use and function of the parts serving for generation.

least for many ages. And yet notwithstanding of so many cities built in the first memory of man, there remains none, whose fame and state, together with the builders name, is not decayed and perished. But this humane work of nature, stands yet secure for this many thousand of years, and shal endure hereafter, because it hath found a way, by which every one may substitute another in his place before he depart. Hence it is that all creatures have members fit for generation, and pleasures inserted in those members, by which they might be inticed to mutuall embraces and copulations. But the mind, which hath dominion over those members hath an incredible desire of propagating the issue, by which also brute beasts incited, desire to propagate their kinds for ever. For seeing that nature understands all these her works considered particularly by themselves, are frail and mortall, it hath done what it could to recompence that fatall necessity of dying, by a perpetuall succession of individualls.

Hitherto we may seem to have aboundantly shewed what necessity of knowledg in Anatomy belongs to all Artizans in Physick, and also what order is to be observed in the same.

ſame. And laſtly, how it is defined, and the reaſon of the parts of the definition. Wherefore it remains that we proſecute what we have taken in hand: which is, that we ſhew and declare how to know all and every the parts of mans body, how many, and what they be, and to underſtand wherefore they be. For although the true knowledg of Anatomy may be perfected by the ſight of the ey, and touching and handling each part with the hand, yet nevertheleſs the labor of deſcribing Anatomy is not unprofitable. For by reading, ſuch as have often exerciſed themſelves in the diſſecting of mens bodies, may refreſh and help their memories, and ſuch as have not, may make plain and eaſie the way to the underſtanding of diſſections.

CHAP. I.

The diviſion or partition of mans Body.

BY reaſon the partition of Mans body can hardly be underſtood, if the diſtinction of the proper faculties of the ſoul be not underſtood, for whoſe cauſe the body enjoys that form (which we ſee) and diviſion into divers inſtruments; Therefore I thought good in few words to touch that diſtinction of the faculties of the ſoul, for the better underſtanding of the partition of the body which we intend. Wherefore the ſoul, the perfection of the body, and beginning of all its functions, is commonly diſtinguiſhed, and that in the firſt and generall diviſion, into three faculties, which are the Animall, Vitall, and Naturall. But the Animall is divided into the principall, ſenſitive, and motive; Again the Principall is diſtinguiſhed into the imaginative, reaſonable, and memorative: And the Senſitive into ſeeing, hearing, ſmelling, taſting, and touching: But the Motive into progreſſive and apprehenſive. And the Vital is divided into the dilative and contractive faculty of the heart and arteries, which we know or underſtand by the pulſifick faculty. But the Naturall is parted into the nutritive, auctive, and generative faculties; which three perform their parts by the help and miniſtery of five other faculties, which are, the attractive, retentive, concoctive, aſſimilative, and expulſive.

What the ſoul is, and with how many faculties it is endued.

After the ſelf-ſame manner, the organ or inſtrument of the ſoul, to wit, Mans body, at the firſt diviſion is diſtinguiſhed into three parts, which from their office they call Animall, Vitall, and Naturall. Theſe again, according to the ſubdiviſion of the ſubalternall faculties, are divided particularly into other parts; ſo that any one may know the organ of each faculty, by the property of the function. For while other Anatomiſts divide mans body into four univerſall and chief parts, they diſtinguiſh from the three firſt, thoſe which they call the Extremities; neither do they teach to what rank of the three prime parts each extremity ſhould be reduced. From whence many difficulties happen in reading the writings of Anatomiſts; for ſhunning whereof, we will proſecute, as we have ſaid, that diſtinction of mans body, which we have touched before.

All the parts of mans body are diſtinguiſhed into three.

Wherefore, as we ſaid before, mans body is divided into three principall and generall parts, Animall, Vitall, and Naturall. By the Animall parts, we underſtand not only the parts pertaining to the head, which are bounded with the crown of the head, the coller-bones, and the firſt *Vertebra* of the breaſt, but alſo the extremities, becauſe they are organs and inſtruments of the motive faculty; *Hippocrates* ſeems to have confirmed the ſame, where he writes; Thoſe who have a thick and great head, have alſo great bones, nerves, and limbs. And in another place he ſaith, thoſe who have great heads, and when they ſtoop ſhew a long neck, ſuch have all their parts large, but chiefly the Animall. Not for that *Hippocrates* would therefore have the head the beginning and cauſe of the magnitude and greatneſs of the bones and the reſt of the members; but that he might ſhew the equality and private care or government of nature, being moſt juſt and exact in the fabrick of mans body, as if ſhe hath well framed the head, it ſhould not be unlike that ſhe idly or careleſly neglected the other parts which are leſs ſeen. I thought good to dilate this paſſage, leſt any might abuſe that authority of *Hippocrates*, and gather from thence, that not only the bones, membranes, ligaments, griſles, and all the other animall parts, but alſo the veins and arteries depend on the head as the originall. But if any obſerve this our diſtinction of the parts of the body, he will underſtand we have a far other meaning.

What parts are here called Animall.

Lib. 6 Epidem.

By the Vitall parts, we underſtand only the heart, arteries, lungs, winde-pipe, and other particles annexed to theſe. But by the Naturall, we would have all thoſe parts underſtood which are contained in the whole compaſs of the *Peritonæum* or Rim of the body, and the proceſſes of the *Erythroides*, the ſecond coat of the Teſticles. For as much as belongs to all the other parts, which we call containing; they muſt be reckoned in the number of the Animall, which notwithſtanding, we muſt thus divide into principall, ſenſitive, and motive; and again, each of theſe in the manner following. For firſt, the principall is divided into the imaginative, which is the firſt and upper part of the brain, with its two ventricles and other annexed particles; into the reaſoning, which is a part of the brain, lying under the former, and (as it were) the top thereof with its third ventricle; into the memorative, which is the *cerebellum* or afterbrain, with a ventricle hollowed in its ſubſtance. Secondly, the Senſitive is parted into the viſive, which is in the eys; the auditive, in

What parts are called Vitall.

The diviſion of the animall parts.

the eares; the ſmelling, in the noſe; the taſting, in the tongue and palate; the tactive, or touching which is in the body, but moſt exquiſite in the skin which inveſts the palms of the hands. Thirdly, the motive is divided into the progreſſive, which intimates the legs, and the comprehenſive, which intimates the hands. Laſtly, into ſimply motive, which are three parts, called bellies, for the greateſt part terminating and containing; for the vitall, the inſtrument of the faculty of the heart, and dilatation of the arteries, are the direct or ſtreight fibers, but of the conſtrictive the tranſverſe; but the three kinds of fibers together, of the pulſifick; or if you pleaſe you may divide them into parts ſerving for reſpiration, as are the lungs, and weazon, and parts ſerving for vitall motion, as are the heart and arteries, furniſhed with theſe fibers, which we formerly mentioned. The diviſion of the naturall parts remains, which is into the nouriſhing, auctive and generative, which again are diſtributed into attractive, univerſall, and particular; retentive, concoctive, diſtributive, aſſimilative, and expulſive. The attractive, as the gullet and upper orifice of the ventricle; the retentive, as the *Pylorus* or lower paſſage of the ſtomach; the concoctive, as the body of the ventricle, or its inner coat; the diſtributive, as the three ſmall guts; the expulſive, as the three great guts; we may ſay the ſame of the liver, for that draws by the meſaraick and gate veins, retains by the narrow orifices of the veins diſperſed through the ſubſtance thereof, it concocts by its proper fleſh; diſtributes by the hollow vein, expels by the ſpleen, bladder of the gall and kidnies. We alſo ſee the parts in the teſticles divided into as many functions; for they draw by the preparing veſſels; retain by the various crooked paſſages; in the ſame veſſels they concoct the ſeed by the power of their proper ſubſtance and faculty; they diſtribute by the ejaculatory, at the glandules called *Proſtatæ*, and the horns of the wombe, ſupplying the place of proſtates; Laſtly, they expell or caſt forth by the proſtates, horns, and adjoining parts. For as much as belongs to the particular attraction, retention, concoction, diſtribution, aſſimilation of each part, that depends of the particular temper, and as they term it, occult property of each ſimilar and ſimple part. Neither do theſe particular actions differ from the univerſall, but that the generall are performed by the aſſiſtance of the three ſorts of fibers, but the ſpecial by the ſeverall occult property of their fleſh, ariſing from their temperature, which we may cal a ſpecifick property. Now in the compoſition of mans body, nature principally aims at three things. The firſt is, to create parts neceſſary for life, as are the heart, brain, and liver. The ſecond, to bring forth other for the better & more commodious living, as the eyes, noſe, ears, arms and hands. The third is, for the propagation and renewing the *ſpecies* or kind, as the privie parts, teſticles, and wombe. And this is my opinion, of the true diſtinction of mans body, furniſhed with ſo many parts, for the performance of ſo many faculties; which you, if you pleaſe, may approve of and follow. If not, you may follow the common and vulgar, which is, into three bellies, or capacities, the upper, middle, lower, (that is, the head, breſt and lower belly) and the limbs or joints. In which by the head we do not underſtand all the Animall parts, but only thoſe which are from the crown of the head to the firſt *vertebra* of the neck, or to the firſt of the back, if according to the opinion of *Galen*, *Lib. de oſſibus*, where he makes mention of *Enarthroſis* and *Arthrodia*, we reckon the neck amongſt the parts of the head. By the breſt, whatſoever is contained from the coller bones to the ends of the true and baſtard, or ſhort ribs, and the midriffe. By the lower belly, the reſt of the trunck of the body, from the ends of the ribs to the ſhare-bones; by the limbs, we underſtand the arms and legs. We will follow this diviſion in this our Anatomicall diſcourſe, becauſe we cannot follow the former in diſſecting the parts of mans body, by reaſon the Animall parts are mutually mixed with the vitall and naturall, and firſt of the lower belly.

The diviſion of the vitall parts.

The diviſion of the naturall parts.

The vulgar diviſion of mans body.

Why the belly is not bony.

Nature would not have this lower belly bony, becauſe the ventricle might be more eaſily dilated by meat and drink, children might grow the better, and the body be more flexible. It is convenient we begin our Anatomical adminiſtration from this, becauſe it is more ſubject to putrefaction than the reſt, both by reaſon of its cold and moiſt temperature, as alſo by reaſon of the feculent excrements therein contained. Yet before we go any further, if the Anatomicall adminiſtration muſt be performed in publick, the body being firſt handſomely placed, and all the inſtruments neceſſary for diſſection made ready, the belly muſt be divided into its parts, of which ſome contain, and other ſome are contained.

The diviſion of the lower belly.

They are called containing, which make all that capacity which is terminated by the *Peritoneum* or Rim of the belly. The upper part whereof is bounded by *Galen* within the compaſs of the direct muſcles, and by a generall name is called *Epigaſtrium*, or the upper part of the lower belly. That again is divided into three parts, that is, into that which is above the navil, and which carries the name of the whole, into that which is about the navil, and is called the umbilicall or middle part; and laſtly, into that which is below the navill, called the *Hypogaſtrium*, or the lower part of the lower belly.

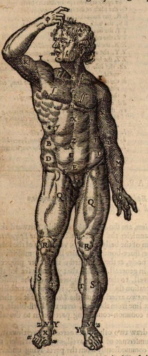
The *Hypochondria*.

In every of which three parts there be two laterall, or ſide parts to be conſidered, as in the *Epigaſtrium*, the right and left *Hypochondria*, which are bounded above and below, in the compaſs of the midriffe, and the ſhort ribs. In the umbilicall the two *Lumbares* (ſome call them *Latera* ſides) which on both ſides from the loweſt parts of the breſt, are drawn to the flanks or hanch-bones; in the *Hypogaſtrium*, the two *Ilia*, or flanks, bounded with

with the hanch and share-bones. Neither am I ignorant, the *Ilia*, or flanks, which the Greeks call Λαγόνες signifie all the empty parts, from the ends of the ribs, even to the hanch-bones, whereupon they also call them Κενεῶνες, as if you should say empty spaces, because they are not encompassed with any bone. Yet I thought good that this doctrine of dividing the belly should be more distinct, to call the parts which are on each side the navell *Lumbares*, and those on the lower part of the lower belly *Ilia*, flanks. But we must observe that the Ancients have been so diligent in deciphering the containing parts, that as exactly as might be, they designed the bowells contained in the belly, which being divers lie in sundry places; for the greater portion of the liver lies under the right *Hypochondrium*; under the left almost all the ventricle and spleen. Under the *Epigastrium* the lower orifice of the ventricle, and the smaller portion of the liver; In the *Lumbares*, or sides, in the right and upper part the right kidney, in the lower part towards the flanck, the blind gut; in the middle part thereof the colick and empty guts. In the upper part of the left side lies the left Kidney, in the middle part, the rest of the empty and colick guts. Under the region of the navell, lies the girdle or upper part of the kall, the colick gut thrusting it self also through that way. Under the *Ilia*, or flanks, the right and left, lie the greater part of the gut Ileon, the horns of the women big with child, and the spermatick vessels in men and women. Under the *Hypogastrium* in the lower part lies the right, or strait gut, the bladder, womb, and the rest of the kal.

If we know, and well understand these things, we shall more easily discern the parts affected by the place of the pain, and cure it by fit application of remedies, without the hurting of any part. The distinction of such places, and the parts in those places, as seeming most profitable, I have thought good to illustrate by the placing these two following figures, in which thou hast deciphered, not only the foresaid parts, containing, and contained, but also of the whole body, and many other things which may seem to conduce to the knowledge of the mentioned parts. The Figures are these. A most certain note of the part affected by the place where the pain is.

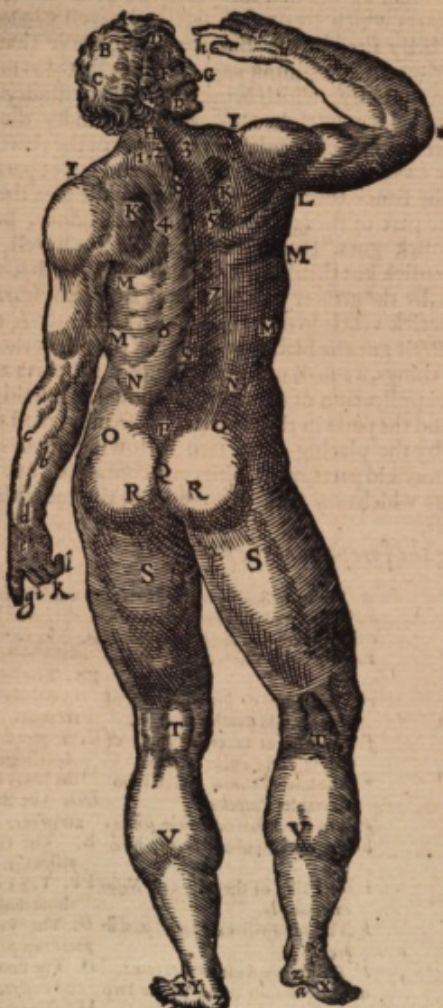
The Figure shewing the foreparts of the body.



A The hairy Scalp, cald τριχωτὸς.
b the forehead cald *Frons* μέτωπον.
c the temples cald *tempora*, κρόταφοι
From *b* to *d* The compass of the face.
e The greater or inward corner of the eyes, cald *Canthus internus*.
f The lesser or externall angle of the eye, cald *Canthus externus*.
* The lower eybrow which is immovable, *Palpebra*.
g The cheek-bone cald *mala*, μῆλα.
h The cheek-puf cald *bucca*, γνάθος.
i The ridg of the nose cald *Nasus externus*, ῥὶν.
k The nosthrils cald *nares*, μυκτῆρες.
l The outward ear, *auris externa*.
m The mouth made of the two lips, *Os*.
n The chin called *mentum*, γένειον.
o The neck, *collum*, αὐχὴν and τράχηλος.
From *o* to *e* the pillar of the neck, *truncus* and ὦμος.
pp The hollow of the neck, called *juguli*, σφαγαὶ.
qq The patel bones, *claves*, κλεῖδες.
r The chest, *pectus*, στέρνον.
ſ The right brest.
ſſ The left brest: to this Region we apply cordiall *Epithemations* moist and dry.
tt The nipples of the brests, *papilla*, θηλὴν.
u The trench of the heart which the Ancient called καρδία. The Latines *Scrobiculus Cordis*. This part is anointed for the mouth of the stomach.
From *u*. to E. the lower belly, γαστήρ.
X The *Epigastrium* or upper part of the lower belly.
yy The *Hypochondria* or *Pracordia*.
* The outward Liver-remedies are applied to this place.
z The region of the navill, called *umbilicalis*, or the middle part of the lower belly.
A. The navill *umbilicus*. The root of the belly ὀμφαλός.
BB. The side *Latera*, πλευραί. and in our Author *Lumbi seu Lumbaris regio*.
C. *Hypogastrium*, the water-course, *Aqualiculus*, the lower part of the lower belly, ἦτρον.
DD. The flanks called *Ilia*, and κενεῶνες.
E. The Groin called *pubes* or *pecten*, χ[illegible] ...
FF. The Leske cald *inguen* where those tumors are cald *Bubones*.
G. The yard with the fore-skin, *penis cum praputio*.
H. The stones or testicles, with the cod or *scrotum*.
II. The shoulders, *humeri*, ἐπωμίδες.
KK. The arms *Brachia*, βραχίονα.
L. The bowt of the arm, called *Gibber*, ἀγκών.
M. The outside of the lower part of the arm called *cubitus*, πῆχυς.
N. The wrist called *Brachiale*, καρπός.
O. The after wrist *postbrachiale*, μετακάρπιον.
P. The Palm called *Palma* or *vola manus*, θέναρ.
φ The back of the hand, *Dorsum manus*, ὀπισθέναρ.
QQ. The fore and middle part of the thigh, where we apply cuppingglasses to bring down womens courses. μηρὸν.
RR. The knee, *genu*. γόνυ.
SS. The leg, *tibia*. κνήμη.
TT. The calf of the leg, *sura*, γαστροκνήμιον.
VV. The instep, *tarsus*.
XX. The top of the foot, *Dorsum pedis*, στῆθος ποδός.
YY. The inner Anckles, σφυρά.
ZZ. The outward anckles, as the toes of the feet, β the place under the inward anckle, where the vein called *Saphena* is opened.

The

The figure of the back-parts of a Man.



A. The forepart of the head, *ſinciput*, βρεγμα.
B the top or crown of the head, *vertex*, κορυφη.
C. the hinder-part of the head, *occiput*, κοτις και ἰνιον.
From D. to D. the face, *facies*, προσωπον.
* E. the eybrows, *ſupercilia*, ὀφρυς.
F. the upper eylid, *palpebra*, βλεφαρον.
G. the tip of the noſe, called *globulus naſi*.
H. the back-part of the neck, called *cervix*, αὐχην, and the nuke or nape of the neck. There is a hollowneſs at the top of this *cervix*, where we apply Seatons.
I. the back-part of the ſhoulder top, called *axilla*, ὠμος.
KK. the ſhoulder blades, *ſcapulæ*, ὠμοπλατα.
1,2,3. On this place we ſet Cupping-glaſſes.
4,5,6,7. the back, *dorſum*, νωτον.
8, 9. the ridg, *ſpina dorſi*. ῥαχις.
L. the armhole, *ala*, μασχαλη.
* The elbow, *gibber brachii*.
MMMM. the ſides, *latera*.
NN. the loins, *lumbi*, or the region of the kidneys, ὀσφυς.
OO. the place of the hips, *coxendices*, where we apply remedies for the Sciatica.
P. the place of the Holy bone, or *Os ſacrum*, where we apply remedies in the diſeaſes of the right gut.
Q. the place of the rump or *Coccyx*.
RR. the buttocks, *nates*, κλουνες.
SS. the back parts of the thigh, *femora*.
TT. the ham, *poples*, ἰσχνυς.
VV. the calf of the leg, *ſura*.
XX. the foot, or *parvus pes*, πους.
YY. the outer ankle, *malleolus exterior*.
ZZ. the heel, *calx*, or *calcaneus*, πτερνα.
aa. the ſole of the foot, *planta pedis*, κοιλον του ποδος.
b. the inſide of the lower part of the arm, called *ulna*, ὠλενη.
c. the outſide of the ſame, *cubitus*, πηχυς.
d d. the wriſt, *carpus*.
e e. the back-part of the hand, *dorſum manus*, g. the forefinger, *index*, δειχτηρ. h. the thumb, *pollex*, ἀντιχειρ.
i. the middle finger, *medius*, μεσος.
k. the ring finger, *annularis*, *medicus*, ἀνωνυμος.
l. the little finger, *auricularis*, *minimus*, σμικρος.

CHAP. II.

Of the containing parts of the Epigaſtrium, and the preparation to Anatomicall adminiſtration.

The containing parts of the lower belly.

THe containing parts of the *Epigaſtrium*, are the *Epidermis*, or thin outward skin; the true skin; the fleſhy or fatty Pannicle; the eight muſcles of the *Epigaſtrium*, with their common coat; the Rim of the belly; the five vertebra's of the loins; all the holy-bone; the hanch-bone; ſhare-bone; the white line and midriff. Of theſe parts, ſome are common to the whole body, as the three firſt; the other proper to the parts contained in the *Epigaſtrium* taken in generall. Which that you may ſee in their order, firſt you muſt cut round about the navell, to the upper ſuperficies of the muſcles, that ſo we may keep it, till ſuch time, as occaſion ſhall offer it ſelf, to ſhew the umbilicall veſſels lying in that place, which are one vein, two arteries, and the *Urachus* (if it be there.) Which being done, you muſt draw a ſtreight line from the cheſt, over the breſt-blade, even to the ſhare-bone, which may divide the common-containing parts, even to the white line.

Then preſently it will be convenient to draw two other lines acroſs or overthwart, of the like depth on each hand, from the circumference of the navell, even to the ſides, that ſo on each part we may draw the skin more commodiouſly from the parts lying under it; the ſight of which otherwiſe it would hinder. Theſe things being done, the skin muſt be

be divided from the parts lying under it from the designed circumference left about the navell. We must teach how the skin is twofold, the true and false, and render a reason of the name, which we will every where do, as far as the thing will suffer, and it shall lye in our power. And in doing or examining these things, it will be convenient diligently to enquire into the nine things mentioned in the Preface. We will begin with the Skin, because that part is first obvious to our senses.

CHAP. III.

Of the utmost Skin or Cuticle.

The skin twofold

THe skin being the first part, and spred over all the body, is twofold, that is, the true and bastard skin: The true is called by the Greeks, *Derma*, which may almost every where be pulled from the parts lying under it, which it invests; except in the face, ears, the palms of the hands, soles of the feet, fingers, and privities, where it sticks so close that it cannot be separated.

From what parts the skin cannot be separated.

The bastard (which first of all we will declare, because it first presents it self to our sight) is by the Greeks called *Epidermis*, because it covers the true skin, they term it commonly the Cuticle. The substance of it is excrementitious, and (as it were) a certain dry flouring, or production of the true skin. That it draws not its substance from the seed is apparent by this, that as it is easily lost, so it is easily repaired, which happens not in parts truly spermaticall. This utmost thin skin, or Cuticle, may two manner of ways be made apparent by it self, and separated from the other, as by burning with fire, or ardent heat of the Sun, (in some delicate bodies, and such as are not accustomed to be conversant in Sunshine.) The quantity in thickness is very small, but the extent is most large, because it covers all the skin; the figure of it is round, and long, like those parts which it invests. The composure of it is obscure; yet because this Cuticle is the excrement of the true skin; we say it hath its matter from the excrementitious superfluity of the nerves, veins, arteries, and substance of the true skin.

The matter of the Cuticle.

The quantity.

The figure.

The composure.

It is in number one, like as the true skin which it outwardly covers, that it might be a *medium* between the object and fixed faculty of touching, diffused over all the true skin, which every where lies under it. For the temperature, by the common consent of Physitians, it is in the midst of all excess; for that seeing it is the *medium* between the object and faculty, if it should be hotter, colder, moister, or drier, it would deceive the faculty by exhibiting all objects, not as they are of themselves, but as it should be; no otherwise than as to such as look through red or green spectacles, all things appear red or green. Wherefore for this reason it was convenient the Cuticle should be void of all sense. It hath no action in the body; but it hath use, for it preserves and beautifies the true skin; for it seems to be given by the singular indulgence of nature, to be a muniment and ornament to the true skin. This providence of Nature, the industry of some Artizans (or rather Curtizans) doth imitate; who for to seem more beautifull, do smooth and polish it. By this you may understand, that not all the parts of the body have action, yet have they their use, because, according to *Aristotles* opinion, Nature hath made nothing in vain. Also you must note that this thin skin or Cuticle being lost, may every where be regenerated, unless in the place which is covered with a scar. For here the true skin being deficient, both the matter and former faculty of the Cuticle is wanting.

The number.

The temperature.

The use.

Why the Cuticle cannot be restored in scars.

CHAP. IIII.

Of the true Skin.

THe true skin called by the Greeks *Derma*, is of a spermatick substance, wherefore being once lost, it cannot be restored as formerly it was. For in place thereof comes a scar, which is nothing else but flesh dried beyond measure. It is of sufficient thickness, as appears by the separating from the flesh.

The substance.

Magnitude.

But for the extent thereof, it encompasses the whole body, if you except the eys, ears, nose, privities, fundament, mouth, the ends of the fingers where the nails grow, that is, all the parts by which any excrements are evacuated. The figure of it is like the Cuticle, round and long, with its productions, with which it covers the extremities of the parts.

Figure.

It is composed of nerves, veins, arteries, and of a proper flesh and substance of its kind, which we have said to be spermaticall, which ariseth from the process of the secundine, which lead the spermatick vessels even to the navell; in which place each of them into the parts appointed by nature, send forth such vessels as are spred abroad and diffused from the generation of the skin. Which also the similitude of them both, that is, the skin and

Composure.

and membrane *Chorion* do argue. For as the *Chorion* is double, without ſenſe, encompaſſing the whole infant, lightly faſtened to the firſt coat, which is called *Amnios*; ſo the skin is double, and of it ſelf inſenſible, (for otherwiſe the nerves were added in vain from the parts lying under it) ingirting the whole body, lightly cleaving to the fleſhy Pannicle. But if any object, That the Cuticle is no part of the true skin, ſeeing it is wholly different from it, and eaſily to be ſeparated from it, and wholly void of ſenſe: I will anſwer, theſe arguments do not prevail. For that the true skin is more craſs, thick, ſenſible, vivid, and fleſhy, is not of it ſelf, being rather by the aſſiſtance and admixture of the parts, which derived from the three principall it receives into its proper ſubſtance; which happens not in the Cuticle. Neither if it ſhould happen, would it be better for it, but verily exceeding ill for us, becauſe ſo our life ſhould lye fit and open to receive a thouſand externall injuries, which encompaſs us on every ſide, as the violent aud contrary acceſs of the four firſt qualities.

The skin of it ſelf is void of ſenſe.

The number.

There is only one skin, as that which ſhould cover but one body, the which it every where doth, except in thoſe places I formerly mentioned. It hath connexion with the parts lying under it by the nerves, veins, and arteries, with thoſe ſubjacent parts put forth into the skin inveſting them, that there may be a certain communion of all the parts of the body amongſt themſelves.

Connexion.

Temperature.

It is cold and dry in its proper temper, in reſpect of its proper fleſh and ſubſtance, for it is a ſpermaticall part. Yet if any conſider the ſinews, veins, arteries, and fleſhy threds which are mixed in its body, it will ſeem temperate, and placed (as it were) in the midſt of contrary qualities, as which hath grown up from the like portion of hot, cold, moiſt, and dry bodies. The uſe of the skin is to keep ſafe and ſound the continuity of the whole body, and all the parts thereof, from the violent aſſault of all externall dangers; for which cauſe it is every where indued with ſenſe, in ſome parts more exact, in others more dull, according to the dignity and neceſſity of the parts which it ingirts, that they might all be admoniſhed of their ſafety and preſervation. Laſtly, it is penetrated with many pores, as breathing-places, as we may ſee by the flowing out of ſweat, that ſo the arteries in their *diaſtole* might draw the encompaſſing air into the body, for the tempering and nouriſhing of the fixed inbred heat, and in the *ſyſtole* expell the fuliginous excrement, which in Winter ſuppreſt by the cold air encompaſſing us, makes the skin black and rough. We have an argument and example of breathing through theſe, by drawing the air in by tranſpiration, in women troubled with the mother, who without reſpiration live only for ſome pretty ſpace by tranſpiration.

Uſe.

The reaſon why the skin is blacker and rougher in Winter.

CHAP. V.

Of the fleſhy Pannicle.

What a membrane is.

AFter the true skin, follows the membrane, which Anatomiſts call the fleſhy Pannicle, whoſe nature that we may more eaſily proſecute and declare, we muſt firſt ſhew what a Membrane is, and how many ways the word is taken. Then wherefore it hath the name of the fleſhy Pannicle. A membrane therefore is a ſimple part, broad and thin, yet ſtrong and denſe, white and nervous, and the which may eaſily without any great danger be extended and contracted. Sometimes it is called a coat, which is, when it covers and defends ſome part. This is called the fleſhy Pannicle; becauſe in ſome parts it degenerates into fleſh, and becomes muſculous, as in a man from the coller-bones, to the hair of the head, in which part it is therefore called the broad muſcle, whereas in other places it is a ſimple membrane, here and there intangled with the fat lying under it, from whence it may ſeem to take or borrow the name of the fatty Pannicle. But in beaſts (whence it took that name, becauſe in thoſe a fleſhy ſubſtance maketh a great part of this Pannicle) it appears manifeſtly fleſhy and muſculous over all the body, as you may ſee in Horſes and Oxen; that by that means being moveable, they may drive and ſhake off their flies, and other troubleſome things, by their ſhaking and contracting their backs. Theſe things conſidered, we ſay the fleſhy Pannicle in its proper body, is of a nervous or membranous ſubſtance, as that which hath its originall from the coat *Amnios*, (which is next to the infant) dilated near to the navell, and ſtretched forth for the generation of this Pannicle; in which thing I think good to note, that as the membranes *Chorion* and *Amnios* mutually interwoven with ſmall nervous fibers, encompaſs and inveſt the child as long as it is contained in the womb; ſo the skin and fleſhy Pannicle, knit together by ſuch like bands, engirt the whole body.

Why it is ſometimes called a coat, ſometimes the fleſhy and fatty Pannicle.

Why beaſts have this Pannicle wholly fleſhy or muſculous.

The ſubſtance.

The magnitude and figure.

Therefore the fleſhy Pannicle is equal in magnitude and like in figure to the true skin, but that it lyes under it, and is contained in it, in ſome places mixt with the fat, in others increaſed by the fleſh interwoven with it, and in other ſome is only a ſimple membrane.

Number.

Compoſure.

The compoſition of it is ſuch, as the ſight of it preſents to our ey, that is, of veins, arte-

arteries, nerves, and the proper flesh, some whites mixed and interlaced with fat, and sometimes with musculous flesh. It is but one, by reason of the use we shall presently shew; it is situated between the skin and fat, or common coat of the muscles, annexed to these and the other parts lying under it, by the veins, nerves and arteries ascending from these inward parts, and implanting themselves into the substance thereof, and then into the true skin.

The temperature thereof is diverse, according to the variety of the parts interwoven with it. The use of it is, to lead, direct, and strengthen in their passage, the vessels which are disseminated into the true skin, and the whole superficies of the body. But in beasts it hath another commodity, that is, it gives a shaking or trembling motion to their skin and back, for that cause we formerly touched.

The temperature.
The use.

CHAP. VI.

Of the Fat.

THe Fat coming near the condition of an excrement, rather than of a part (as we said, when we treated of the similar parts) is of an oily substance, bred of the aery and vaporous portion of the blood, which sweating through the pores of the coats, or mouths of the vessels, becomes concrete about the membranes, and nerves, and cold bodies, and turns into fat by the coldness of the place. Whereby we may know, that cold, or a more remiss heat, is the efficient cause of fat, which is manifest by contemplation not only of creatures of divers kinds, but also by those of the same species and sex, if so be that the one be colder than the other.

The Fat is rather an excrement than a part.
The substance.
The efficient cause of Fat.

By which we may understand that the fat is the more or less in quantity, according to the different temper of the whole body, and of its particular parts; for its composition, it consists of that portion of the blood which we formerly mentioned, intermixt with certain membranes, nervous fibers, veins and arteries. The greatest part of it lyes between the fleshy Pannicle, and the common coat of the Muscles. * Otherwise it is diffused over all the body, in some places more, in some less, yet it is always about the nervous bodies, to which it delights to cleave. Most Anatomists enquire whether the fat lye above or beneath the fleshy Pannicle. But me thinks this question is both impertinent and idle; being we often see the fat to be on both sides. *a* It is of a middle temper, between heat and cold, being it ariseth of the more aery portion of the blood; although it may seem cold in respect of the efficient cause, that is, of cold by which it concretes. For the rest, moisture is predominant in the fat. *b* The use thereof is, to moisten the parts which may become dry by long fasting, vehement exercise, or immoderate heat; and besides to give heat, or keep the parts warm. Although it do this last rather by accident, than of its own nature, as heated by exercise, or by some such other chance; it heats the adjacent parts, or may therefore be thought to heat them, because it hinders the dissipation of the native and internall heat; like as cold heats in winter, whereby the bellies are at that time the hotter. I know some learned Physitians of our time stiffly maintained, that the fat was hot, neither did they acknowledg any other efficient cause thereof, than temperate heat and not cold. But I think it best to leave the more subtil agitation of these questions to naturall Philosophers. But we must note, *c* that at the joints which are more usually moved, there is another sort of Fat, far more solid and hard, than that which we formerly mentioned, often found mixed with a viscid and tough humor like the whites of Eggs, that so it might be sufficient for a longer time to moisten these parts, subject to be hurt by dryness, and make them slippery, and so fitter for motion, in imitation whereof they usually grease hard bodies, which must be in frequent motion, as Coach-wheels and axletrees. And there is another kind of fat, which is called *Sevum*, seam, in one thing differing from the ordinary fat, that is much dryer; the moister and softer portion of the fat being dissipated by the raging heat of the place. For it is found principally about the midriff, where there are many windings of arteries and veins; and it is also about the reins, loins, and basis of the heart. The Fat is wasted by long fasting; is dryed and hardened by vehement exercise and immoderate heat. Hence it is that it is much more compact in the palms of the hands, and soles of the feet, about the eys and heart, so that it resembles the flesh in density and hardness; because by the continuall motion and strong heat of these parts, the thinner portion being dissipated and diffused, the more grois and terrestriall remain.

The quantity.
The composure.
The fite.

I was present at the opening of a body, Feb. 1630. in which the fat in the lower part of the lower belly was in thickness above 8 inches, upon the breast between 4 and 5 inches: which I thought good to remember in this place both for the rarity of the thing, as also because it was encreased by report, and the place mistaken, some saying the *Omentum* or Call was so thick, which was false, for it did not much exceed the quantity of that part, in other fat men.

a The temper.
b The use.
c The solider fat, or seame.

In what parts and for what cause the fat is more dense.

CHAP.

CHAP. VII.

Of the common coat of the Muſcles.

The ſubſtance. NExt under the Fat, appears a certain coat, ſpred over all the Muſcles, and called the common coat of the Muſcles, it is of a nervous ſubſtance, as all other membranes are. The quantity and breadth thereof is bounded by the quantity of the Muſcles which it involves, and fits it ſelf to, as that which encompaſſes the Muſcles of the *Epigaſtrium*, is of equal largeneſs with the ſame Muſcles. The figure of it is round: it is compoſed of veins, nerves, arteries, and its peculiar fleſh conſiſting of three ſorts of fibers; the beginning of it is from the *Perioſtium*, in that part where the bones give ligaments to the Muſcles; or according to the opinion of others, of the nervous and ligamentous fibers of the Muſcles, which riſing up and diffuſed over the fleſhy ſuperficies thereof, are united for the generation of this coat. But this membrane ariſing from the *Perioſtium* (as every membrane which is below the head takes it originall from the *Perioſtium* either primarily, by the interpoſition of no Medium, or ſecondarily) is ſtretched over the Muſcles by their tendons. But if any object, That this membrane pluck'd from the belly of the Muſcle, may ſeem to end in a ligament. I will anſwer, that it is the condition of every nervous part, ſo to binde or faſten it ſelf to another part of his own kinde as to a ſtay, ſo that it can ſcarce be pluck'd from thence. We ſee the proof hereof, in the *Peritonæum* or Rim in the *Epigaſtrium* or lower part of the lower belly. That which covers the Muſcles of the *Epigaſtrium* is but one, unleſs you had rather part it in two, the right and the left diſtinguiſhed by the interpoſition of the *Linea Alba*, or white Line. It is ſituate betwixt the Fat and Muſcles; for it is faſtened above and below to theſe parts with fibers, which in ſmalneſs and fitneſs exceed the Spiders web. But by its veſſels, it participates with the three principall parts, and is of a cold and dry temper. The uſe of it is, to contain the Muſcles in their naturall union, and to keep them as much as in it lyes, from putrefaction, which may happen to them from *pus* or matter, which is often caſt forth of the ſimilar parts into the empty ſpaces and diſtances of the Muſcles. Wherfore going about to ſeparate the Fat of the *Epigaſtrium* (where thou muſt begin the diſſection of mans body) you muſt have a care that you hurt it not with your knife, but that, before you touch the Muſcles, ſee you artificially take it away, that you may the more eaſily ſeparate the Muſcles lying under it, diſtinguiſhed by a manifeſt ſpace at the white Line, which is made by the meeting together of the proper coats of all thoſe Muſcles.

The quantity.

The compoſure.

The Originall.

The number.

The ſite.

The uſe.

What the white line is.

CHAP. VIII.

What a Muſcle is, and how many differences there be thereof.

What a Muſcle is. A Muſcle is the inſtrument of voluntary motion; and ſimple voluntary motion is performed ſix manner of ways, upwards, downwards, forwards, backwards, to the right hand and to the left; but the compound one way, which is circularly, the which is performed by the continuall ſucceſſion of the motion of the Muſcles ingirting the part. Such a motion Falconers uſe when they ſtretch forth their hand and lure their Hawk. We have ſome parts, which have motion without a Muſcle, but that motion is not voluntary; ſuch parts be the heart, ſtomach, guts, both the bladders, (that is, that of the gall and that of the urine) and divers other which have the motions of attraction, expulſion and retention, by the means of the three ſorts of fibers; for they draw by the right, expell by the tranſverſe, and retain by the oblique. The differences of Muſcles which are many and diverſe, are taken from their ſubſtance, originall, inſertion into the part which they move, form or figure, holes or openings, magnitude, colour, ſite, kinde of fibers, their conjugation or connexion, heads, bellies, tendons, oppoſition in action and office. Some in ſubſtance are nervous, venous, arterious, becauſe they have manifeſt nerves, veins, and arteries, as the Midriff, the Intercoſtall or Epigaſtrick Muſcles, and many more, and that for their difference from other Muſcles, into which neither nerve, nor vein, or arteries are manifeſtly inſerted, although ſecretly they admit them all for ſenſe and motion, life and nouriſhment; ſuch are the Muſcles of the wriſt, the wormy Muſcles of the hands and feet; for if there be any nerves obſerved in them, they are very ſmall. Some had rather make the difference of Muſcles thus, that ſome of them are fleſhy, ſome nervous, others membranous. From their Originall, ſome ariſe from the bones, as theſe which move the hands, arms, and legs; others from griſles, as the Muſcles of the throat; others from membranes which inveſt the tendons, as the wormy Muſcles of the hands and feet; others from ligaments, as the Extenders of the fingers; others from other Muſcles, as the two lower Muſcles of the yard which proceed from the Sphincter Muſcle of the fundament. Others have no originall, as the membrane which we call the fleſhy Pannicle aſſumes fleſh in

How the circular motion is performed.

From whence the differences of Muſcles are drawn.

Differences of Muſcles from their ſubſtance

Differences of Muſcles from their originall.

in certain places, and degenerates into a Muſcle; ſuch are the *Cremaſter* or hanging Muſcles of the teſticles, the large Muſcles of the face, and if you pleaſe the Midriff, as that which is compoſed of two coats, the one encompaſſing the ribs and the *Peritonæum*, hath fleſh in the midſt between the two membranes. And moreover ſome Muſcles have their originall from one only bone, as theſe which bend and extend the Cubit; others ariſe of many bones, as the oblique deſcending, the Dorſall and many Muſcles of the neck, which ariſe together from many ſpondyls and ſides of ſpondyls. There be others, according to the opinion of ſome men, both from the bones and griſles of the *Pubis* at the right or direct Muſcles of the *Epigaſtrium*, yet by their favor I think otherwiſe. Becauſe by the Anatomicall and received axiome, A muſcle is there thought to take his beginning, from whence he receives a nerve; but theſe Muſcles take a nerve from the intercoſtall muſcles, wherefore their originall ought to be referred to the ſides of the breſt-blades, as ſhall be ſhewed in due place. From their inſertion ariſe theſe differences, ſome are inſerted into a bone, as thoſe which move the head, arms and legs; others into a griſle, as thoſe of the Throtle, ey-lids, noſe, and the oblique aſcendent muſcles of the *Epigaſtrium*; ſome into a bone and griſle both, as the right muſcles of the *Epigaſtrium* and the Midriff; ſome into the ſkin, as the muſcles of the lips; others into the Coats, as the muſcles of the eys; others into Ligaments, as the muſcles of the yard. But theſe differences following may be drawn both from their inſertion and originall. For ſome muſcles ariſing from many parts, are inſerted into ſome one part, as divers of theſe which move the arm and the ſhoulder, which ariſing from many ſpondyls, are inſerted into the bone of the ſhoulder, and the ſhoulder-blade. Others ariſe from one part, and inſert themſelves into more, as thoſe which ariſe from the bottom of the ſhoulder-blades, are extended and inſerted into ſome eight or nine of the upper ribs, to help reſpiration; and the benders and extenders of the fingers and toes: Others ariſing from many bones, are inſerted into as many, as ſome of thoſe which ſerve for reſpiration, to wit thoſe which we call the hinder Saw-muſcles and the *Semiſpinatus*, which ſends a tendon into all the ribs. Others have their originall from many bones, and end in griſles of the ſeven ribs, as thoſe two which lye under the *Sternon*. Moreover alſo theſe differences of muſcles may be drawn from the originall and inſertion, that ſome proceed from bones, and are inſerted into the next bone, to help and ſtrengthen the motion thereof, as the three muſcles of the Hip: Others ariſe from an upper bone and are not inſerted into the next, but into ſome other, as the long muſcles. Some are named from the part they move, as the temporall muſcles, becauſe they move the temples; others from their office, as the grinding muſcles, becauſe they move the ſkin as a mill, to grinde aſunder the meat. From their form or figure, becauſe ſome are like Mice, other like Lizards which have their legs cut off, for that they imitate in their belly, body or tendon, the belly or tail of ſuch creatures, and from whence the names of *Muſculus* and *Lacertus* are derived. Such are thoſe which bend the wriſt, and which are faſtned to the bone of the Leg, and which extend the foot; others are triangular, as that which lifts up the arm, called *Epomis* or *Deltoides*, and that which draws the arm to the breſt, called the Pectorall muſcle. Others quadrangular, as the Rhomboides, or Lozenge-muſcle of the ſhoulder-blade, and the two hindeſom-muſcles ſerving for reſpiration, and two of the wriſts which turn down the hand; others conſiſt of more than four angles, as the oblique deſcending, and that muſcle which joins it ſelf to it from the ſhoulder-blade; others are round and broad, as the Midriff; others circular, as the Sphincter-muſcle of the fundament and bladder; others are of a pyramidicall figure, as the ſeventh muſcle of the ey, which compaſſes the optick nerve in beaſts but not in men. Others have a ſemicircular form, as that which ſhuts up the ey, ſeated at the leſſer corner thereof; others reſemble a Monks cowl, or hood, as the *Trapezius* of the ſhoulder-blade. Beſides others at their firſt originall are narrow, but broad at their inſertion, as the Saw-muſcle of the ſhoulder, and the tranſverſe of the *Epigaſtrium*; others are quite contrary, as the three muſcles of the Hip; others keep an equal breadth or bigneſs in all places, as the intercoſtall muſcles and theſe of the wriſt; others are long and ſlender, as the long muſcle of the thigh; others are long and broad, as the oblique deſcending muſcles of the *Epigaſtrium*; others are directly contrary, as the Intercoſtall, which are very narrow. From their perforations, for ſome are perforated, as the Midriff which hath three holes, as alſo the oblique and tranſverſe of the *Epigaſtrium*, that ſo they may give paſſage forth to the preparing ſpermatick veſſels, and to the ejaculatory veſſels, the Coat *Erythroides* aſſociating and ſtrengthening them; others are not perforated. From their magnitude, for ſome are moſt large, as the two muſcles of the Hip; others very ſmall, as the eight ſmall muſcles of the neck, and the proper muſcles of the Throtle, and the wormy muſcles. Others are of an indifferent magnitude. From their colour, for ſome are white and red, as the Temporall muſcles, which have tendons coming from the midſt of their belly; others are livid, as the three greater muſcles of the calf of the leg, which colour they have by the admixtion of the white, or tendinous nervie coat with the red fleſh, for this coat by its thickneſs darkning the colour of the fleſh, ſo that it cannot ſhew its redneſs and freſh colour, makes it ſeem of that livid colour. From their ſituation, for ſome are ſuperficiary, as thoſe which appear under the skin and fat; others deep in and hid, as the ſmooth and four twin muſcles; ſome are ſtretched

Where a Muſcle hath its originall.

Differences of muſcles from their inſertion.

Differences of Muſcles taken from their figure.

Differences from their perforations.

From their magnitude.

From their colour.

From their ſite.

ſtretched out, and (as it were) ſpred over in a ſtreight and plain paſſage, as the muſcles of the thigh which move the leg, except the Ham-muſcle; others oblique, as thoſe of the *Epigaſtrium*; otherſome tranſverſe, as the tranſverſe of the *Epigaſtrium*; where you muſt obſerve, that although all the fibers of the muſcles are direct, yet we call them oblique and tranſverſe, by comparing them to the right muſcles, as which by the concourſe of the fibers make a ſtreight or acute angle.

From their Fibers. From the ſorts of fibers; for ſome have one kinde of fiber; yet the greateſt part enjoy two ſorts running ſo up and down, that they either are croſſed like the letter X, as happens in the pectorall and grinding muſcles; or elſe do not concur, as in the Trapezii. Others have three ſorts of fibers, as the broad muſcle of the face.

From their connexion. From their coherence and connexion, or their texture of nervous fibers; for ſome have fibers ſomewhat more diſtant and remote immediately at their originall, than in other places, as you may ſee in the muſcles of the buttocks: Others in their midſt and belly, which by reaſon thereof in ſuch muſcles is more big or tumid, their head and tail being ſlender, as happens in moſt of the muſcles of the arm and leg, in which the denſe maſs of fleſh interwoven with fibers, disjoins the fibers in ſo great a diſtance; in otherſome the fibers are more diſtant in the tail, as in the greater Saw-muſcle ariſing from the bottom of the ſhoulder-blade; in others they are equally diſtant through the whole muſcle, as in the muſcles of the wriſt and between the ribs.

From their head. From their head; for in ſome it is fleſhy, interwoven with few fibers, as in the muſcles of the buttocks; in others it is wholly nervous, as in the moſt-broad-muſcle common to the arm and ſhoulder-blade, and in the three muſcles of the thigh proceeding from the tuberoſity of the hucle-bone; in ſome it is nervous and fleſhy, as in the internall and externall muſcle of the arm. Beſides, ſome have one head, others two, as the bender of the elbow, and the externall of the leg; others three, as the Threeheaded muſcle of the thigh. But we muſt note that the word Nerve or Sinew is here taken in a large ſignification, for a ligament, nerve and tendon, as *Galen* ſaith, (*Lib. de Oſſibus*) and moreover we muſt obſerve, that the head of a muſcle is one while above, another while below, otherwhiles in the midſt, as in the Midriff, as you may know by the inſertion of the Nerve, becauſe it enters the muſcle by its head.

From their belly. From their belly alſo, there be ſome differences of muſcles taken; for ſome have their belly immediately at their beginning, as the muſcles of the buttocks; others at their inſertion, as the Midriff; others juſt at their head, as thoſe which put forth the Calf of the leg; in others it is ſomewhat further off, as in thoſe which draw back the arm, and which bend the leg; in others, the belly extends even from the head to the tail, as in the intercoſtall muſcles, and theſe of the wriſt; in others it is produced even to their inſertion, as in thoſe of the palms of the hands and ſoles of the feet; ſome have a double belly diſtinguiſhed by a nervous ſubſtance; as thoſe which open the mouth, and thoſe which ariſe from the root of the lower proceſs of the ſhoulder-blade.

From their Tendons. Moreover the differences of muſcles are drawn alſo from the Tendons, for ſome have none, at leaſt which are manifeſt, as the muſcles of the lips and the ſphincter-muſcles, the intercoſtall and thoſe of the wriſt; others have them in part, and want them in part, as the Midriff; for the Midriff wants a Tendon at the ends of the ſhorter ribs, but hath two at the firſt *Vertebra* of the Loins in which it is terminated: Others have a Tendon indeed. But ſome of theſe move with the bone, ſome not, as the muſcles of the eys; and beſides, ſome of theſe have broad and membranous tendons, as the muſcles of the eys and *Epigaſtrium*, except the right muſcles: In others they are thick and round, as in the benders of the fingers; in others they are leſs round, but more broad than thick, ſuch is the Tendon ariſing from the twin muſcles and *Soleus* of the leg; others have ſhort Tendons, as the muſcles which turn down the hand; otherſome long, as thoſe of the palms of the hands, and ſoles of the feet; beſides others produce Tendons from the end of their belly, which Tendons are manifeſt; others from the midſt, as the Temporall muſcles.

Beſides alſo, others diffuſe many Tendons from their belly, as in the hands the benders of the fingers, and the extenders of the feet. Otherſome put forth but one, which ſometimes is divided into many, as thoſe which bend the third articulation of the foot; otherwhile many muſcles by their meeting together make one Tendon, as the three muſcles of the Calf of the leg, and thoſe which bend the cubit and leg. All Tendons have their originall, when the nerves and ligaments diſperſed through the fleſhy ſubſtance of a muſcle, are by little and little drawn and meet together, untill at laſt carried to the joint, they are there faſtned for the fit bending and extenſion thereof. From the contrariety of their Actions, for ſome parts have contrary muſcles, benders and extenders; other parts have none, for the Cods and fundament have only lifters up. From their function, for ſome are made for direct motions, as thoſe which extend the fingers and toes; others for oblique, as the Supinators of the hand, and the Pronators; others perform both, as the pectorall muſcle, which moves the Arm obliquely upward and downward, as the upper and lower fibers are contracted; and alſo outright, if all the fibers be contracted together, which alſo happens to the *Deltoides* and *Trapezius*. I have thought it good to handle particularly

From their action.

From their function.

larly these differences of muscles, because that by understanding them the prognostick will be more certain; and also the application of remedies to each part; and if any occasion be either to make incision, or suture, we may be more certain whether the part affected be more or less nervous.

CHAP. IX.

Of the parts of a Muscle.

HAving declared the nature and differences of a Muscle, we must note that some of the parts thereof are compound or universall, others simple or particular. The compound are the head, belly, and tail. The simple are ligaments, a nerve, flesh, a vein, artery and coat. For the compound parts, by the head, we understand the beginning and originall of a muscle, which is one while ligamentous and nervous, otherwhiles also fleshy. By the belly, that portion which is absolutely fleshy; But by the tail we understand a Tendon consisting partly of a nerve, partly of a ligament promiscuously comming forth from the belly of the muscle. For as much as belongs to the simple, which are six in number, three are called proper, and three common. The proper are a Ligament from a bone, a nerve proceeding from the Brain or spinall marrow, and flesh compact by the concretion of blood. The common are, a vein from the Liver or trunk arising from thence; an artery proceeding from the Heart, a Coat produced by the nervous and ligamentous fibers spreading over the superficies of the muscle. But for the simple use of all such parts, the nerve is (as it were) the principall part of a Muscle, which gives it sense and motion, the ligament gives strength, the flesh contains the nervous and ligamentous fibers of the Muscle, and strengthens it, filling up all the void spaces, and also it preserves the native humidity of these parts, and cherisheth the heat implanted in them; and to conclude, defends it from all externall injuries; for like a fan it opposeth it self against the heat of the Sun; and is as a garment against the cold; and is as a cushion in all *falls and bruises*; and as a buckler or defence against wounding weapons. The vein nourishes the muscle, the artery gives it life, the coat preserves the harmony of all the parts thereof, lest they should be any ways disjoined or corrupted by purulent abscesses breaking into the empty or void spaces of the Muscles, as we see it hapneth in a Gangrene, where the corruption hath invaded this membrane, by the breathing out of the more acrid matter or filth.

The compound and simple parts of a muscle.

What use each simple particle hath in a muscle.

CHAP. X.

A more particular inquisition into each part of a muscle.

HAving gone thus far, it remains, that we more particularly inquire into each part of a muscle, that (if it be possible) nothing may be wanting to this discourse. Wherefore a Ligament properly so called, is a simple part of mans body, next of a bone and grisle, the most terrestriall, dry, hard, cold, white, taking its originall immediatly, or by the interposition of some Medium from the Bones or Grisles (from whence also the Muscles have their beginning) whereby it comes to pass, that a ligament is void of sense, unless it receive a nerve from some other place; (for so the ligaments which compose and strengthen the tongue and yard, are partakers of sense, and it inserts it self into the bone and grisle, that so it may bind them together, and strengthen and beautifie the whole joint or connexion; (for these three be the principall uses of a ligament) then diffusing it self into the membranes and muscles to strengthen those parts. A Nerve, to speak properly, is also a simple part of our body, bred and nourished by a gross and phlegmatick humor, such as the brain, the originall of all the nerves, and also the Spinall marrow endued with the faculty of feeling, and oftentimes also of moving. For there be divers parts of the body which have nerves, yet are destitute of all voluntary motion, having the sense only of feeling, as the membranes, veins, arteries, guts, and all the entrails. A nerve is covered with a double cover from the two membranes of the brain, and besides also with a third proceeding from the ligaments which fasten the hinder part of the head to the *Vertebra's*, or else from the *Pericranium*. We understand no other things by the fibers of a Nerve, or of a Ligament, than long and slender threds, white, solid, cold, strong, more or less, according to the quantity of the substance, which is partly nervous and sensible, partly ligamentous and insensible. You must imagine the same of the fleshy fibers in their kinde; but of these threds some are streight for attraction; others oblique, for retention of that which is convenient for the creature; and lastly, some transverse, for expulsion of that which is unprofitable. But when these transverse threds are extended in length, they are lessned in bredth; but when they are directly contracted, they are shortned in length. But when they are extended all together as it were with an unanimous consent, the whole member

The nature of a Ligament.

The threefold use of a Ligament.

What a nerve is.

What we mean by the nervous and ligamentous fibers.

is wrinkled as contracted into it ſelf, as on the contrary it is extended when they are relaxed. Some of theſe are beſtowed upon the animall parts, to perform voluntary motions; others upon the virall to perform the agitation of the heart and arteries; others upon the naturall for attraction, retention, and expulſion. Yet we muſt obſerve, that the attraction of no ſimilar part is performed by the help of the foreſaid fibers or threds, but rather by the heat implanted in them, or by the ſhunning of emptineſs, or the familiarity of the ſubſtance. The fleſh alſo is a ſimple and ſoft part, compoſed of the purer portion of the blood inſinuating it ſelf into the ſpaces between the fibers, ſo to inveſt them for the uſes formerly mentioned. This is (as it were) a certain wall and bulwark againſt the injuries of heat and cold, againſt all falls and bruiſes, as it were a certain ſoft pillow or cuſhion yeelding to any violent impreſſion. There be three ſorts of fleſh; one more ruddy, as the muſculous fleſh of perfect creatures, and ſuch as have blood; for the fleſh of all tender and young things having blood, as Calves, and alſo of all ſorts of fiſh, is whitiſh, by reaſon of the too much humidity of the blood. The ſecond kinde is more pallid, even in perfect creatures having blood, ſuch is the fleſh of the heart, ſtomach, weaſond, guts, bladder, womb. The third is belonging to the entrails, or the proper ſubſtance of each entrail, as that which remains of the Liver (the veins, arteries and coat being taken away) of the bladder of the gall, brain, kidneys, milt: Some add a fourth ſort of fleſh which is ſpongy, and that they ſay is proper to the tongue alone.

By what power the ſimilar parts, principally draw or tract.

What and of how many ſorts the fleſh is.

A Vein is the veſſel, pipe, or channel of the blood, or bloody matter; it hath a ſpermatick ſubſtance, conſiſts of one coat compoſed of 3 ſorts of fibers.

What a vein is.

An Artery is alſo the receptacle of blood, but that ſpirituous and yellowiſh, conſiſting in like manner of a ſpermatick ſubſtance; But it hath two coats with three ſorts of fibers, the utmoſt whereof is moſt thin, conſiſting of right fibers, and ſome oblique: But the inner is five times more thick and denſe than the utmoſt, interwoven with tranſverſe fibers; and it doth not only contain blood and ſpirit, but alſo a ſerous humor, which we may beleeve becauſe there be two emulgent Arteries as well as veins.

What an artery is.

But the inner coat of an Artery is therefore more thick, becauſe it may contain blood which is more hot, ſubtil, and ſpirituous; for the ſpirit, ſeeing it is naturally more thin and light, and in perpetuall motion, would quickly fly away, unleſs it were held in a ſtronger hold. There is other reaſon for a Vein, as that which contains blood groſs, ponderous, and ſlow of motion. Wherefore if it had acquired a denſe and groſs coat, it could ſcarce be diſtributed to the neighbouring parts: God the maker of the Univerſe, foreſeeing this, made the coats of the veſſels contrary to the conſiſtence of the bodies contained in them. The *Anaſtomaſis* of the Veins and Arteries, that is to ſay, the application of the mouths of the one to the other, is very remarkable, by benefit of which they mutually communicate and draw the matters contained in them, and ſo alſo transfuſe them by inſenſible paſſages, although that *anaſtomoſis* is apparent in the Vein and Artery that meet together at the joint and bending of the arm, which I have ſometimes ſhewed in the Phyſick ſchools, at ſuch time as I there diſſected Anatomies.

Why an artery is more thick and denſe than a vein.

The mutuall Anaſtomoſis of the veins and arteries. Where it is manifeſt.

But the action or function of a Muſcle is either to move or confirm the part according to our will, into which it is implanted; which it doth when it draws it ſelf towards its originall, that is to ſay, its head. But we define the head by the inſertion of the nerve, which we underſtand by the manner of the working of the Muſcle.

From whence a muſcle hath its beginning or head.

CHAP. XI.

Of the muſcles of the Epigaſtrium, or lower Belly.

NOw ſeeing that we have taught what a Muſcle is, and what the differences thereof are, and what ſimple and compound parts it hath, and what the uſe, action, and manner of action in each part is; it remains that we come to the particular explication of each Muſcle, beginning with thoſe of the lower belly, as thoſe which we firſt meet withall in diſſection.

Theſe are 8 in number, four oblique, two on each ſide, two right or direct, one on the right, another on the left ſide; and in like manner two tranſverſe. All theſe are alike in force, magnitude and action, ſo mutually compoſed, that the oblique deſcendant of one ſide, is conjoined with the other oblique deſcendant on the other ſide, and ſo of the reſt.

Eight muſcles of the Epigaſtrium.

We may add to this number the two little Supplying or Aſſiſting muſcles, which are of a *Pyramidall* form, and ariſe from the Share-bone, above the inſertion of the right muſcles; Of the oblique Muſcles of each ſide the one aſcends, the other deſcends, whereupon it comes to paſs, that they are called the Oblique deſcendant and aſcendant Muſcles. Thoſe oblique which we firſt meet with, are the deſcendant, whoſe ſubſtance is partly ſanguine, partly ſpermatick; for they are fleſhy, nervous, ligamentous, veinous, arterious, and membranous. Yet the fleſhy portion is predominant in them, out of which reſpect *Hippocrates* is wont to expreſs the muſcles by the name of fleſhes; their greatneſs is indifferent

The oblique deſcendant. Their ſubſtance. Their greatnes and figure.

be-

between the large and the ſmall muſcles; their figure is three ſquare. They are compoſed of the forementioned parts, they are two in number; their ſite is oblique, taking their beginning from the touching of the great ſaw-muſcle, and from the ſixt and ſeventh true ribs, or rather from the ſpaces between the ſix lower ribs, and rather on the forepart of the muſcles, than of the ribs themſelves, from whence ſhunning the *Vertebra's* of the Loins, the fleſhy parts of them are terminated in the externall and upper eminency of the Haunch-bone, and the membranous end in the lower eminency of the Share-bone and the White-line. Yet *Columbus* diſſenting from this common deſcription of the oblique Muſcles, thinks that they are only terminated in the White-line, and not in the Share-bone. For (ſaith he) wherefore ſhould they be inſerted into the Share-bone which is not moved? But becauſe it would be an infinit labor and trouble to ſet down at large the ſeverall opinions of all Authors of Anatomy; I have thought it ſufficient for me to touch them lightly by the way. Their connexion is with the oblique aſcendant lying under them, and with the direct or right. Their temperament is twofold, the one hot and moiſt, by reaſon of the belly and the fleſhy portion of them; the other cold and dry, in reſpect of their ligamentous and tendinous portion. Their action is to draw the parts into which they are inſerted towards their originall, or elſe to unite them firmly. Yet each of theſe privately and properly draws the hip in an oblique manner towards the *Cartilago Scutiformis* or breſt-blade. Then follow the oblique aſcendant, who have the ſame ſubſtance, quantity, figure, compoſure, number and temper the deſcendant have. They are ſituate between the deſcendant and tranſverſe with whom they have connexion, eſpecially by the veſſels which are brought from the parts beneath. All the fleſhy parts ariſe from the rackbones of the Haunch to the ends of the baſtard ribs, which they ſeem to admit above and below, being fleſhy even to the fourth, and then becoming membranous, they take their way to the White-line, with a double *aponeuroſis*, which paſſes through the right Muſcles above and below, as we may plainly ſee from the navell downwards. In their fleſhy part they draw their original from the ſpine of the Haunch-bones a little lower than the deſcendent and in their fleſhy part. But for their membranous parts, they ariſe before from the ſharebone, but behinde from the ſpondyls of the Holy-bone, and *Vertebra's* of the Loins obliquely aſcending upwards to the White-line, into which they are terminated by an *aponeuroſis* or membranous tendon (which ſeems to penetrate the right Muſcle upwards and downwards, eſpecially under the navell) but by their fleſhy part at the ends of all the baſtard ribs, which they ſeem to receive above and below. And becauſe theſe muſcles are terminated in the White-line, they have alſo another uſe, yet ſuch as is common to all the muſcles of the *Epigaſtrium*, that is, to preſs down the Guts. Their action is (if they perform it together) to draw down the cheſt, and dilate the breſt; but if their actions be ſeparate, they draw the cheſt to the hip with an oblique motion. After theſe follow the right muſcles, ſo called becauſe they deſcend according to the length of the body, and becauſe they have right or ſtreight fibers.

Their compoſure and ſite.

Their connexion.
Their temperament.
Their action.

The oblique aſcendant.
Their ſite and connexion.

Their action.

The right muſcles of the *Epigaſtrium*.

We will ſay nothing (to ſhun prolixity, which in all other places we will avoid) of their ſubſtance and other conditions, which they have common with the fore-mentioned Muſcles. They are ſituate in the eminenteſt or extuberating region of the belly, bounding the *Epigaſtrium* taken in generall, (or the ſuperficiary belly) they are divided by the manifeſt intercourſe of the White-line, even to the Navell, in which place they ſeem to be united even to the place of their inſertion. They draw their originall not from the Share-bone, as ſome would have it, but according to the inſertion of their nerves from the ſides of the *Cartilago ſcutiformis*, and the ends of the ſixth, ſeventh and eighth ribs; but they end in the Share-bone, where they make a common Tendon ſufficiently ſtrong and ſhort. *Sylvius*, *Veſalius*, and *Columbus* think they ariſe from the Share-bone, becauſe they cannot be inſerted into that bone, becauſe it is unmovable. You may perceive in theſe Muſcles certain nervous and tranſverſe interſections, oftentimes three in number for the ſtrength of theſe Muſcles, (of which *Galen* makes no mention, although they may be ſeen in Apes.) And alſo in the inner ſide of theſe muſcles you may ſee four veins, and as many arteries, of which ſome creep upwards, others run downwards. The upper, called the Mamillary, deſcend from the Axillary by the ſide and lower parts of the *Sternon*, the ſlenderer portions thereof being diſtributed by the way to the *Mediaſtinum*, and about the fourth and fift rib to the Dugs, from whence they take their name.

Their ſite.

Originall.

That which remains breaking out by the ſides of the Breſt-blade, inſerts it ſelf into thoſe muſcles, creeping along, even almoſt to the navell; in which place they are manifeſtly united (that is, the veins with the veins, and arteries with the arteries) with the Epigaſtrick, which aſcend from the upper part of the Iliacks on each ſide under the ſaid muſcles, untill they meet with theſe four mamillary veſſels. That you may finde this concourſe of the veins and arteries about the navell, you muſt follow both the upper and the lower ſomewhat deep into the fleſh, preſſing the blood on both ſides from above downwards, and from below upward, untill you ſhall finde the exoſculation of theſe veſſels, which will appear by this, That the blood will flow from this into that, and from that into this; otherwiſe you can ſcarce perceive it, by reaſon of the ſmalneſs of ſuch veſſels which want blood.

The meeting together of the Epigaſtrick and mamillary veins and arteries.

But that by the benefit of ſuch concourſe of the veſſels, the matters may be communicated and tranſported both from the womb to the dugs, and again from the dugs to the womb, appears in Nurſes who want their courſes, when the milk comes into their dugs; and on the contrary loſe their milk when their courſes flow plentifully. Otherwiſe to what purpoſe ſhould there be ſuch concourſe between the veſſels of the paps and womb? for there are veins and arteries diffuſed to the ſides of the womb from the root of the Epigaſtricks; for indeed the Epigaſtricks which in their aſcent meet with the mamillary, go not to the womb, though they be next to them, and ariſe from the ſame trunk with the Hypogaſtrick vein of the womb. The action of theſe Muſcles is, to move or draw near together the parts of the Hypogaſtrium to the *præcordia* or Hypochondries. Their uſe, in *Columbus* opinion, is, to draw the breſt downwards ſo to dilate it. At the ends of theſe, nature hath produced two other ſmall Muſcles from the upper part of the Share-bone, of a triangular figure, for the ſafety of the thick and common tendon of the right Muſcles; whereupon they are called *Succenturiati*, or aſſiſters.

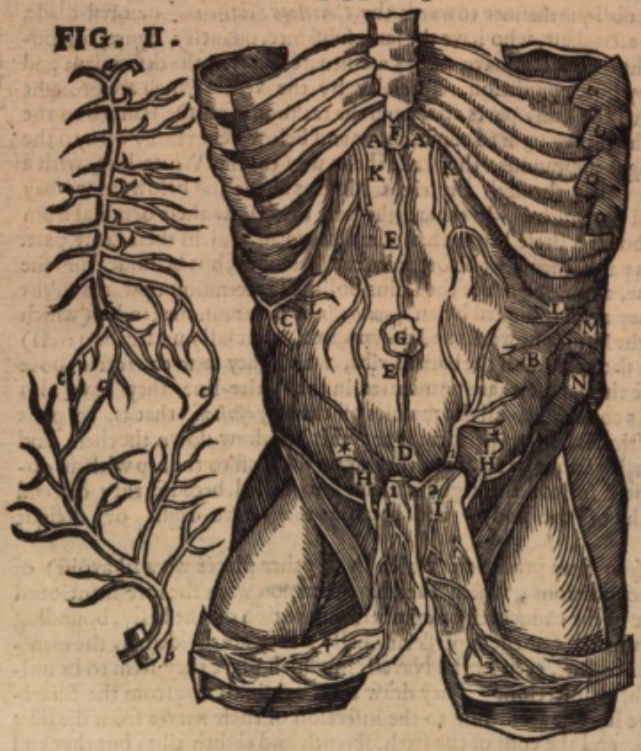
Their action.

Their uſe.

The firſt figure of the Lower belly.

FIG. I

FIG. II.



A ABCD. The upper, lower and lateral parts of the *Peritonæum.*

EE. The white Line from the griſle of the Breaſt-bone, called the Breaſt-blade, to the commiſſure or meeting of the Share-bones.

F. The Griſle of the Breaſt-bone, *Cartilago enſi-formis*, or the Breaſt-blade.

G. The Navell, which all the Muſcles being taken away, muſt be kept for the demonſtration of the Umbilicall Veſſels.

H H. The produ&ctions of the *Peritonæum*, which contain the ſeminary Veſſels on either ſide.

** The hole which giveth way to the ſeminary Veſſels of men.

II. A vein and an artery from the *Epigaſtrick*, which being carried upward under the right Muſcles, do here hang down, and are diſtributed into the lower part of the *Abdomen.*

K K. A Vein and an artery, from the internall Mammary proceeding from under the Bone of the Breaſt, are carried downward through the right muſcles, & are diſſeminated into the upper part of the *Abdomen.*

1, 2 the place wherin the right muſcles ariſe, which being here cut off, do hang down, that their Veſſels may the better be ſeen. 3, 4. The *Anaſtomaſis* or inoculation of the foreſaid Veſſels, making the conſent of the *Abdomen* and the Noſe, and of the Womb with the Breſts, as ſome think. LL. Branches of Veins running into the ſides of the *Peritonæum.* N. The place of the Haunch-bone bared, to which the Oblique and the Tranſverſe muſcles do grow.

The Pyramidal or aſſiſting Muſcles.

Some (moved with I know not what reaſon) would have theſe two ſmall Muſcles to help the erection of the yard. *Columbus* thinks they ſhould not be ſeparated from the right, and that they only are the fleſhy beginnings of the right. But on the contrary, *Fallopius* manifeſtly proves them different and ſeparate from the right, and ſhews their uſe.

The tranſverſe muſcles of the *Epigaſtrium.* Their figure and ſite.

The Tranſverſe remain to be ſpoken of, ſo called by reaſon of their fibers, which make right angles with the fibers of the right Muſcles. They have a quadrangular figure ſituate upon the greateſt part of the *Peritonæum*, to which they ſtick ſo cloſe that they ſcarce can be ſeparated. They take their originall from the production of the loins, the eminency of the Haunch-bone, the tranſverſe productions of the *vertebra's* of the loins, and the ends of the baſtard-ribs; contrary to the opinion of many, whom the inſertion of the nerve convinces, but they end in the White-line, as all the reſt do.

Their action. The common uſe and action of the eight muſcles of the *Epigaſtrium.*

Their action is to preſs the guts, eſpecially for the expulſion of excrements.

But all the eight recited Muſcles, beſides their proper uſe, have another common, that is, they ſtand for a defence or bulwark for all the parts lying under them, and ſerve for the expulſion both of the excrements, infant, and vapors, and alſo for the ſtrengthening

of

of the voice, as experience shews in those who sound Trumpets and Cornets.

Therefore these muscles do equally on every side press the Belly; but the Midriff, the intercostall muscles assisting it, doth drive from above downwards, from which conspiring contention follows the excretion of the excrements by the fundament; but unless the Midriff should assist, these muscles would press the excrements no more downwards, than upward to the mouth.

Although to this excretion of the excrements, it is not sufficient that the Epigastrick, Midriff, and intercostall muscles press the belly, but the muscles of the throtle must be also shut. For the mouth being open, the excrements never go well forth; because the vapors that pass out of the mouth, which being restrained and driven to the Midriff, by stretching it powerfully thrusts down the excrement. Wherefore Apothecaries when they give glysters, bid the Patient to open his mouth, that the glyster may easilyer go up, which otherwise would scarcely go up, the mouth being shut, because so we should have no place empty in us, into which the glyster might be admitted. Why when the mouth is open the excrements go more slowly forth.

Of the White-line, and Peritonæum or Rim of the belly.

THe White-line is nothing else, than the bound and extremities of the muscles of the *Epigastrium*, distinguishing the belly in the midst into two parts, the right and left. It is called white, both of its own colour, and also for that no fleshy part lyes under it, or is placed above it. It is broader above the navell, but narrower below, because the right muscles do there grow into one. Now we must treat of the Coat or membrane, *Peritonæum* or Rim of the belly; it is so called, because it is stretched over all the lower belly, and particularly over all the parts contained in the ventricle, to which also it freely lends a common coat. It hath a spermatick substance, as all other membranes have; the quantity of it in thickness is very small, (for it is almost as thin as a Spiders web) yet differing in divers places in men and women; for men have it more thick and strong above the navell, that so it may contain the extension of the stomack, often stretched beyond measure with meat and drink. On the contrary women have it so thick and strong below their navell, that it seems double, that so they may more easily endure the distention of their womb, caused by the childe contained in it. But above the navell, men and women have the *Peritonæum* of an equal strength, for the self-same reason. The longitude and latitude of it is known by the circumscription of the belly. What the White-line is. What the Peritonæum is. The substance, and quantity.

The figure is round and somewhat long; it puts forth some productions, like finger-stalls, both for the leading and strengthening the spermatick vessels, and the Cremaster muscles of the Testicles, and besides it the ejaculatory vessels, as also to impart a coat to the Testicles and all the naturall parts. The figure.

It is composed of slender, membranous and nervous fibers, certain small branches of veins and arteries concurring with them, which it receives for life and nourishment from the adherent parts. The composition.

This membrane is one in number, and besides every where one and equal, although *Galen* would have it perforated in that place where the spermatick vessels descend to the Testicles; But in truth we must not think that a hole, but rather a production, as we said before. The number. Lib. de sem.

The later Anatomists have observed, the Coat *Peritonæum* is doubled below the Navel, and that by the spaces of these reduplications the umbilicall arteries ascend to the Navell.

It is situate near the naturall parts, and compasses them about, and joined by the coat, which it gives them, as also on the sides, it is joined to the *vertebra's* of the loins, from whose ligaments (or rather Periosteum) it takes the originall: On the lower part, it cleaves to the share-bone, and on the upper to the Midriff, whose lower part it *wholly* invests; on the fore or outer part it sticks so close to the transverse muscles, that it cannot be pluckt from them but by force, by reason of the complication and adhæsion of the fibers thereof with the fibers of the proper membrane of these muscles, which membrane in *Galens* opinion proceeds from this *Peritonæum*, that so it is no marvail that we may more easily break than separate these two coats. It is of temperature cold and dry, as all other membranes are. The site and connexion. Lib. 6. Meth.

It hath many uses, the first whereof is, to invest and cover all the parts of the lower belly, specially the Kall, lest it should be squeezed by great compressures and violent attempts into the empty spaces of the muscles, as it sometimes happens in the wounds of the *Epigastrium*, unless the lips of the ulcer be very well united; for then appears a tumor about the wound by the Guts and Kall thrusting without the *Peritonæum* into those spaces of the muscles; from whence proceeds cruel pain. Use.

Another use is to further the casting forth of the excrements by pressing the ventricle and guts on the foreside, as the Midriff doth above, as one should do it by both their hands joined together.

The third use is, it prohibits the repletion of the parts with flatulency after the expulsion of the excrements, by straitning and pressing them down.

The fourth and last is, that it contains all the parts in their seat, and binds them to the back-bone, principally that they should not fly out of their places by violent motions, as leaping and falling from on high.

Laſtly, we muſt know, that the Rim is of that nature, that it will eaſily dilate it ſelf, as we ſee in Dropſies, in women with childe, and in tumors againſt nature.

CHAP. VIII.

Of the Epiploon, Omentum, or Zirbus, that is, the Kall.

The ſubſtance, magnitude, figure.

AFter the containing parts, follow the contained, the firſt of which is the *Epiploon*, (or Kall) ſo called, becauſe it (as it were) ſwims upon all the guts. The ſubſtance of it is fatty and ſpermatick, the quantity of it for thickneſs is diverſe, in divers men according to their temperament. The latitude of it is deſcribed by the quantity of the guts. It is in figure like a purſe, becauſe it is double.

The compoſure.

It is compoſed of veins, arteries, fat and a membrane, which ſliding down from the gibbous part of the ventricle, and the flat part of the gut *Duodenum* and ſpleen over the Guts, is turned back from the lower belly to the top of the Colon. It is one as we ſaid covering the Guts.

The connexion.

It hath its chief connexion with the firſt *Vertebra's* of the Loins, from which place in beaſts it ſeems to take a coat, as in men from the hollow part of the Spleen, and gibbous of the ventricle, and depreſſed part of the *Duodenum*, from whence doubled it is terminated in the fore and higher part of the Colick-gut.

Lib. Anatom. adminiſt.

Which moved *Galen* to write, that the upper part of the membrane of the Kall was annexed to the ventricle; but the lower, to the laxer part of the Colick-gut.

The temper.

From the veſſels of which parts it borrows his, as alſo the nerves, if it have any.

The uſe twofold.

The temper of it in lean bodies is cold and dry, becauſe their Kall is without fat; but in fat bodies it is cold and moiſt by reaſon of the fat. The uſe of it is twofold: The firſt is to heat and moiſten the Guts, and help their concoction, although it do it by accident, as that which through the denſity of the fat hinders the cold air from piercing in, and alſo forbids the diſſipation of the internall heat. Another uſe is, that in want of nouriſhment in times of great famin, for ſometimes it cheriſhes, and (as it were) by its dew preſerves the innate heat, both of the ventricle and neighbouring parts, as it is written by *Galen*.

Lib. 4. de uſu partium.

Moreover we muſt obſerve, that in a rupture or relaxation of the *Peritonæum*, the Kall fals down into the *ſcrotum*, from whence comes that rupture we call *Epiplocele*.

A cauſe of fruſtrating conception.

But in women that are ſomewhat more fat, it thruſts it ſelf between the bladder and the neck of the womb, and by its compreſſion hinders, that the ſeed comes not with full force into the womb, and ſo fruſtrates the conception. Beſides, when by a wound or ſome other chance, any part of it be defective, then that part of the belly which anſwers to it, will afterwards remain cold and raw, by reaſon of the forementioned cauſes.

The ſecond figure of the lower belly.

A A, B B. The inner part of the *Peritonæum* cut into four parts, and ſo turned backward.

B. The upper *B* ſheweth the implantation of the Umbilicall vein into the Liver.

C. The Navel ſeparated from the *Peritonæum*. From D to the upper *B* the Umbilicall veins.

E, E. The forepart of the ſtomach blown up, neither covered by the Liver nor Kall.

F, F. A part of the *Gibbous* ſide of the Liver.

G. Veſſels diſſeminated through the *Peritonæum*. * The Breſt blade.

H. The bottom of the Bladder of urine.

I. The connexion of the *Peritonæum* to the bottom of the Bladder.

K, K, K, K. The Kall covering the Guts.

M, N. Veſſels and ſinews embracing the bottom of the ſtomach.

O The meeting of the Veſſels of both ſides; ſo that *M, N*, and *O*, ſhew the ſeam which *Ariſtotle* mentions, 3 *Hiſt.* & 4 *de part. Anim.* where he ſaith, That the Kall ariſes and proceeds from the midſt of the belly.

P, P. Branches of Veſſels running alongſt the bottom of the ſtomach.

QQQQ. Certain branches of the Veſſels diſtributed to the upper membrane of the *Omentum*, and compaſſed with fat.

a, a. The two Umbilicall arteries going down by the ſides of the bladder to a branch of the great artery.

b The Ligament of the Bladder which is ſhewed for the *Urachus*.

CHAP.

CHAP. XIIII.

Of the Ventricle or Stomach.

NOw we must speak of the Stomach, the receptacle of the food necessary for the whole body, the seat of appetite, by reason of the Nerves dispersed into its upper orifice, and so into its whole substance. The substance thereof is rather spermatick than sanguine, because that for one fleshy membrane, it hath two nervous; The quantity or magnitude of the ventricle is divers, according to the various magnitude of bodies, and gluttony of men. The figure of it is round and somewhat long, like a Bagpipe. The stomach is composed of two proper coats, and one common from the *Peritoneum*, together with veins, sinews, and arteries; the innermost of its proper coats is membranous woven with right fibers, for the attraction of meats, it is extended and propagated even to the mouth thereof, whereby it comes to pass that the affections of one part may easily be communicated to the other by sympathy, or consent. This coat hath its originall from the membranes of the brain which accompany the nerves descending from the third and fourth conjugation to the mouth thereof. And in like sort from other productions descending by the passages of the head, from whence also another reason may be drawn from that, which they commonly bring from the nerves of the sixt conjugation; why in wounds of the head, the stomach doth so soon suffer by consent with the brain. The exterior or outer is more fleshy and thick, woven with oblique fibers, to retain and expell. It draws it originall from the *Pericranium*, which as soon as it comes to the gullet, takes unto it certain fleshy fibers. There be nerves sent into the stomach from the sixt conjugation of the brain, as it shall be shewed in its proper place. Veins and arteries are spread into it from the *Gastrica*, the *Gastrepiploides*, the *Coronaria* and splenick, from the second, third, and fourth distribution of the *Vena porta*, or gate-vein; and the third of the descendent artery to the naturall parts, as soon as it passes forth of the midriffe.

What the ventricle is
The substance;
The magnitude.
The figure.
The composure.

The cause of the consent of the mouth and stomach.

It is one in number. The greater part of it is situated on the left side between the spleen, the hollowness of the liver, and the guts, that assisted by the heat of such neighbouring parts, it may more cheerfully perform the concoction of the meat. Neither am I ignorant that *Galen* hath written, that a great part of the stomach lies on the left side. But inspection it self, and reason makes me derogate from *Galens* authority, for because there is more empty space on the left side, by reason the spleen is less than the liver, it was fit it should lie more on the left side. The more proper connexion of it is with the gullet and guts, by its two orifices; with the brain by its nerves; with the liver and spleen by its veins; with the heart by its arteries; and with all the naturall parts by its common membrane.

The number.

Lib. 4. de usu partium.

The connexion.

The temper of the ventricle in men of good habit, is temperate, because it is almost composed of the equall commixture of sanguine and spermatick parts; or according to *Galens* opinion, it is cold of its self, and by the parts composing it; and hot by the vicinity of the bowels. But in some it is hotter, in others colder, according to the divers temper and complexion of divers bodies. That stomach is to be thought well tempered, that powerfully draws down the meat and drink, and embraces and retains them so drawn, untill by concoction and elixation, they shall be turned into a juice like cream (which the Greeks call *Chylos*;) and lastly, which doth strongly send from it, and repell the excrements of this first concoction.

The temper.
Lib. 9. Meth.

The stomach is known to be hotter by this, that it better concocts and digests course and hard meats, as beef, hard egs, and the like, than soft meats easie of digestion, which it corrupts and turns into belchings. For so a young chickin, is sooner burnt than well rosted at a great fire. The stomach which is colder, desires much meat, but is slow in concocting them, especially if they be cold and hard of digestion, which for that cause quickly turn sowre. The action of a well conditioned stomach is twofold, one common, another proper. The common is to attenuate, mixe and digest the meats taken in at the mouth, for the nutrition of it self and the whole body, after the liver hath performed its duty, which before it be done, the ventricle only enjoyes the sweet pleasure of the *Chylus*, and comforts its self against the impurity of the adjacent parts, whereof it is called the work-house of concoction. Its first action is to attract, retain, and assimilate to it self that which is convenient; but to expell whatsoever shall be contrary, either in quantity, or quality, or in the whole substance.

Notes of a hot stomach.

The action twofold.

It hath two orifices, one above, which they commonly call the stomach and heart, the other lower, which is called the *Pylorus*, or lower mouth of the stomach. The upper bends to the left side neer the back bone; it is far more large and capacious than the lower, that so it may more commodiously receive meats half chewed, hard and gross, which Gluttons cast down with great greedines; it hath an exquisite sense of feeling, because it is the seat of the appetite, by reason of the nerves incompassing this orifice, with their mutuall imbracings; whereby it happens that the ventricle in that part is endued with a quick sense, that perceiving the want and emptines of meat, it may stir up the creature to seek food. For albeit nature

The two orifices of the stomach.

nature hath beſtowed four faculties on other parts, yet they are not ſenſible of their wants, but are only nouriſhed by the continuall ſucking of the veins, as plants by juice drawn from the earth.

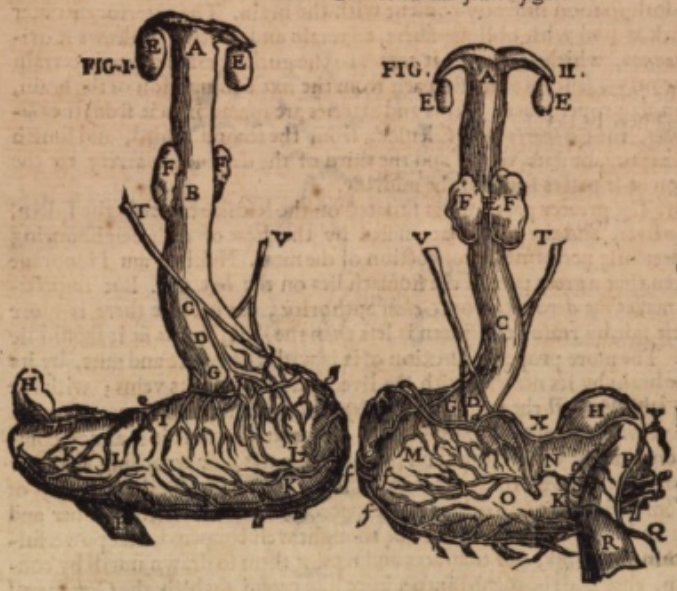
The fite.

This orifice is ſeated at the fifth *Vertebra* of the cheſt, upon which they ſay it almoſt reſts. Yet I had rather ſay that it lies upon the twelfth *Vertebra* of the cheſt, and the firſt of the loins; for in this place the gullet perforates the midriffe, and makes this upper orifice. The lower orifice bends rather to the right ſide of the body, under the cavity of the liver. It is far ſtraiter than the upper, leſt any thing ſhould paſs away before it be well attenuated and concocted; and it doth that by the help or aſſiſtance of, as it were, a certain ring, like to the ſphincter muſcle of the fundament, which ſome have thought a glandule made by the tranſpoſition of the inner and fleſhy membrane of the ventricle into that which is the outer of the guts. I know *Columbus* laughs at this glandulous ring, but any one that looks more attentively ſhall perceive that the *Pylorus* is glandulous. The ſtomach in its lower and inner ſide, hath many folds and wrincles, which ſerve to hold and contain the meats, untill they be perfectly concocted. In the ventricle we obſerve parts gibbous and hollow; the hollow is next to the liver and midriffe; the gibbous is towards the guts. Now we muſt note, that the ventricle when it is much reſolved or looſed, may ſlide down even to the navill near the bladder, the which we have obſerved in ſome bodies diſſected after their death.

The glandulous ring of the *Pylorus*.

The falling down of the ſtomach.

The third and fourth figure.



The firſt figure ſhews the fore-ſide of the ſtomach and gullet.

A. ſheweth the orifice of the gullet cut from the throat.

B. the ſtraight and direct courſe of the gullet from A. to B.

C. how the gullet above the firſt rack bone of the cheſt, from B. to C. inclineth to the right hand.

D. his inclination to the left hand, from C. to D.

EE. the two glandules called the Almonds, ſet cloſe to the gullet in the end of the throat, called alſo *Pariſtmia*, *Antiades*, *Tonſillæ* and *Salviares glandulæ*. FF. Another glandulous body in the midſt of the gullet, about the fifth rack bone, from which place the gullet gives place to the great arterie, ſomewhat declining to the right ſide: *Væſalius, Lib. 5. Cap. 3.* and *Columbus Cap. ult. lib. 9.* write, that thoſe Glandules are filled with a certain moiſture, with which the gullet is moiſtened, that the meats may ſlide down more eaſily into the ſtomach, as through a ſlippery paſſage. No otherwiſe than the *Glandulæ proſtatæ*, filled with a kind of groſs and oily moiſture, ſmooth the paſſage of the urine, that ſo it may flow through it, with a more free and leſs troubled courſe. G. the connexion of the gullet with the ſtomach, where the upper orifice of the ſtomach is faſhioned. H. the lower orifice of the ſtomach called *Pylorus*. I. K. the upper part of the ſtomach at I. the lower at K. LL. the fore-ſide of the ſtomach. P. the gut called *Duodenum*. T. V. the right and left nerves of the ſixth pair encompaſſing about the gullet and the uppermoſt left orifice of the ſtomach.

The ſecond Figure ſheweth the back parts of the Ventricle and Gullet.

A. EE. FF. G. H. P. TV. ſhew the like parts as in the former. From C. to D. the inclination of the ſtomach to the left hand. M. N. O. the backſide of the ſtomach. M. ſheweth the prominence of the left ſide. N. of the right. O. ſheweth the dock or impreſſion, where it reſteth upon the rack bones. Q. R. the paſſage of the bladder of the gall into the *Duodenum* at R. S. a glandulous body growing under the *Duodenum*, bearing up the veſſels X. Y. a nerve on the left ſide creeping up to the top of the ſtomach, and ſo running out to the liver.

CHAP.

CHAP. XV.

of the Guts.

THe Guts the instruments of distribution and expulsion, are of the same substance and composure with the stomach, but that the site of the coats of the stomach is contrary to those of the guts. For that which is the innermost coat of the stomach is the outermost of the guts, and so on the contrary. The figure of the guts is round, hollow and capacious, some more, some less, according to the divers bigness. The ir substance. Figure.

But for the quantity of the guts, some are small, some great, more or less, according to the variety of bodies. But they are six in number: for there be three small; the *Duodenum*, the *Jejunum*, or empty gut, and the *Ileon*. Three great, the Blind, the Colick, and the Right gut. All which have had their names for the following reasons; the first, because it is extended the length of twelve fingers, like another stomach, without any turning, or winding; of which greatness it is found in great bodied men, such as were more frequently to be met withall in *Galens* time, than in this time of ours, in which this gut is found no longer than seven, eight, or nine fingers at the most. The cause of this length is, that there may be a free passage to the Gate-vein, coming out of the liver, as also to the artery and nerve which run into it. For seeing that this gut may sometimes rise to the top of the liver, it would possess the space under the bladder of the gall (with which it is often tinctured) if it had any revolutions that way, which is the passage for such like vessels. Others give another reason of this figure, which is, that there should be nothing to hinder the easie and fit distribution of the perfectly concocted *Chylus* to the liver. Their number. The *Duodenum*.

The second is called *Jejunum*, or the empty gut, not because it is absolutely so, but because it contains little in comparison of the other. There is a triple cause of this emptiness, the first the multitude of the meseraick veins and arteries which are about it, whereupon there is a greater and quicker distribution of the *Chylus*. The second is the vicinity or neighborhood of the liver strongly drawing the *Chylus* contained in it; the third is the flowing down of the chollerick humor from the bladder of the Gall into it, which ever and anon by its acrimony cleanses away the filth, and by continuall flowing solicits it to expulsion. The third is called *Ileon* because it lies between the *Ilia* or flanks; it differs nothing from the rest in substance and magnitude, but in this one thing, that there is more matter contained in it than in the rest, by reason of the paucity of the vessels terminated in it, that it is no marvell that there can be no exact demonstration made of them. The fourth is called *Cecum* or the blind, because it hath but one passage to send out and receive in the matter. This gut hath a long and strait production, which according to the opinion of some (though altogether erroneous) often falls down into the *Scrotum* in the rupture, or relaxation of the Rim of the Belly; for that production in the lower belly strongly sticks to the *Peritonæum* or Rim, which hinders such falling down. But *Galen* seems by such a blind gut to have meant this long and narrow production, and certainly so thinks the common sort of Anatomists, but here *Vesalius* justly reprehended *Galen*. Wherefore *Sylvius* that he might free *Galen* of this fault, would have us by the blind gut to understand the beginning of the colick gut. The fifth is called *Colon* (or colick gut) because it is greater and more capacious than the rest. The sixt and last, the Right gut, by reason of the rightness or streightness of the passage. This, in beasts especially, hath a certain fatness in it to make the passage slippery, and lest the gut should be exulcerated in the passage, by the sharpness of hard and acrid excrements. The *Jejunum*. *Ileon*. *Cæcum*. *Colon*. *Rectum*.

The site of these guts is thus: The *Duodenum* upon the backbone bends to the right hand; the *Jejunum* possesses a great part of the upper umbilicall region, diffuses it self into both sides with windings, like to these of the gut *Ileum*, even to the flanks. The gut *Ileon* is situate at the lower part of the umbilicall region, going with many turnings and windings, even to the hollownesses of the holy-bone above the bladder and side parts of the *Hypogastrium*, they call the flanks. Their site.

The Blind bends to the right hand, a little below the kidney, above the first and fourth *Vertebra* of the loins. The Colon or Colick gut is crooked and bent, in the form of a *Scythian* bow, filling all the space from the blind gut, below the right kidney even to the hollowness of the liver, and then it goes by the gibbous part of the stomach above the small guts, even to the hollowness of the Spleen; from whence sliding under the left kidney, with some turnings, it is terminated upon the *Vertebra's* of the loins.

By all which turnings and windings of the colick gut, it is easie to distinguish the pain of the stone of the kidneys, which remain fixt in one certain place, from the colick wandring through these crooked passages we mentioned. The right gut tends with an oblique site towards the left hand, upon the holy bone even to the very fundament. They have all one and a common connexion; for they are all mutually joined together by their coats, because there is but one way from the gullet even to the fundament, but they are joined to the principall parts by their nerves, veins, and arteries. The distinction between the colick and the stone in the kidneys. Their connexion.

But a more proper connexion is that, where the *Duodenum* on the upper part of it, is joined

ed with the *Pylorus*; but on the lower part to the *Jejunum*, and the parts lying under it, by the coat of the *Peritonæum*. The *Jejunum*, or empty gut, is joyned to the *Duodenum* and *Ileon*. The *Ileum* with the empty and blind guts. The blind with the *Ileon* and *Colon*, and with the right side of the backbone where it is tied more straitly. The *Colon* with the blind and right guts, and in his middle part, with the kidneys and gibbous part of the stomach; whereby it comes to pass, that being distended with wind in the colick, it overturns and presses the stomach, and so causes vomiting.

Why vomiting happens in the colick.

Lastly, the right gut is annexed with the colick gut and fundament. At the end whereof there is a muscle fastened, of figure round and circular, called the *Sphincter*, arising from the lower *Vertebra's* of the holy bone and rump, by the benefit of which as of a dore or gate, the excrements are restrained at our wil, lest man born for all honest actions, without all shame, in every time and place, should be forced every where to ease his belly. For such as have lost the benefit of this muscle by the palsy, have their excrements go from them against their wills. There is a body situate at the end of the right gut, of a middle substance between the skin and flesh, as it were arising from the mixture of them both, like the extremities of the lips, of the same use with the *Sphincter*, but that it is not altogether so powerfull. But there are also certain veins situate about it called the Hæmorrhoidall, of which we will speak in their place.

The *Sphincter* muscles of the fundament.

Gal. lib. 5. de usu partium. cap. 14.

Besides there are two other muscles that descend to the end of this gut, being broad and membranous on each side, one arising from the side and inner parts of the share and hip-bones, which inserted above the *Sphincter* pull up the fundament falling down, wherefore they are called *Levatores Ani*, or the lifters up of the fundament. Wherefore when as either they are too weak, or resolved, or the fundament oppressed with the weight of flegmatick, salt, cholerick and sharp humors, the gut is scarce restored into its place, that there is need of the help of the fingers for that purpose.

Levatores Ani.

The guts follow the temper of the stomach. Their action is the distributing the *Chylus* by the meseraick veins (which of duty belongs to the three small guts) and the receiving the excrements of the *Chylus*, and retention of them, till a fit time of expulsion, which belongs to the third quarter. Besides, these small guts finish up the work of concoction, begun in the stomach, although they be not altogether made for that use. But nature is often accustomed to abuse the parts of the body for some better use.

The action of the guts.

The fifth figure of the lower belly.

A. The brest blade, *Cartilago, Ensiformis.*
BB. The Rim, with the midriffe and broken ribs bent outwards.
CC. the gibbous part of the liver.
D. a ligament tying the liver to the midriffe.
E. part of the umbilicall vein.
FF. the stomach fild full of meat.
G. a part of the spleen.
H. the blind gut of the late writers, for the Ancients took the top of the *colon* for it.
I. the beginning of the great or thick guts.
I. and so to K. sheweth the passages of the colick gut from the right kidney to the liver. And so the colick and the stone on this side are in one place, and therefore hardly distinguished.
K. to L. the same colick gut lyeth under the whole bottome of the stomach, which is the reason that those which are troubled with the colick cast so much.
L. to M. The passage of the *Colon* from the spleen to the share bone, by the left kidney, a way, which maketh the pain of the stone and the Colick on the left side very hard to distinguish. N. The *Colon* ending in the right gut. O. The beginning of the right gut unto the bladder. P. Q. The sunken or fallen side of the *Colon* at P. and his Chambers or Cels at Q. R. S. T. The lesser guts especially lying under the Navel. *a. a.* The two umbilicall arteries. *b.* The bottome of the bladder. * The connexion of the bladder and the *Peritonæum.*

But

But we must note, that for the composure of the guts, they have only transverse fibers, for expulsions sake, unless that at the beginning of the *Colon*, and the end of the right gut, you may see certain right fibers added to the transverse to strengthen them, lest these guts should chance to be broken and torn by the passage of hard excrements, and the laborious endeavour of expulsion (specially in brute beasts.) Their fibers.

But if any aske, how they have retention, being they want oblique fibers; he may know that the *faces* are retained in the right gut, by the force of the *Sphincter* muscle, but oft times in the blind, by their hardness and abundance, whereby they stick in the passage; but in the rest, by reason of their conformation into many windings and turnings. The length of the guts, is seven times more than the length of the whole body; to this length they have windings, lest the nourishment should quickly slide away, and left men should be withdrawn by gluttony from action and contemplation. For so we see it comes to pass in most beasts, which have one Gut, stretched streight out from the stomach to the fundament; as in the Lynx and such other beasts of insatiable gluttony, alwayes, like plants, regarding their food. How the guts become hot to retain. Their length.

CHAP. XVI.

Of the Mesentery.

After the Guts followes the Mesentery, being partly of a fatty and partly of a spermatick substance. The greatness of it is apparent enough, although in some it be bigger, and in some lesser according to the greatness of the body. It is of a round figure and not very thick. It is composed of a double coat arising from the beginning and root of the *peritonæum*. In the midst thereof it admits nerves from the Costall of the sixt conjugation, veins from the *Vena Porta* or Gate vein; Arteries from the descendent artery, over and besides a great quantity of fat and many glandulous bodies, to prop up the division of the vessels spred over it, as also to moisten their substance. It is in number one, situate in the middle of the guts, from whence it took its name. Yet some divide it into two parts, to wit, into the *Meseræum*, that is, the portion interwoven with the small guts, and into the *Mesocolon* which is joyned with the Great. It hath connexion by its vessels, with the principall parts, by its whole substance with the guts, and in some sort with the kidneys, from whose region it seems to take its coats. The substance. Magnitude. Figure. Composure. Number. The connexion.

It is of a cold and moist temper, if you have respect to his fatty substance; but if to the rest of the parts, cold and dry. The temper.

The action and use of it is, to bind and hold together the guts, each in his place, lest they should rashly be folded together, and by the Meseraick veins (which they term the hands of the Liver) carry the *Chylus* to the liver. The action and use.

In which you must note, that all the Meseraick Veins come from the liver, as we understand by the dissection of bodies; although some have affirmed, that there be some veins serving for the nourishment of the guts, no wayes appertaining to the Liver, but which end in certain Glandulous bodies, dispersed through the Mesentery, of whose use we will treat hereafter. All the meseraick veins come from the liver.

CHAP. XVII.

Of the Glandules in generall, and of the Pancreas, *or sweet-bread.*

A Glandule is a simple part of the body, sometimes of a spungy and soft substance, sometimes of a dense and hard. Of the soft Glandules are the *Tonsilles*, or Almonds, like in substance to blanched Almonds; the *Thymus*, *Pancreas*, *Testicles*, *Prostatæ*. But the dense and hard are the *Parotides* and other like. The Glandules differ amongst themselves in quantity and figure, for some are greater than other some, and some are round and others plain, as the *Thymus* and *Pancreas*. Substance of the glandules. Quantity and figure.

Others are compounded of veins, nerves, arteries, and their proper flesh, as the Almonds of the ears, the milky glandules in the breasts and the testicles. Others want nerves, at least which may be seen, as the *Parotides*, the axillary, or those under the armholes and others. The number of glandules is uncertain, by reason of the infinite multitude and variety of sporting nature. You shall find them alwayes in these places, where the great divisions of vessels are made; as in the middle ventricle of the brain, in the upper part of the Chest, in the Mesentery and other like places. Composition. Number.

Although othersome be seated in such places, as nature thinks needfull to generate and cast forth of them a profitable humor to the creature; as the almonds at the root of the tongue, the kernels in the dugs, the spermatick vessels in the *scrotum* and at the sides of the wombe; or where nature hath decreed to make emunctories for the principall parts,

as

Connexion. as behind the ears, under the armholes, and in the groins. The connexion of glandules is not only with the vessels of the parts concurring to their composition, but also with those, whose division they keep and preserve. They are of a cold temper, wherefore Physitians say the blood *recrudescere* (*i*) to become raw again in the dugs, when it takes upon it the form of milk. But of these some have action, as the almonds, which pour our spatle usefull for the whole mouth, the dugs milk, the Testicles seed; others, use only, as those which are made to preserve, underprop and fill up the divisions of the vessels. Besides this we have spoken of glandules in generall, we must know that the *Pancreas* is a glandulous and flesh-like body, as that which hath every where the shape and resemblance of flesh. It is situate at the flat end of the liver, under the *Duodenum* with which it hath great connexion, and under the gate-vein, to serve as a bulwarke, both to it and the divisions thereof, whilst it fils up the empty spaces between the vessels themselves, and so hinders, that they be not pluckt asunder, nor hurt by any violent motion, as a fall or the like.

Temper.
Action and use.
The substance of the *Pancreas*.
The site.

CHAP. XVIII.

Of the Liver.

HAving gone thus far, order of dissection now requires, that we should treat of the distribution of the gate-vein; but because it cannot well be understood unless all the nature of the liver from whence it arises, be well known, therefore putting it off to a more fit place, we will now speak of the Liver. Wherefore the Liver (according to *Galens* opinion, *lib. de form. fœtus*) is the first of all the parts of the body, which is finished in conformation, it is the shop and Author of the blood, and the originall of the veins; the substance of it, is like the concrete mud of the blood, the quantity of it is divers, not only in bodies of different, but also of the same species; as in men amongst themselves, of whom one will be gluttonous and fearfull, another bold, and temperate, or sober; for he shall have a greater liver than this, because it must conceive and concoct a greater quantity of *Chylus*: yet the liver is great in all men, because they have need of a great quantity of blood for the repairing of so many spirits and the substantifick moisture, which are resolved and dissipated in every moment by action and contemplation. But there may be a twofold reason given, why such as are fearfull have a larger liver. The first is, because in those the vitall faculty (in which the heat of courage and anger resides) which is in the heart, is weak; and therefore the defect of it must be supplyed by the strength of the naturall faculty. For thus nature is accustomed to recompence that which is wanting in one part, by the increase and accession of another. The other reason is, because cold men have a great appetite, for by *Galens* opinion *In arte parva*, coldness increases the appetite; by which it comes to pass that they have a greater quantity of *Chylus*, by which plenty the liver is nourished and grows larger. Some beasts, as Dogs, and Swine, have the liver divided into five or more Lobes, but a man hath but one Lobe, or two, or three at the most; and these not so much distinguished, as which cherish the upper and hollow region of the ventricle, with embracing to help forward the work of concoction. Therefore the liver is almost content with one Lobe, although it is alwayes rent with a small division, that the umbilicall vein piercing into the roots and substance of it, may have a free passage; but also oftentimes there is as it were a certain small lobe of the liver, laid under that umbilicall vein, as a cushion.

What the liver is.
Its substance and quantity.
Why cowards have great livers.

The figure of the liver is gibbous; rising up and smooth towards the Midriffe; towards the stomach is the *sinous* or hollow side of it somewhat unequall, and rough by reason of the distance of the Lobes, the original of the hollow vein, and the site of the bladder of the Gall.

The figure.

The composition of the liver is of veins, nerves, arteries, the coat and proper substance thereof which we call the gross and concrete blood, or *Parenchima*. Veins and arteries come to it from the navill; but nerves immediately from these which are diffused over the stomach according to *Hippocrates*; yet they penetrate not very deep into its substance, for it seems not to stand in need of such exact sense, but they are distributed upon the coat and surface thereof, because this part made for distribution over the whole body, keeps to it self no acrid or malign humor; for the perception of which it should need a nerve, although the coat investing it, sends many nervous fibers into its substance, as is apparent by the taking away of the coat from a boiled liver; we must think the same of the other entrails. The coat of the liver is from the *Peritonæum*, waxing small from the umbilicall vein, when it divides it self for the generation of the gate and hollow veins, as is observed by *Galen*, *Lib. de format. Fœtus*. The liver is only one, situate in the greater part on the right side, but with the lesser part on the left, quite contrary to the stomach. Its chief connexion is with the stomach and guts, by the veins and membranes of the *Peritonæum*; by the hollow vein and artery, with the heart; by the nerve with the brain, and by the same ligatures with all the parts of the whole body. It is of a hot and moist temper, and such as have it more hot, have large veins and hot blood; but such as have it cold, have small veins, and a discoloured hew.

The compo-sure.
The vessels.
The number and site.
The connexion.
The temper.

shew. The action of the Liver is the conversion of *Chylus* into the blood, the work of the second concoction. For although the *Chylus* entring into the meseraick veins, receive some resemblance of blood, yet it aequires not the form and perfection of blood, before it be elaborate, and fully concoct in the liver. It is bound and tyed with three strong ligaments, two on the sides in the midst of the bastard ribs, to bear up its sides, and the third more high and strong, descending from the breast-blade, to sustain its proper part, which with its weight would press the lower orifice of the stomach, and so cause a falling or drawing down of the sternon and coller bone. And thus much may suffice for its proper ligaments, for we before mentioned its common; the veins, arteries, nerves, and coat of the *Peritonæum*, by which it is knit to the loins and other naturall parts. But we must note, that besides these three proper ligaments, the liver is also bound with others to the bastard ribs; as *Sylvius* observes in his Anatomicall observations, and *Hollerius* in his Practise, *Cap. de pluritide.*

The action.

The ligaments.

CHAP. XIX.

Of the bladder of the Gall.

NOw we must come to the bladder of the Gall, which is of a nervous substance, and of the bigness of a small pear; it is of figure round, with the bottom more large, but the sides and mouth more narrow and strait. It is composed of a double coat, one proper, consisting of three sorts of fibers, the other from the *peritonæum*. It hath a vein from the *Porta* or gate-vein, and an artery from that which is diffused into the liver, and a nerve from the sixt conjugation. It is but one and that hid on the right side under the greater lobe of the liver, it is knit with the touching of its own body, and of the passages and channels made for the performance of its actions with the liver, and in like manner with the *Duodenum*, and not seldome with the stomach also, by another passage; and to conclude to all the parts by its veins, nerves, arteries, and common coat. It is of a cold temper, as every nervous part is. The action of it is to separate from the liver the cholerick humor, and that excrementitious, but yet naturall by the help of the right fibers, for the purifying of the blood, and by the oblique fibers, so long to keep it being drawn, untill it begin to become troublesome in quantity, or quality, or its whole substance, and then by the transverse fibers, to put it down into the *Duodenum* to provoke the expulsive faculty of the guts. I know *Fallopius* denies the texture of so many fibers, to be the minister of such action to the gall. But *Vesalius* seems sufficiently to have answered him. The bladder of the gall hath divers channells, for coming with a narrow neck, even to the beginning of the Gate-vein, it is divided into two passages, the one whereof suffering no division is carryed into the *Duodenum*, unless that in some it send another branch into the bottome of the stomach, as is observed by *Galen*; which men have a miserable and wretched life, being subject to cholerick vomitings, especially when their stomachs are empty, with great pains of their stomach and head, as is also observed by *Galen*, *Cap.* 74. *Artis Med.* The other coming out of the body of the liver divides it self into two or three passages, again entring the substance of the liver, is divided with infinite branches, accompanying so many branches of the Gate-vein through the substance of the liver, that so the blood unless it be most elaborate and pure, may not rise into the hollow vein, all which things Dissection doth manifestly teach.

The substance, greatness, and figure thereof. The composition. Number and connexion.

Temper. Action.

The channells of the gall.

Lib. 2. de temper.

The sixth Figure of the bladder of the Gall.

M. the *Pylorus* joyned to the *Duodenum*.
N. the *Duodenum* joyned to the *Pylorus*.
P. shews the bottom of the bladder of the gall.
Q Q. the holes of the bladder of gall dispersed through the liver, betwixt the roots of the hollow and Gate-veins. R. the root of the Gate vein in the liver. S. the root of the hollow vein in the liver. *a.* the concourse or meeting of the passages of choler into one branch. *b.* the neck of the bladder into which the passage is inserted *c.* the passage of the Gall into the *Duodenum*. *d.* the *Duodenum* opened, to manifest the insertion of the *porus biliaris*. *e.* an artery going to the hollow part of the liver, and the bladder of the gall. *f.* a small nerve belonging to the liver and the bladder of gall, from the rib branch of the sixth pair. *gg.* the cistick twins from the gate-veins.

CHAP. XX.

Of the Spleen or Milt.

The substance.

BUt because we cannot well shew the distribution of the gate-vein, unless the Spleen be first taken away, and removed from its seat: therefore before we go any further, I have thought good to treat of the Spleen. Therefore the Spleen is of a soft, rare, and spongious substance (whereby it might more easily receive and drink up the dregs of the blood from the liver) and of a flesh more black than the liver. For it

Magnitude. Figure.

resembles the colour of its muddy blood, from which it is generated. It is of an indifferent greatness; but bigger in some, than in othersome, according to the diverse temper and complexion of men. It hath as it were a triangular figure, gibbous on that part, it sticks to the ribs

Composition.

and midriffe, but hollow on that part next the stomach. It is composed of a coat, the proper flesh; a vein, artery, and nerve. The membrane comes from the *Peritonæum*, the proper flesh from the *fæces* or dregs of bloud, or rather of the naturall melancholy humour, with which it is nourished. The fourth branch of the *vena porta*, or gate vein, lends it a vein; the first branch of the great descendent artery presently, after the first entrance without the Midriff, lends it an artery. But it receives a nerve, from the left costall, from the sixt conjugation on the inner part, by the roots of the ribs; and we may manifestly see this nerve, not only disperse it self through the coat of the liver, but also penetrating with its vessels the proper

Number and Site.

flesh thereof, after the self same manner, as we see it is in the heart and lungs. It is one in number, situate on the left side, between the stomach and the bastard ribs, or rather the midriffe which descends to their roots. For it oft times cleaves to the midriffe, on its gibbous part, by a

Connexion.

coat from the *Peritonæum*, as also on the hollow part to the stomach, both by certain veins which sends it into the ventricle, as also by the kall. It hath connexion, either primarily, or secundarily, with all the parts of the body, by these its vessels.

Temper and use.

It is of a cold and drie temper; the action and use of it is to separate the melancholick humor, which being feculent and drossie, may be attenuated by the force of many arteries dispersed through its substance. For by their continuall motion, and native heat, which they carry in full force with them from the heart, that gross blood puts off its grosness, which the Spleen sends away by passages fit for that purpose, retaining the subtler portion for its nourishment. The passages by which it purges it self from the grosnesse of the melancholy bloud, are a vein ascending from it into the stomach to stir up the appetite by its sourenesse, and strengthen the substance thereof by its astriction; and also another vein, which sometimes from the Spleen branch, sometimes from the Gate-vein, plainly under its orifice, descends to the fundament, there to make the Hæmorrhoidall veins.

CHAP. XXI.

Of the Vena Porta, *and Gate-vein, and the distribution thereof.*

The substance and figure. Composition. Number and Site.

THe gate-vein, as also all the other veins, is of a spermatick substance, of a manifest largeness, of a round and hollow figure, like to a pipe or quill. It is composed of its proper coat, and one common from the *Peritonæum*. It is only one, and that situate in the simous or hollow part of the liver, from whence it breaks forth (or rather out of the umbilicall vein) into the midst of all the guts, with which it hath connexion, as also with the stomach, spleen, *sphincter* of the fundament and *Peritonæum*, by the coat which it receives from thence. It is of a cold and dry temper. The Action of it is, to suck the *Chylus* out of the ventricle and guts, and so to take and carry it to the Liver, untill it may carry back the same turned into blood for the nutriment of the stomach, spleen and guts. This

Temper and Action.

gate-vein coming out of the simous part of the Liver, is divided into six branches, that is, foure

Division thereof into 6 branches, of which, 4 simple.

simple, and two compound, again divided into many other branches. The first of the simple ascends from the forepart of the trunk to the bladder of the Gall by the passage of the Choler (and are marked with *g. g.*) with a like artery for life and nourishment, and this

1 *Cystica gemella* 2

distribution is knowne by the name of *Cystica gemella* or Cystick twins. The second is called the *Gastrica* or stomach vein, arising in like manner from the forepart of the trunk, is carried to the *Pylorus* and the simous or back part of the stomach next to it.

Gastrica.

3 *Gastrepiploïs.*

The third is called *Gastrepiploïs*, the stomach and kall vein, which coming from the right side of the gate-vein goes to the gibbous part of the stomach next to the *Pylorus* and the right side of the kall.

4 *Intestinalis.*

The fourth going forth from behind and on the right hand of the gate-vein, ascends above the root of the Meseraick branch even to the beginning of the gut *Jejunum*, along the gut *Duodenum*, from whence it is called *Intestinalis*, or the gut vein. And these

are

are the foure ſimple branches. Now we will ſpeak of the compound.

To compound.

The firſt is the ſplenick, which is divided after the following manner. For in its firſt beginning and upper part, it ſends forth the *Coronalis*, or crowne vein of the ſtomach, which by the back part of the ſtomach aſcends into the upper and hollow part thereof; to which place, as ſoon as it arrives, it is divided again into two branches, the one whereof climbs up even to its higher orifice, the other deſcends downe to the lower, ſending forth by the way other branches to the fore and back parts of the ſtomach. Theſe engirt and on every ſide incompaſs the body of the ventricle, for which cauſe they are named the crown veins.

1. *Ramus* ſplenicus ſending forth.

1. *Coronalis.*

I have ſometime obſerved this comming forth of the trunk, a little above the orifice of the ſplenick branch. But this ſame ſplenick branch on its lower part, produces the branch of the Hæmorrhoidall veins, which deſcending to the fundament above the left ſide of the loines, diffuſes a good portion thereof into the leaſt part of the colick gut, and the right gut, at the end whereof it is often ſeen to be divided into five Hæmorrhoidall veins, ſometimes more, ſometimes leſs.

2. *Hæmorrhoidalis interna.*

Silvius writes that the Hæmorrhoidall branch deſcends from the meſenterick, and truly we have ſometimes obſerved it to have been ſo. Yet it is more ſutable to reaſon, that it ſhould deſcend from the ſplenick, not only for that we have ſeen with our eyes that it is ſo, but alſo becauſe it is appointed by nature for the evacuation of the excrementitious melancholick humor. But this ſame ſplenick branch out of the middle almoſt of its upper part produces the third branch going to the gibbous part of the ſtomach, and the kall: they terme it the greater, middle and left *Gaſtrepiploïs*. But on the lower part towards the ſpleen it produces the ſimple *Epiploïs*, or kall-vein, which it diffuſes through the left ſide of the kall. Moreover from its upper part, which touches the liver, it ſends forth a ſhort branch called *vas breve*, or *venoſum*, to the upper orifice of the ventricle for ſtirring up the appetite.

3. *Gaſtrepiploïs major ſiniſtra.*

4. *Epiploïs ſimplex.*

5. *Vas breve ſeu venoſum.*

Lib. 4. de uſu partium.

We have oftentimes and almoſt alwayes obſerved, that this venie veſſell, which *Galen* cals *vas breve*, comes from the very body of the ſpleen, and is terminated in the midſt of the ſtomach on the left ſide, but never pierces both the coats thereof. Wherefore it is ſomewhat difficult to find, how the melancholy juyce can that way be powred, or ſent into the capacitie of the ſtomach. Now the ſplenick branch, when it hath produced out of it thoſe five forementioned branches, is waſted and diſperſed into the ſubſtance and body of the ſpleen.

Then followes another compound branch of the *vena porta*, called the meſenterick, which is divided into three parts; the firſt and leaſt whereof goes to the blind gut and to the right and middle part of the colick-gut, divided into an infinite multitude of other branches. The ſecond and middle is waſted in the *Ileon*; as the third and greater in the *Iejunum* or empty gut. It is called Meſenterick becauſe it is diffuſed over all the Meſentery; as the ſplenick is in the ſpleen. And thus much we have to ſay of the diviſion of the gate vein, the which if at any time thou ſhalt find to be otherwiſe, than I have ſet downe, you muſt not wonder at it; for you ſhall ſcarce find it the ſame in two bodies, by reaſon of the infinite varietie of particular bodies, which (as the Philoſophers ſay) have each their owne, or peculiar gifts. Our judgment is the ſame of other diviſions of the veſſels. Yet we have ſet down that which we have moſt frequently obſerved.

2. *Ramus meſentericus* devided into three parts.

CHAP. XXII.

Of the originall of the Artery, and the diviſion of the branch, deſcending to the naturall parts.

THoſe things being thus finiſhed and conſidered, the guts ſhould be pulled away, but ſeeing that if we ſhould do ſo, we ſhould diſturb and loſe the diviſion of the artery deſcending to the naturall parts; therefore I have thought it better to handle the diviſion thereof, before the guts be pluckt away. Therefore we muſt ſuppoſe, according to *Galens* opinion, that as all the veins come from the liver, ſo all arteries proceed from the heart. This preſently at the beginning is divided into two branches, the greater whereof deſcends downwards to the naturall parts upon the ſpine of the back, taking its beginning at the fifth *vertebra* thereof, from whence it goes into the following arteries. The firſt called the intercoſtall, runs amongſt the intercoſtall muſcles, and the diſtances of the ribs, and ſpinall marrow, through the perforations of the nerves on the right and left hand from the fifth true, even to the laſt of the baſtard ribs.

The originall of arteries. The diviſion of the great deſcendent artery, is into theſe.

1. *Arteria intercoſtalis.*

This in going this progreſs makes 7 little branchings, diſtributed after the forementioned manner, and going forth of the trunk of the deſcendent over againſt each of the intercoſtall Muſcles.

The ſecond being parted into two goes on each ſide to the Midriffe, whence it may be called, or expreſſed by the name of the *Diaphragmatica* or *Phrenica*, (1) the midriffe artery. The third being of a large proportion, ariſing from the upper part of the arterie preſently after it hath paſſed the midriffe, is divided into two notable branches, whereof on goes to the ſtomach, ſpleen, kall, to the hollow part of the liver and the gall; the other is ſent forth to the meſen-

2. *Phrenicæ*

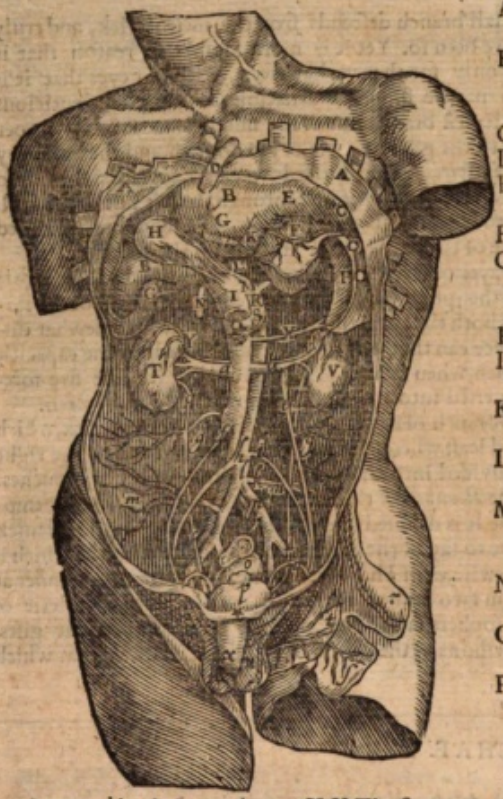
3. *Caliacæ.*

meſentery and guts after the ſame manner, as we ſaid of the meſeraick veins, wherefore it is called the *Cœliaca*, or ſtomach artery. But we muſt note, all their mouths penetrate even to the innermoſt coat of the guts, that by that means they may the better and more eaſily attract the *Chylus* contained in them.

4. *Emulgent.* The fourth is carryed to the reins, where it is named the Reinall or Emulgent, becauſe it ſucks fit matter from the whole maſs of blood.

5. *Spermatica.* The fifth is ſent to the teſticles with the preparing Spermatick veins, whence alſo it is named the Spermatick Artery, which ariſes on the right ſide, from the very trunk of the deſcendent Artery; that it may aſſociate the ſpermatick vein of the ſame ſide, they run one above another, beneath the hollow vein, wherefore we muſt have a great care whilſt we labour to lay it open, that we do not hurt and break it.

The ſeventh figure of the lower Belly.



A, A, The midriffe turned back with the ribs and the *peritonæum*.
BB, The cave or hollow part of the liver, for the liver is lifted up that the hollow part of it may be better ſeen.
C, The leaſt ligament of the liver.
D, The Umbilicall vein.
E, The hollowneſs in the liver, which giveth way to the ſtomach.
F, The left orifice of the ſtomach.
G G, Certain knubs, or knots, and impreſſions in the hollow part of the liver.
H, The bladder of gall.
I, The Gate-vein, cut off, and branches which go to the bladder of gall.
K, A nerve of the liver coming from the ſtomachicall nerve.
L, An Artery common to the liver and bladder of gall.
M, A Nerve common alſo to them both, coming from the right *coſtall* Nerve of the ribs.
N, the paſſage of the Gall to the Guts cut off.
O O, The hollow of the fore parts of the Spleen.
P, The line where the veſſels of the Spleen are implanted. Q. The trunk of the hollow vein. R, The trunk of the great Artery. S, The *Cœliacall* Artery cut off. T, V, The Kidneys yet wrapped in their membrane. X, Y, The fatty veins called *venæ adipoſæ*. *a*, *b*, The Emulgent veins with the Arteries under them. *c c*, *d d*, The Ureter from either kidney to the bladder. *e*, *f*, The ſpermaticall veins to the teſticles, the right from the hollow vein, the left from the Emulgent. *g*, *g*, Veins coming from the ſpermaticall to the *peritonæum*. *h*, *i*, the ſpermaticall Arteries. *k*, The lower meſentericall Artery. *l*, The aſcending of the great Artery above the hollow vein, and the diviſion of it, and the hollow vein into two trunks. *m*, the Arteries of the loins called *lumbaris*. *n*, The holy Artery called *Sacra*. *o*, A part of the right gut. *p*, The bladder of Urine. * The connexion of the bladder with the *peritonæum*. *q*, A part of the veſſels which lead the ſeed from the Teſticles, is here reflected. *r*, *ſ*, the *ſcrotum*, or cod, that is, the skin that inveſts the yard and teſticles. *t*, The fleſhy pannicle or membrane which is under the cod. *u*, The coat which is proper to the teſticles with his veſſels. *x*, A part of the yard excoriated or flayed, and hanging down.

Hæmorrhoidalis ſeu meſenterica inferior. The ſixth going from the fore and upper part of this deſcendent arterie, deſcends with the Hæmorrhoidall veins to the fundament; preſently from his beginning, ſending forth certain branches alongſt the colick gut, which by *Anaſtomaſis* are united with other branches of the *Cœliacall* Arteries; for whoſoever ſhall look more attentively, he ſhall often obſerve that veins are ſo united amongſt themſelves, and alſo Arteries, and ſometimes alſo the veins with the Arteries. For an *anaſtomaſis* is a communion and communicating of the veſſels amongſt themſelves, by the application of their mouths, that ſo by mutuall ſupplies they may eaſe each others defects. But they call this the lower meſeraick Artery.

7. *Lumbaris.* The ſeventh proceeding from the trunk with ſo many branches as there be *Vertebra's*

in

in the loines, goes to the loines and the parts belonging to them, that is, the ſpinall marrow of that part, and other parts encompaſſing theſe *Vertebra's*, whereupon it is ſtiled the *Lumbaris* or Loine Artery.

The eight maketh the Iliack arteries, untill ſuch time as it departs from the *Peritonæum* where the Crurall Arteries take their originall. This Iliack Artery ſends many divarications towards the Holy bone where it takes its beginning, and to the places lying neer the Holy bone, which becauſe they run the ſame courſe as the Iliak veins, for brevities ſake, we will let paſs further mention of them, till we come to treat of the Iliack veins. *Iliacæ.*

CHAP. XXIII.

Of the diſtribution of the Nerves to the naturall parts.

IT remains, that before the bowels be taken away, we ſhew the nerves ſent to the entrails and natural parts, that as wiſe and provident men we may ſeem to have omitted nothing. Firſt we muſt know that theſe nerves are of the ſixt conjugation, which deſcend as well to the ſtomach all alongſt the Gullet and the ſides thereof, as thoſe at the roots of the ribs on both ſides within. But when they are paſſed through the Midriffe, thoſe which are diſtributed amongſt the naturall parts follow the turnings of the veins and arteries, but ſpecially of the arteries. Wherefore if you have a mind to follow this diſtribution of the nerves, you muſt chiefly look for it in thoſe places, in which the artery is diſtributed amongſt the Guts above the loins. The originall of the nerves which are carryed to the naturall parts.

Theſe nerves are but ſmall, becauſe the parts ſerving for nutrition, needed none but little nerves, for the performance of the third duty of the nerves, which is in the diſcerning & knowing of what is troubleſome to them. For unleſſe they had this ſenſe, there is nothing would hinder, but theſe bowels neceſſary for life, being poſſeſſed with ſome hurtfull thing, the creature ſhould preſently fall down dead; but we have this benefit by this ſenſe, that as ſoon as any thing troubles and vellicates the bowels, we being admoniſhed thereof may look for help in time. Their magnitude and uſe.

And beſides if they were deſtitute of this ſenſe, they might be gnawn, ulcerated and putrefied by the raging acrimony of the excrements falling into and ſtaying in them; but now (by means hereof) as ſoon as they find themſelves pricked, or pluckt, preſently by the expulſive faculty they endeavour to expell that which is troubleſome, and ſo free themſelves of preſent and future dangers.

CHAP. XXIIII.

The manner of taking out the Guts.

WHen the Guts are to be taken out, you muſt begin with the right Gut. And you muſt divide it, being firſt ſtraitly tyed in two different places, at a juſt diſtance about four fingers from the end, with a ſharp knife between the two ligatures. Then you muſt ſhew its proper coats, and fibers, and that common one which it hath from the *Peritonæum*. This being done, you muſt in like manner bind the trunk of the gate veine as neer the originall as you can; that ſo all his branches being in like manner tyed there may be no feare of effuſion of blood: you muſt doe the like with the Cœliack Artery at the left Kidney, and in the lower Meſenterick, which deſcends to the right Gut with the Hæmorrhoidall veins. This being done, pull away the guts even to the *Duodenum*, which being in like manner tyed in two places, which ought to be below the inſertion of the *Porus Cholagogus* or paſſage of the Gall, that you may ſhew the oblique inſertion thereof into that gut, for the obliquity of its inſertion is worth obſervation, as that which is the cauſe that the Gall cannot flow back into its bladder, by the compreſſion of this Gut from below upwards. Then all theſe windings of the Guts may be taken away from the body.

CHAP. XXV.

The Originall and diſtribution of the deſcendent Hollow veine.

BEcauſe the reſt of the naturall parts, do almoſt all depend upon the deſcendent Hollow vein, therefore before we goe any further, we will ſhew its originall and diſtribution. We ſaid before that all veins proceeded from the Liver, but yet in divers places. For the gate vein goes out of the hollow part, and the hollow vein out of the Gibbous part of the liver, which going forth like the body of a tree, is divided into two great branches, the leſſer of which goes to the vital & animal parts, The originall of the hollow veine. It is divided into two trunks.

and the extremeties of these parts, as we shall shew in their place. The greater descending from the back part of the Liver above the *Vertebra's* of the loins to the parts beneath, goes in the manner following. The first division thereof is to the membranes of the reins, which come from the *Peritonæum*. Wherefore there it produces the *Venæ adiposæ*, or fatty veins, so called, because they bring forth a great quantity of fat in those places; Of these fatty veins, there is a diverse originall, for the right doth oftentimes arise from the right emulgent, because it is higher; but the less comes from the very trunck of the hollow vein because the Emulgent on that side is lower, and you shall scarse see it happen otherwise.

The division of the greater branch of the hollow vein.

1. *Adiposa.*

2. *Emulgent.*

The second being the Kidney or Emulgent veins, go to the Reins, which at their entrance, or a little before, is divided into two branches, like as the Artery is, the one higher, the other lower, and these again into many other through the substance of the Kidneys, as you may learn better by ocular inspection, than by book. They are thick and broad, that the serous humor may without impediment have freer passage. Their originall is different, for the right Emulgent oftentimes comes forth of the hollow vein somewhat higher than the left; that seeing their office and duty is to purge the mass of blood from the cholerick and serous humor, that if any part thereof slide by the one, it may not so scape, but fall as it were into the other. Which certainly would not have happened if they had been placed the one just opposite to the other. For the serous or wheyish humor would have stayed as equally ballanced or poised, by reason of the contrariety of the action and traction, or drawing thereof. But we must remember that in dissecting of bodies, I have oft-times found in such as have been troubled with the stone, seven Emulgent veins and so many arteries; four from the left side coming from divers places, of which the last came from the Iliack; three from the right hand likewise in divers places.

3. *Spermatica.*

The third division is called the Spermatick or seed vein, it goes to the Testicles; the originall thereof is thus, that the right arises on the forepart of the trunck of the hollow vein; but the left most commonly from the Emulgent. Besides you shall sometimes find that these have companions with them, to the right Emulgent; but to the left, another from the hollow vein, in some but on one side, in others on both. But also I have sometimes observed the left emulgent to proceed from the spermatick or seed vein.

4. *Lumbaris.*

The fourth because it goes to the loins is called *Lumbaris*; which in his originall and insertion is wholly like the Artery of the loins. But there are 4 *Lumbares* or Loin-veins on each side, that is, one in each of the 4 spaces of the 5 *Vertebra's* of the loins.

5. Iliacæ which are divided into.

The fift division makes the *Iliacæ*, untill passing through the *Peritonæum*, they take the names of Crurall veins; These are first divided into the musculous, so called, because they goe to the oblique ascendent and transverse muscles, and to the *Peritonæum*. Sometimes they have their originall from the end of the Trunk. And then the same *Iliacæ*, are divided into the *Sacræ*, or Holy; which goe to the spinall marrow of the Holy-bone, through those holes, by which the nerves generated of this marrow, have their passage.

1. Musculosæ.

2. Sacræ.

Thirdly, the *Iliacæ* are divided into the *Hypogastricæ*, so called, because they were distributed to all the parts of the *Hypogastrium*, or lower part of the lower belly, as to the right Gut, the muscles thereof, the musculous skin, (in which place they often make the externall Hæmorrhoidall, ordained for the purging of such blood as offends in quantity, as those other, [that is, the inward Hæmorrhoidall] which descends to the right Gut from the Gate-vein by the spleenick branch, serves for cleansing of that which offends in qnality,) to the bladder and the neck thereof, even to the end of the yard, to the womb and even to the neck of the wombe and utmost parts of the privities, from whence it is likely the courses break forth in woemen with child and Virgins. But this same vein also sends a portion also without the *Epigastrium* by that perforation which is common to the share and haunch bones, which strengthened by meeting of the other internall Crurall vein descends even to the Ham, but in the mean time by the way it is communicated to the muscles of the thigh called *Obturatores* and other parts within. Fourthly, the *Iliacæ* produce the *Epigastricæ* which on both sides from below ascend according to the length of the right muscles, spreading also by the way some branches to the oblique and transverse muscles and also to the *Peritonæum*. Fiftly, these produce *Iliacæ* the *Pudendæ* or veins of the privities, because they go in women to their privities, and into men to the Cods, where they enter that fleshy coat filled with veins, and go to the skin of the yard, they take their beginning under the *Hypogastricæ*.

3. *Hypogastricæ*, which produce the Hæmorrhoidales externæ.

4. *Epigastricæ.*

5. *Pudendæ.*

CHAP.

CHAP. XXVI.

Of the Kidneys or Reins.

NOw follow the Kidneys, which that they may be more easily seen, (after that you have diligently observed their situation) you shall dispoil of their fat, if they have any about them, as also of the membrane they have from the *Peritonæum*. First, you shall shew all their conditions, beginning at their substance.

Their substance.

The substance of the Kidneys is fleshy, dense and solid, lest they should be hurt by the sharpness of the urine.

Magnitude.

Their magnitude is large enough, as you may see.

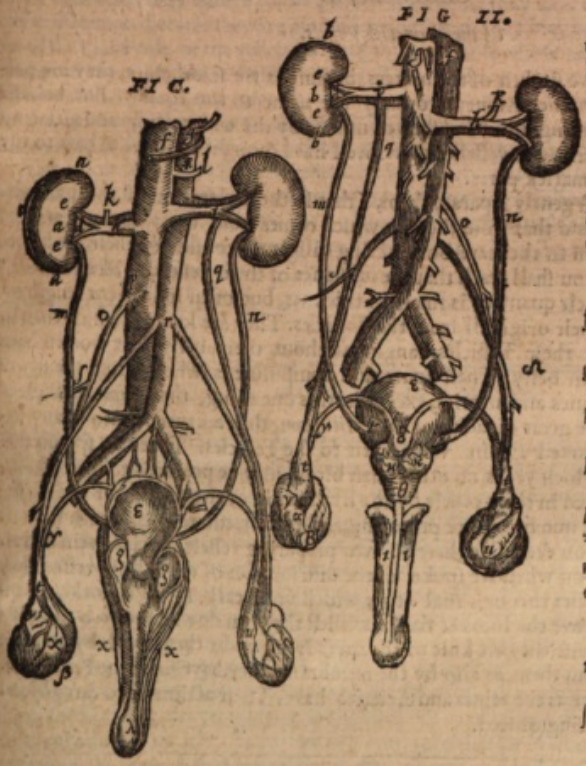
Figure.

Their figure is somewhat long and round almost resembling a semicircle, and they are lightly flatted above and below. They are partly hollow and partly gibbous; the hollow lies next the hollow vein, and on this side they receive the Emulgent veins and Arteries, and send forth the Ureters, their gibbous part lies towards the loins.

Composition.

They are composed of a coat coming from the *Peritonæum*, their own peculiar flesh, with the effusion of blood about the proper vessels, (as happens also in other entrails) generates a small nerve, which springing from the Costall of the sixt conjugation is diffused to each Kidney on his side into the coat of the kidney it self, although others think it alwayes accompanies the vein and artery.

The ninth and tenth figure of the vessels of seed and urine.



The first figure sheweth the foreside, the second the hinder-side.

a.a.a. 1. The forepart of the right kidney.

b. b. b. 2. The back part of the left kidney.

c. 1. the outside.

d. d. 1, 2. The inner-side.

e. e. 1, 2. The two cavities whereinto the emulgent vessels are inserted.

f. f. 1, 2. The trunk of the hollow vein.

g. g. 1, 2. The trunk of the great artery.

h. i. 1, 2. The emulgent vein and artery.

k. k. 1, 2. The right fatty vein.

l. 1. The left fatty vein.

*. 1. The Cœliacall artery.

m. n. 1, 2. The ureters.

o. p. q. 1, 2. The right spermatick veine which ariseth neer *p*. the left neer *q*.

r. i. The place where the Arteries of the seed arise.

s. 1, 2. Small branches distributed from the spermaticall veins to the *Peritonæum*. *t.* 1, 2. The spiry varicous body, called *Varicosum Vas pyrimidale*. *u.* 1, 2. The *Parastatæ*, or *Epididymis*. *x.* 1. The testicle yet covered with its coat. *y.* 1, 2. The place where the leading vessell called *vas deferens*, doth arise. α, 1, 2. The descent of the same leading vessell. β, 1, 2. The revolution of the same leading vessell. γ, 1, 2. The passage of the same vessell, reflected like a recurrent nerve. δ, 2. The meeting of the same leading vessels. ε, 1, 2. The bladder of urine, the first figure sheweth it open, the second sheweth the back parts. ζζ, 1. The small bladder of the seed opened. η, η, 2. The Glandules called *Glandulæ Prostatæ*. θ, 1. The Sphincter muscle of the bladder. ι, ι, 1, 2. The two bodies which make the substance of the yard. κ, κ, 1. The vessels which go unto the yard and neck of the bladder. λ, 1. The passage which is common to the urine and seed, cut open. Υ, 2. The implantation of the ureters into the bladder.

But *Fallopius* that most diligent Author of Anatomy hath observed, that this nerve is not only oftentimes divaricated into the coat of the kidneys, but also pierces into their sub-

stance;

Number. Site.

ſtance. They are two in number, that if the one of them ſhould by chance be hurt, the other might ſupply thoſe neceſſities of nature, for which the Kidneys are made. They lye upon the loyns at the ſides of the great veſſels, on which they depend by their proper veins and arteries; and they ſtick to them, as it were by a certain ſecond coat, leſt that they might be ſhaken by any violent motions. Wherefore we may ſay that the Kidneys have two coats, one proper adhering to their ſubſtance, the other as it were coming from the *Peritonæum* on that part they ſtick to it. The right Kidney is almoſt alwayes the higher, for thoſe reaſons I gave, ſpeaking of the originall of the Emulgent veſſels. *Columbus* ſeems to thinke the contrary, but ſuch like controverſies may be quickly decided by the Eye. They have connexion with the Principall veſſels by the veins, nerves and arteries, by the coats with the loins & the other parts of the lower belly, but eſpecally with the bladder by the ureters. They are of a hot and moiſt temper, as all fleſhy parts are. Their action is to cleanſe the Maſſe of the blood from the greater part of the ſerous and cholerick humor. I ſaid the greater part, becauſe it is needfull that ſome portion thereof ſhould go with the alimentary blood to the ſolid parts, to ſerve in ſtead of a vehicle, leſt otherwiſe it ſhould be too thick.

Connexion. Temper, Action.

Their ſtrainer.

Beſides you muſt note that in each Kidney there is a cavity bounded by a certain membrane, incompaſſed by the diviſion of the Emulgent veins and arteries, through which the urine is ſtrained partly by the expulſive faculty of the Kidneys, partly by the attractive of the ureters, which run through the ſubſtance of the Kidneys on the hollow ſide, no otherwiſe than the *Porus cholagogus* through the body of the Liver.

CHAP. XXVII.

Of the ſpermatick Veſſels.

NOw we ſhould have ſpoken of the ureters, becauſe as we ſaid before, they are paſſages derived from the Kidneys to carry the urine to the bladder. But becauſe they cannot be diſtinguiſhed and ſhewed unleſſe by the corrupting and vitiating the ſite of the ſpermatick veſſels; therefore I have thought it better to paſs to the explication of all the ſpermatick parts.

And firſt of all you muſt gently ſeparate them, (that ſo the declaration of them may be more eaſie and manifeſt) and that from the coat which comes from the *peritonæum*, and the fat which inveſts them even to the ſhare-bone, having diligently conſidered their ſite before you ſeparate them. Then you ſhall teach that the ſubſtance of theſe veſſels, is like to that of the veins and arteries. Their quantity is ſmall in thicknes, but of an indifferent length by reaſon of the diſtance of their originall from the Teſticles. They are longer in men than in women, becauſe theſe have their Teſticles hanging without their belly, but women have them lying hid within their belly. Their figure and compoſure is wholly like the figure and compoſition of the veines and arteries, except in this one thing, that from that place where they goe forth of the great capacity of the *Peritonæum*, they are turned into many intricate windings, like crooked ſwoln veins, even to the Teſticles. That the ſpermatick matter in that one tract, which yet is no other than blood, may be prepared to concoction, or rather be turned into ſeed in theſe veſſels, by the irradiation of the faculty of the Teſticles. Theſe veſſels are ſix in number, foure preparing, and two ejaculatory, of which we will ſpeak hereafter. Therefore on each ſide there be two preparing veſſels, that is, a vein and an artery, ariſing as we told you when we ſpoke of the diſtribution of the hallow vein. They are inſerted into the Teſticles through that coate which ſome call *Epididymis*, others *Darton*. Their ſite is oblique above the loins & flanks, whileſt they run downe between the ends of the ſhare and haunch bone, they are knit to the parts lying under them, both by certaine fibers which they ſend from them, as alſo by the membrane they have from the *Peritonæum*. They have like temperature as the veines and Arteries have. Their action is to carry blood to the Teſticles, for generating of ſeed.

Their ſubſtance. Quantity. Figure and compoſure. Number. Site.

CHAP. XXVIII.

Of the Teſticles, or Stones.

THe Teſticles are of a Glandulous, white, ſoft and looſe ſubſtance, that ſo they may the more eaſily receive the ſpermatick matter: their magnitude and figure equall, and reſemble a ſmall pullets Egge ſomewhat flatted; their compoſure is of veins, arteries, coats and their proper fleſh. Their veins and arteries proceed from the ſpermatick veſſels, their nerves from the ſixt conjugation, by the roots of the ribs and out of the holy bone. They are wrapped in foure coats, two whereof are common, and two proper. The common are the *Scrotum* or skin of the Cods, proceeding from the true skin; and the fleſhy coat, which conſiſts of the fleſhy Pannicle in that place receiving a great number of veſſels, through which occaſion it is ſo called. The proper coats are firſt the *Erythroeis* ariſing from the proceſs of the *Peritonæum*, going into the *Scrotum* together

Their ſubſtance. Magnitude and figure. Compoſition. The coat *Erithroeis*.

gether with the ſpermatick veſſels which it involves and covers; this appears red both by reaſon of the veſſels as alſo of the Cremaſter muſcles of the Teſticles; Then the *Epididymis* or *Dartos* which takes its originall of the membrane of the ſpermatick preparing veſſels. The fleſh of the Teſticles is as it were a certaine effuſion of matter about the veſſels, as we ſaid of other entrails. But you muſt obſerve that the *Erythroïs* encompaſſes the whole ſtone, except its head, in which place it ſticks to the *Epididymis*, which is continued through the whole ſubſtance of the Teſticle. This *Epididymis* or *Dartos* was therefore put about the ſtones, becauſe the Teſticles of themſelves, are looſe, ſpongious, cavernous and ſoft, ſo that they cannot ſafely be joined to the ſpermatick veſſels, which are hard and ſtrong. Wherefore Nature that it might join extreams by a fit *Medium* or mean, formed this coat *Epididymis*. This is ſcarce apparent in women by reaſon of its ſmalneſſe. The two forementioned common coats, adhere or ſtick together by their veſſels not only amongſt themſelves, but alſo with the *Erythroïs*. You muſt beſides obſerve the Cremaſter muſcles are of the ſaid ſubſtance with other muſcles, ſmall and thin, of an oblique and broad figure, ariſing from the membrane of the *Peritonæum*, which (as we ſaid before) aſſumes fleſh from the flanks. Their compoſition is like that of other muſcles. They are two, on each ſide one. They are ſituate from the ends of the flanks, even to the ſtones. They have connexion with the proceſs of the *Peritonæum* and Teſticles. Their temper is like that of other muſcles. Their action is to hang and draw up the Teſticles towards the belly, whence they are called hanging muſcles. The Teſticles are moſt commonly two in number, on each ſide one; ſometimes there be three, ſometimes one alone, as it happens alſo in the Kidnies; for ſome have but one Kidney. They lie hid in the *Scrotum* at the very roots of the ſharebone, connexed to the principall parts of their veſſels, with the neck of the bladder and yard; but by their coats they adhere to the parts from whence they have them. They are of a cold and moiſt temper, becauſe they are glandulous; although they may be hot by accident, by reaſon of the multitude of the veſſels flowing thither. Thoſe whoſe teſticles are more hot are prompt to venery, and have their privities and the adjacent parts very hairy, and beſides their teſticles are very large and compact. Thoſe on the contrary that have them cold are ſlow to venery, neither do they beget many children, and thoſe they get are rather female than male, their privities have little hair upon them, and their teſticles are ſmall, ſoft and flat.

The action of the teſticles is to generate ſeed, to corroborate all the parts of the body, and by a certain manly irradiation to breed or encreaſe a true maſculine courage. This you may know by Eunuchs or ſuch as are Gelt, who are of a womaniſh nature, and are oftentimes more tender and weak than women. As *Hippocrates* teaches, by example of the *Scythians*; *lib. de Aere, locis & aquis.*

The *Epididymis*, or *Dartos*.

The Cremaſter muſcles.

Temper.

Action.

CHAP. XXIX.

Of the varicous bodies or Paraſtat's, *and of the ejaculatory veſſels, and the glandulous or* Proſtates.

THe varicous *Paraſtatæ* are nervous and white bodies, like as the nerves wound and cloſe woven amongſt themſelves, they are ſtretched even from the top to the bottom of the teſticles, from whence preſently by their departure they produce the *Vaſa ejaculatoria*, or leading veſſels. But unleſs we doe very well diſtinguiſh their names, they ſhall ſcarce ſhun confuſion. For that which I call *Paraſtatæ*; that is, as it were the head of the teſticle, being as it were like another ſtone, is called *Epididymis* by *Galen. lib. 1. de ſemine.* But I by the example and authority of many Anatomiſts, underſtand by the *Epididymis* the proper coat of the teſticles, of which thing I thought good by the way to admoniſh you of. Their Action is by their crooked paſſages to hinder the ſeed from departing out of the preparing into the leading veſſels before it ſhall bee moſt perfectly laboured and concocted in theſe veſſels by the power and force of the teſticles. For in the firſt windings, the blood lookes pure; but in the laſt it is not ſo red, but ſomewhat whitiſh For Nature commonly doth thus delay the matter in its paſſage either by ſtraitneſs, or obliquity, which it deſires to make more perfect and elaborate by any new concoction; this we may learn by the foldings of the *Rete mirabile*, the windings of the Guts, the wrinkles in the bottome of the ſtomach, the ſtraitneſſe of the *Pylorus*, the capillary veins diſperſed through the body of the Liver; certainly nature hath intended ſome ſuch thing in the making of the ſpermatick veſſels. Their quantity is viſible, and figure round, tending ſomewhat to ſharpneſſe. They are compoſed of veins, nerves, and arteries, which they enjoy from the veſſels of the teſticles, from the *Epididymis*, or the coat, from the *Peritonæum* and their proper ſubſtance. Their temper is cold and dry. They bee two in number, one to each teſticle. But theſe varicous bodies are called *Paraſtatæ*, Aſſiſters, becauſe they ſuperficially aſſiſt, and are knit to the teſticles according to their length, or long wayes. Out of the *Paraſtatæ* proceed the *Vaſa ejaculatoria*, or leading veſſels, being of the ſame ſubſtance as their Progenitors; that is, ſolid, white and as it were nervous. Their quantity is indifferent, their figure round, and hollow, that the ſeed may have a free paſſage through them, yet they ſeem not to bee perforated by any manifeſt paſſage, unleſs

Their ſubſtance.

Here the author ſpeaks otherwiſe then *Galen.*

Action.

Their quantity figure, and compoſure.

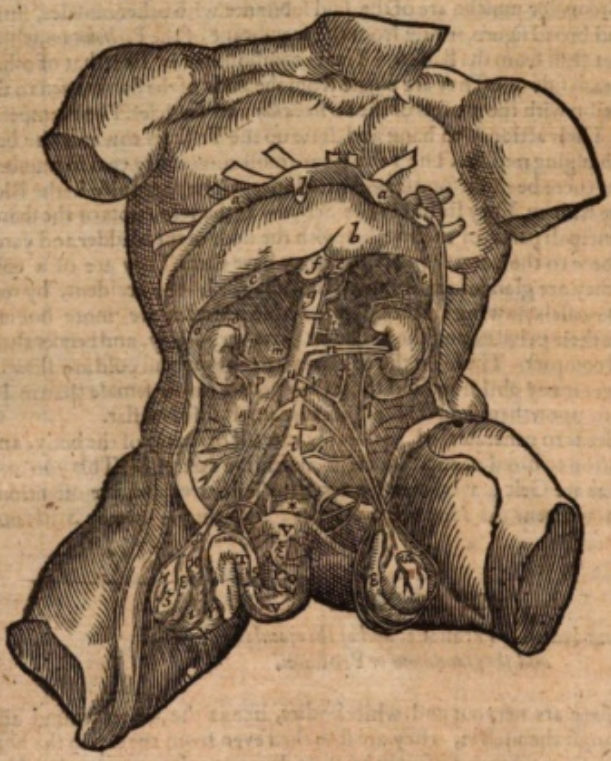
Their temper and number.

Vaſa ejaculatoria, the ejaculatory or leading veſſels.

unleſs by chance in ſuch as have had a long *Gonorrhœa*. They have like temper as the *Paraſtates*, between which and the *Proſtates* they are ſeated, immediately knit with them both; as both in the coat and the other veſſels with the parts from whence they take them.

But we muſt note, that ſuch like veſſels coming out of the *paraſtates* aſcend from the bottom of the ſtones even to the top, in which place meeting with the preparing veſſels, they riſe into the belly by the ſame paſſages, and bind themſelves together by nervous fibers, even to the inner capacity of the belly; from whence turning back, they forſake the preparing, that ſo they may run to the bottom of the ſhare-bone, into the midſt of two glandulous bodies which they call *proſtates* ſituate at the neck of the bladder, that there meeting together they may grow into one paſſage.

The tenth figure, wherein thoſe things ſhewed in the former figure, are more exactly ſet forth.



aa, A part of the Midriffe and of the *Peritonæum* with the ribs broken.
bb, *cc*. The Convex or gibbous part of the Liver marked with *bb*. the hollow or concavous part with *cc*.
de, The right and left ligaments of the Liver.
f, The trunk of the gate vein.
g, The trunk of the hollow vein.
h, *l*, The fatty veins both left and right.
i, The aſcent of the great artery of above the hollow vein, and the diviſion thereof.
k, The *Cœliacall* artery.
m, *n*, The emulgent veſſels.
oo, *ff*, The fat tunicles or coats torn from both the kidneys.
qq, The ureters that go unto the bladder.
t, *u*, The right ſpermaticall vein which ariſeth near to *u*. *x*, *y*, The double originall of the left ſpermaticall vein. *x*. from the emulgent. *y*, from the hollow vein. *α*, The originall of the ſpermaticall arteries. *β*, Certain branches from the ſpermatick arteries which run unto the *Peritonæum*. *γ*, The paſſage of the ſpermaticall veſſels through the productions of the *Peritonæum*, which muſt be obſerved by ſuch as uſe to cut for the Rupture. *δ*, The ſpiry bodden bodies entrance into the teſticle, it is called *Corpus varicoſum pyramidale*. *ε*, The *Paraſtate*. *ζ*, The ſtone or teſticle covered with his inmoſt coat. *η*, The deſcent of the leading veſſell called *Vas deferens*. *Y*, The Bladder. * The right gut. *ξ*. The glandules called *proſtatæ* into which the leading veſſels are inſerted. *ρ*, The muſcle of the bladder. *στυ*. Two bodies of the yard, *σ*. and *τ*. and *υ*. his veſſels. *φχ*, The coat of the Teſticle. *ψω*, The muſcle of the Teſticle *ψ*, hit veſſels *ω*.

For thus of three paſſages, that is, of the 2 leading veſſels, and 1 paſſage of the bladder, there is one common, one in men for the caſting forth of ſeed and urine. A Caruncle riſing like a creſt at the beginning of the neck of the bladder argues this uniting of the paſſages, which receiving this ſame paſſage which is ſufficiently large, is oft-times taken by ſuch as are ignorant in Anatomy for an unnaturall Caruncle, then eſpecially when it is ſwoln through any occaſion. Theſe leading veſſels are two in number, on each ſide one. Their action is to convey the ſeed made by the teſticles to the Proſtats, & ſo to the neck of the bladder, ſo to be caſt forth at the common paſſage. But if any ask whether that common paſſage made by the two leading veſſels between the two glandulous bodies be obvious to ſenſe or no: We anſwer, it is not manifeſt, though reaſon compell us to confeſs that that way is perforated by reaſon of the ſpermatick, groſs and viſcous matter carryed that way. But peradventure the reaſon why that paſſage cannot be ſeen is, becauſe in a dead carcaſs all ſmall paſſages are cloſed and hid, the heat and ſpirits being gone, and the great appear much leſs,

Their number and action.

by

by reason all the perforations fade, and fall into themselves. Yet certainly these passages must needs be very strait, even in a living man, seeing that in a dead they will not admit the moint of a needle. Wherefore we need not fear, lest in searching, whilst we thrust the *Catheter* into the bladder, it penetrate into the common passage of the leading vessels which runs within the Caruncle, unless peradventure by some chance, as a *Gonorrhœa*, or some great *Phlegmon*, it be much dilated besides nature. For I have sometimes seen such passages so open, that they would receive the head of a Spathern; which thing should admonish us, that in searching we take great care, that we do not rashly hurt this Caruncle, for being somewhat rashly handled with a *Catheter* it casts forth blood, especially if it be inflamed. But also the concourse of the spirits flowing with great violence together with the seed, much helps forward such ejaculation thereof performed through these strait passages by the power of the imaginative faculty in the Act of generation.

This Caruncle must be observed and distinguished from a *Hypersarcosis* or fleshy excrescence.

After the leading vessels follow the *Prostatæ*, being glandulous bodies of the same substance and temper that other Glandules are. Their quantity is large enough, their figure round, & somewhat long, sending forth on each side a soft production of an indifferent length. They are composed of veins, nerves, arteries, a coat (which they have from the neighbouring parts) and lastly their proper flesh, which they have from their first conformation. They are two in number, situate at the root of the neck of the bladder, somewhat straitly bound or tyed to the same, to the leading vessels, and the parts annexed to them. But alwayes observe, that every part which enjoyes nourishment, life and sense, either first or last hath connexion with the principall parts of the body, by the intercourse of the vessels which they receive from thence.

The *Prostatæ*. Their quantity and figure.

Number and site.

An anaromicall axiome.

The use of the Prostates is, to receive in their proper body the seed laboured in the testicles, and to contain it there, untill it be troublesome either in quantity or quality, or both. Besides they contain a certain oily and viscid humor in their glandulous body, that continually distilling into the passage of the urine, it may preserve it from the acrimony & sharpness thereof. But we have observed also on each side other Glandules, which *Rondeletius* calls *Appendices glandulosæ*, Glandulous dependences to arise from these prostates, in which also there is seed reserved.

Their use is.

Read in method. med. ad morbos.

CHAP. XXX.

Of the Vreters.

NOw it seems fit to speak of the *Vreters*, bladder and parts belonging to the bladder. Therefore the Ureters are of a spermatick, white, dense and solid substance, of an indifferent bignes in length and thickness. Their figure is round and hollow. They are composed of two coats, one proper, consisting of right and transverse fibers, which comes from the emulgent veins and arteries; the other common, from the *Peritonæum*; besides they have veins, nerves and arteries from the neighbouring parts.

The substance, magnitude, figure and composure of the Ureters.

They be two in number, on each side one; they are situate between the Kidneys (out of whose hollow part they proceed) and the bladder. But the manner how the Ureters insert or enter themselves into the bladder, and the *Porus Cholagogus* into the *Duodenum*, exceeds admiration; for the ureters are not directly but obliquely implanted neer the orifice of the bladder, and penetrate into the inner space thereof; for within they doe as it were divide the membrane or membranous coat of the body of the bladder, and insinuate themselves into that, as though it were double. But this is opened at the entrance of the urine, but shut at other times, the cover as it were falling upon it, so that the humor which is faln into the capacity of the bladder cannot be forced or driven back, no not so much as the aire blown into it can come this way out, as we see in swines bladders blown up and filled with aire.

Number and site.

For we see it is the Aire contained in these which fills them thus, neither can it be pressed forth but with extraordinary force.

For as this skin or coat turned in by the force of the humor gives way, so it being pressed out by the body contained within, thrusts its whole body into the passage as a stopple; like to this is the insertion of the *Porus Cholagogus* into the Guts.

The ureters have connexion with the above mentioned parts, with the muscles of the loins; upon which they run from the Kidneys to the bladder.

Connexion.

Wherefore nothing hinders, but that the stone sliding through the ureters into the bladder, may stupefie the thigh as much as it did when it was in the Kidney. They are of a cold and dry temper.

Their use is, to serve as passages, or channels for carrying the urine into the bladder.

Temper and use.

CHAP. XXXI.

Of the Bladder.

THe bladder is of the same substance that the ureters, that is, nervous, that so it may be the more easily dilated.

The substance.

It is of a large proportion, in some bigger, in some lesse, according to the difference of age, and habit of body. It is of a round figure and as it were Pyramidall.

Figure.

It

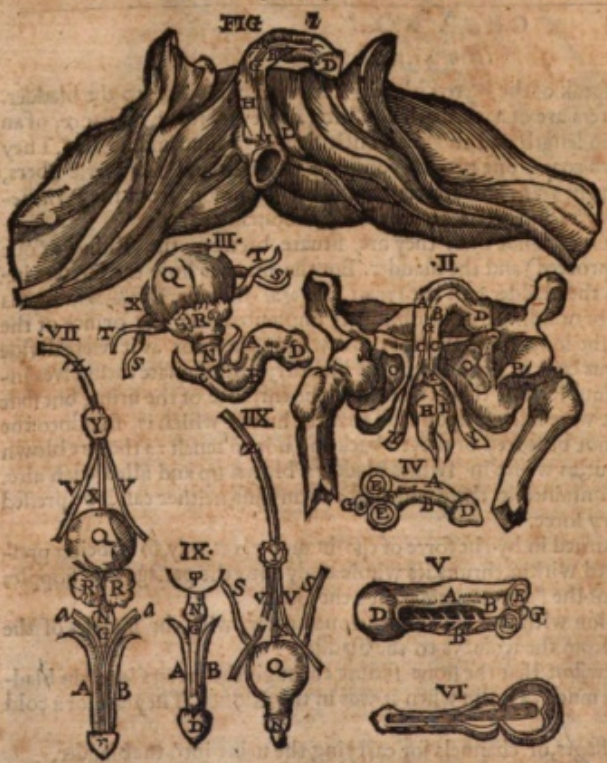
Compoſition. It is compoſed of the two coats, one proper, which is very thick and ſtrong, compoſed of the three ſorts of fibers, that is, in the inner ſide of the direct; without of the tranſverſe; and in the midſt of the oblique. The other common Coat coming from the *Peritonæum* hath veins and arteries on each ſide one, from the *Hypogaſtrick* veſſels above the holy-bone, alſo it hath nerves on each ſide from the ſixt conjugation mixt with the nerves of the holy-bone. For theſe nerves deſcend from the brain even to the end of the holy-bone.

It is but one and that ſituate in men in the lower belly upon the right gut and below the ſhare-bone, but in women between the womb and that bone, to which it cleaves with its membranous ligaments, as it doth to the yard by its neck, and to the right gut by its common coat and proper veſſels. It is of a cold and dry temper.

Temper, uſe or action. The uſe and action thereof is by the fibers continually to draw the urine, and contain it as long as need requires, and then to expell it by the neck, partly by compreſſion either of it ſelf, or rather to the muſcles of the *Epigaſtrium* and midritte, becauſe this motion, ſeeing it is voluntary cannot be performed unleſs by a muſcle which the bladder wants; partly by the dilatation and relaxation of the Sphincter muſcle compoſed of tranſverſe fibers, like the ſphincter of the fundament, after the ſame manner to ſhut up the orifice of the bladder, that the urine flow not out againſt our will. But the bladder as it fils is dilated, but as it is emptyed, it is contracted like a purſe. You may eaſily obſerve this Muſcle in a Sows bladder, it is ſtretched from the orifice of the bladder and beginning of the urinary paſſage even to the privities even in women; but in man it is terminated in the *Peritonæum* as ſoon as it hath left the right Gut.

Their Sphincter of the bladder. Beſides, this muſcle is thus far ſtretched forth, that the urine by its compreſſion ſhould be wholly preſſed out of the bladder, which by too long ſtay would by its acrimony do ſome harm. This is the common opinion of Anatomiſts concerning the Sphincter of the bladder, which nevertheleſs *Fallopius* allows not of. For (ſaith he) if this muſcle ſhould be ſituate beneath the glandulous bodies, the ſeed in copulation could never be caſt forth without ſome ſmall quantity of urine. Wherefore he thinks that this muſcle is ſituate above the *Proſtats*, and that it is nothing elſe but the beginning of the neck of the bladder, which becomes more fleſhy whilſt it is woven with tranſverſe fibers.

The eleventh figure of the Bladder and Yard.



AB, 1, 2, 3, 4, 5, 7, 9, the two bodies which make the yard.

CC, 2, 3, the place where theſe two bodies do firſt ariſe.

D, 1, 2, 3, 4, 5, 7, 9, the nut of the yard called *glans penis*.

EE, 4, 5, the fungous and red ſubſtance of the bodies of the yard.

F, 4, 5, the mutuall connexion of the bodies of the yard, and the nervous outward ſubſtance of the ſame, compaſſing round about the former fungous ſubſtance.

G, 1, 2, 3, 4, 5, 7, 9, the paſſage of the Urine, or common pipe running under the yard all along his length.

H, I, 1, 2, the firſt pair of Muſcles of the yard, which in the firſt figure do yet grow to it, but in the ſecond they hang from their originall.

K, L, 1, 2, the ſecond pair of Muſcles of the yard, in the firſt figure growing, in the ſecond hanging from their inſertion. M, 1, 2, the Sphincter of the right gut. N, 3, 7, 8, 9, the round ſphincter Muſcle of the bladder. OO, a Membrane which is over the holes of the ſhare-bone. P, 2, a round Ligament from the meeting of the ſhare-bones on the head of the thigh. Q, 3, 7, 8. the body of the bladder. RR, 3, 7, the *Proſtatæ*, which into ſeed when it is perfectly laboured, is led. SS, 3, 8, Portions of the ureters. TT*3, Portions of the veſſels, which lead down the ſeed. VV, 7, 8, the umbilicall arteries. X, 7, 8, the ligament of the bladder cald *Urachus*. Y, 7, 8 the navil or *umbilicus*. Z, 7, 8, the umbilicall vein. *aa*, 7, the vein and artery of the yard. *b*, 5. the artery diſtributed through the body of the yard.

For

For the neck of the bladder it differs nothing in ſubſtance, compoſure, number, and temper from the bladder, but only in quantity, which is neither ſo large, nor round in figure, but ſomewhat long together with the yard repreſenting the ſhape of the letter S. It is placed in men at the end of the right Gut and *Perineum*, riſing upwards even to the roots of the yard, and with it bending it ſelf downwards; in women it is ſhort, broad, and ſtreight, ending at the orifice of the neck of the womb between the nervous bodies of the *Nymphæ*. The neck of the bladder.

In men it hath connexion with the bladder, the ejaculatory veſſels, the right gut and yard, but in women only with the neck of the wombe and privities. The uſe of it is in men to caſt forth ſeed and urine, in women only urine. But we muſt note that the ſhare bones muſt be divided and pulled aſunder, in that part where they are joyned, that ſo you may the more exactly obſerve the ſituation of theſe parts. Beſides you muſt note that by the *Perineum* we underſtand nothing elſe, in men and women, then that ſpace which is from the fundament to the privities, in which the ſeam is called *Taurus*. The connexion and uſe thereof.

CHAP. XXXII.

Of the Yard.

NOw follows the declaration of the Privy parts of men and women, and firſt we will treat of mens. The yard is of a ligamentous ſubſtance, becauſe it hath its originall from bones, it is of an indifferent magnitude in all dimenſions, yet in ſome bigger, in ſome leſs; the figure of it is round, but yet ſomewhat flatted above and beneath. The ſubſtance, quantity and figure of the yard.

It is compoſed of a double coat, nerves, veins, arteries, two ligaments, the paſſage of the urine, and four muſcles. It hath its coats both from the true skin, as alſo from the fleſhy pannicle, but the veins and Arteries from theſe of the lower part of the lower belly which run on the lower part of the Holy-bone into the yard, as the ſeminary veſſels run on the upper part. Compoſure.

The ligaments of the yard proceed on both ſides from the ſides and lower commiſſure of the ſhare-bones; wherefore the yard is immediately at his root furniſhed with a double ligament, but theſe two preſently run into one ſpungy one. The paſſage of the urine ſituate in the lower part of the yard comes from the neck of the bladder between the two ligaments. The ligaments.

For the four muſcles, the two ſide ones compoſing or making a great part of the yard, proceed from the inward extuberancy of the Hip-bone, and preſently they are dilated from their originall; and then grow leſs again. The two other lower ariſe from the muſcles of the fundament and accompany the urinary paſſage the length of the *perineum* untill they enter the yard; but theſe two muſcles cleave ſo cloſe together, that they may ſeem one having a triangular form. The muſcles.

The action of theſe four muſcles in the act of generation is, they open and dilate this common paſſage of urine and ſeed, that the ſeed may be forcibly or violently caſt into the field of nature; and beſides they then keep the yard ſo ſtiffe, that it cannot bend to either ſide. Their Action.

The yard is in number one, and ſituate upon the lower parts of the ſhare-bone, that it might be more ſtiffe in erection. It hath connexion with the ſhare-bone and neighbouring parts; by the particles of which it is compoſed. It is of a cold and dry temper. The action of it is to caſt the ſeed into the womb, for preſervation of mankind.

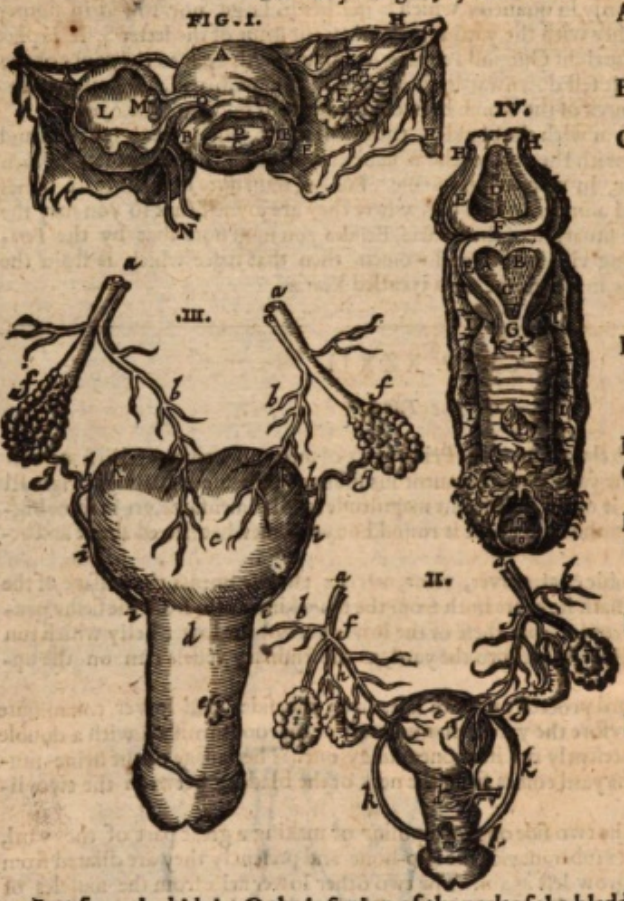
The head of it begins where the tendons end, this head from the figure thereof is called *Glans* and *Balanus*, that is, the Nut, and the skin which covers that head is called *Præputium*, that is, the foreskin. The fleſh of this *Glandule* is of a middle nature between the glandulous fleſh and true skin. But you muſt note that the Ligaments of the yard are ſpongy contrary to the condition of others, and filled with groſs and black blood. But all theſe ſtirred up by the delight of deſired pleaſure, and provoked with a venereall fire, ſwell up and erect the yard. The Nut. The *Præputium*, or foreskin.

CHAP. XXXIII.

Of the ſpermatick veſſels and teſticles in women.

NOw we ſhould treat of the Privy parts in women, but becauſe they depend upon the neck and proper body of the womb, we will firſt ſpeak of the womb, having firſt declared what difference there is between the ſpermatick veſſels and teſticles of men and women. Wherefore we muſt know that the ſpermatick veſſels in women do nothing differ from thoſe in men in ſubſtance, figure, compoſure, number, connexion, temper, originall and uſe; but only in magnitude and diſtribution, for women have them more large and ſhort. In what the ſpermatick veſſels in women differ from thoſe in men.

The twelfth Figure, of the Womb.



A. The bottome of the womb laid open without any membrane.
BB. the neck of the womb turned upward.
CD. a part of the bottom of the womb like the nut of the yard, swelling into the upper part of the neck of the womb, in the middle whereof the orifice appeareth.
EE. a membrane knitting the womb to the *Peritoneum*, & holding together the veſſels thereof.
F. the left teſticle.
G. the ſpermaticall vein and artery.
H. a part of the ſpermaticall veſſels reaching unto the bottom of the womb.
I. one part of the veſſels coming to the teſticles *a veſſell leading the ſeed unto the womb.
K. the coat of the teſticle with the implication of the veſſels. L. the cavity of the bladder opened. M. the inſertion of the Ureters into the bladder. N. the Ureters cut from the kidnies. O. the inſertion of the neck of the bladder into the lap or privity.

The ſecond Figure.

aa. The ſpermaticall vein and artery. *bb.* branches diſtributed to the *Peritoneum* from the ſpermatical veſſels. *c.* the bottom of the womb. *d.* the neck of the womb. *e.* certain veſſels running through the inſide of the womb, and the neck thereof. *ff.* veſſels reaching to the bottom of the womb produced from the ſpermaticall veſſel. *gg.* the leading veſſell of the ſeed called *Tuba*, the Trumpet. *hh.* a branch of the ſpermaticall veſſel compaſſing the Trumpet. *ii.* the teſticles. *kk.* the lower ligaments of the womb, which ſome cal the Cremaſters or hanging muſcles of the womb. *l.* the lap or privity into which the Cremaſters do end. *m.* a portion of the neck of the bladder.

The third Figure.

aa. The ſpermaticall veſſels. *bb.* a branch from theſe ſpermaticall veſſels to the bottom of the womb. *cc.* the body or bottom of the womb. *d.* the neck of the ſame. *e.* the neck of the bladder ending into the neck of the womb. *ff.* the teſticles. *gg.* the leading veſſels, commonly though not ſo well called the ejaculatory veſſels. *hh.* the diviſion of theſe veſſels, one of them determining into the horns at double *kk. ii.* the other branch ending in the neck, by which women with child avoid their ſeed. *kk.* the horns of the womb.

The fourth Figure.

AB. The boſome of the bottom of the womb, at whoſe ſides are the horns. CD. a line like a ſuture or ſeam, a little diſtinguiſhing that boſome. EE. the ſubſtance of the bottom of the womb, or the thickneſs of his inner coat. F. a protuberation or ſwelling of the womb in the middle of the boſom. G. the orifice of the bottom of the womb. HH. the coat or ſecond cover of the bottom of the womb, coming from the *Peritoneum*. IIII. a portion of the membranes which tie the womb. KK. the beginning of the neck of the womb. L. the neck of the bladder inſerted into the neck of the womb. *m.* the *Clitoris* in the top of the privity. *n.* the inequality of the privity where the *hymen* is placed. *o.* the hole or paſſage of the privity in the cleft. *p.* the skinny caruncle of the privity.

Why woman's ſpermatick veſſels they are larger, but ſhorter then men's.

It was fit they ſhould be more large, becauſe they ſhould not only convey the matter fit for generation of young and nouriſhment of the teſticles, but alſo ſufficient for the nouriſhment of the womb and child; but ſhorter, becauſe they end at the teſticles and womb within the belly in women. Where you muſt note that the preparing ſpermatick veſſels,

ſels, little before they come to the Teſticles are divided into two unequall branches, of which the leſſer bended, after the ſame manner as we ſaid in men, goes into the head of the teſticle, through which it ſends a ſlender branch into the coats of the teſticles for life and nouriſhment, and not only into the coats but alſo into leading veſſels. But the bigger branch deſcends on each ſide by the upper part of the wombe between the proper coat and the common, from the *Peritonæum* where it is divided into divers branches. By this difference of the ſpermatick veſſels you may eaſily underſtand why women caſt forth leſs ſeed than men.

In what their teſticles differ from mens.

For their Teſticles, they differ little from mens but in quantity; For they are leſſer and in figure more hollow and flat, by reaſon of their defective heat which could not elevate or lift them up to their juſt magnitude. Their compoſure is more ſimple; for they want the *ſcrotum* or cod, the fleſhy coat, and alſo according to the opinion of ſome the *Erythroides*, but in place thereof they have another from the *Peritonæum* which covers the proper coat, that is, the *Epididymis*, or *Dartos*. *Silvius* writes that womens Teſticles wants the *Erythroides*; yet it is certain that beſides their peculiar coat *Dartos*, they have another from the *peritonæum*, which is the *Erythroides*, or as *Fallopius* cals it the *Elythroides*, that is as much as the *vaginalis* or ſheath: But I think that this hath ſprung from the miſ-underſtanding th at place in *Galen* where he writes, that womens teſticles want the *Epididymis*. For we muſt not underſtand that to be ſpoken of the coat, but of the varicous paraſtats (as I formerly ſaid). They differ nothing in number, but in ſite; for in men they hang without the belly at the ſhare bone above the *Peritonæum*; women have them lying hid in their belly, neer the bottome at the ſides of the wombe, but yet ſo as they touch not the body of the wombe.

Lib. 14. de uſu part.

Site.

But theſe teſticles are tyed to the womb both by a coat from the *Peritonæum*, as alſo by the leading veſſels deſcending to the horns of the wombe, but to the reſt of the body by the veſſels and the nerves ariſing from the holy bone and Coſtall nerves. They are of a colder Temper than mans. The ejaculatory, or leading veſſels in women differ thus from mens, they are large at the beginning, and of a veiny conſiſtence, or ſubſtance, ſo that you can ſcarce diſcern them from the coat *Peritonæum*, then preſently they become nervous, and waxe ſo ſlender, that they may ſeem broken or torn, though it be not ſo; but when they come nearer to the horns of the wombe, they are again dilated; in their other conditions, they agree with mens, but that they are altogether more ſlender and ſhort. They have a round figure, but more intricate windings than mens; I beleeve, that theſe windings might ſupply the defect of the varicous Paraſtats. They are ſeated between the teſticles and wombe, for they proceed out of the head of the teſticle, then preſently armed with a coat from the *Peritonæum*, they are implanted into the wombe by its horns.

Connexion.

Temper.

Their ejaculatory veſſels.

Why they have more intricate windings.

Their ſite.

CHAP. XXXIIII.

Of the Wombe.

Where in the privy parts in women differ from thoſe in men.

THe Wombe is a part proper only to women, given by nature in ſtead of the *Scrotum*, as the neck thereof, and the annexed parts in ſtead of the yard; ſo that if any more exactly conſider the parts of generation in women and men, he ſhall find that they differ not much in number, but only in ſituation and uſe. For that which man hath apparent without, that women have hid within, both by the ſingular providence of nature, as alſo by the defect of heat in women, which could not drive and thruſt forth thoſe parts, as in men. The womb is of a nervous and membranous ſubſtance, that it may be more eaſily dilated and contracted, as need ſhall require.

The ſubſtance and magnitude of the wombe.

The magnitude thereof is divers, according to the diverſity of age, the uſe of venery, the flowing of their courſes, and the time of conception. The wombe is but ſmall in one of unripe age, having not uſed venery, nor which is menſtrous; therefore the quantity cannot be rightly defined.

Figure. The horns of the wombe. Compoſure. The veins and Arteries.

The figure of the wombe is abſolutely like that of the bladder, if you conſider it without the productions, which *Herophilus* called horns, by reaſon of the ſimilitude they have with the horns of Oxen at their firſt coming forth. It conſiſts of ſimple and compound parts. The ſimple are the veins, arteries, nerves, and coats. The veins and arteries are four in number, two from the preparing ſpermatick veſſels, the two other aſcend thither from the *Hypogaſtrick*, after this manner.

Firſt, theſe veſſels before they aſcend on each ſide to the wombe, divide themſelves into two branches, from which otherſome go to the lower part of the wombe, otherſome to the neck thereof, by which the menſtruous blood, if it abound from the conception, may be purged.

Nerves.

Nerves come on both ſides to the wombe, both from the ſixt conjugation, deſcending by the length of the back bone, as alſo from the holy bone, which preſently united and joyned together, aſcend and are diſtributed through the wombe, like the veins and arteries.

The Coats.

The utmoſt or common coat of the wombe, proceeds from the *Peritonæum*, on that

part it touches the holy bone; but the proper it hath from the first conformation, which is composed of the three sorts of fibers, of the right on the inside of the attraction of both seeds; the transverse without to expell, if occasion be; the oblique in the midst for the due retention thereof.

No cels in the wombe.

The wombe admits no division, unless into the right and left side, by an obscure line or seam, such as we see in the *scrotum*, but scarce so manifest; neither must we after the manner of the ancients, imagine any other cels in the wombe. For by the law of nature, a woman at one birth can have no more than two. An argument hereof is, they have no more than two dugs. If any chance to bring forth more, it is besides nature, and somewhat monstrous, because nature hath made no provision of nourishment for them.

The site.

Nature hath placed the wombe at the bottome of the belly, because that place seems most fit to receive seed, to carry and bring forth the young. It is placed between the bladder and right gut, and is bound to these parts much more straitly by the neck, than by the body thereof; but also besides it is tyed with two most strong ligaments on the sides, and upper parts of the sharebone, on which it seems to hang; but by its common coat from the *Peritonæum*, chiefly thick in that place, it is tied to the hollow bone, and the bones of the hanch and loins.

The temper and action.

By reason of this strait connexion, a woman with child feeling the painfull drawings back, and as it were convulsions of those ligaments, knows her self with child. It is of a cold and moist temper, rather by accident, than of it self. The action thereof is to contain both the seeds, and to cherish, preserve, and nourish it, so contained, untill the time appointed by nature; and also besides, to receive, and evacuate the menstruous blood. The compound parts of the wombe are, the proper body and neck thereof. That body is extended in women big with child, even to the navell, in some higher, in some lower.

The *Cotyledones*.

In the inner side the *Cotyledones* come into our consideration, which are nothing else than the orifices and mouths of the veins, ending in that place. They scarce appear in women, unless presently after child-bearing, or their menstruall purgation; but they are apparent in sheep, Goats, and Kine, at all times like wheat corns, unless when they are with young, for then they are of the bigness of hasell nuts: but then also they swell up in women, and are like a rude peece of flesh of a finger and a half thick; which begirt all the naturall parts of the infant shut up in the wombe; out of which respect this shapeles flesh, according to the opinion of some, is reckoned amongst the number of coats investing the infant, and called *Chorion*, because, as in beasts, the *Chorion* is interwoven with veins, and arteries, whence the umbilicall vessels proceed; so in women this fleshy lump is woven with veins, and arteries, whence such vessels have their originall. Which thing, how true and agreeable to reason it is, let other men judg.

Columbus justly reproved.

There is one thing whereof I would admonish thee, that as the growth of the *Cotyledones* in beasts are not called by the name of *Chorion*, but are only said to be the dependents thereof, so in women such swollen *Cotyledones* merit not the name of *Chorion*, but rather of the dependences thereof.

The orifice of the wombe.

This body ends in a certain straitness which is met withall, in following it towards the privities, in women which have borne no children, or have remained barren some certain time; for in such as are lately delivered, you can see nothing but a cavity and no straitness at all. This straitness we call the proper orifice of the wombe, which is most exactly shut after conception, especially untill the membrane, or coats incompassing the child be finished, and strong enough to contain the seed, that it flow not forth, nor be corrupted by entrance of the air; for it is opened to send forth the seed, and in some the courses and serous humors, which are heaped up in the wombe in the time of their being with child.

The proper orifice of the wombe is not alwayes exactly shut in women with child.

The neck of the wombe.

From this orifice the neck of the wombe taking its originall, is extended even to the privities. It is of a musculous substance, composed of soft flesh, because it might be extended and contracted, wrinckled, and stretched forth, and unfolded, and wrested, and shaken at the coming forth of the child, and after be restored to its former soundness and integrity. In process of age it grows harder, both by use of venery, and also by reason of age, by which the whole body in all parts thereof becomes dry and hard. But in growing, and in young women, it is more tractable and flexible for the necessity of nature.

Its magnitude. Composition.

The magnitude is sufficiently large in all dimensions, though divers, by reason of the infinite variety of bodies. The figure is long, round, and hollow. The composition is the same with the wombe, but it receives not so many vessels as the wombe; for it hath none but those which are sent from the *Hypogastrick* veins, by the branches ascending to the wombe. This neck on the inside is wrinckled with many crests, like the upper part of a dogs mouth, so in copulation to cause greater pleasure by that inequality, and also to shorten the act.

Number and site.

It is only one, and that situate between the neck of the bladder and the right gut, to which it closely sticketh, as to the wombe by the proper orifice thereof, and to the privities by its own orifice; but by the vessels to all the parts from whence they are sent.

Temper.

It is of a cold and dry temper, and the way to admit the seed into the wombe, to exclude the infant out of the wombe, as also the menstruall evacuation. But it is worth observation,

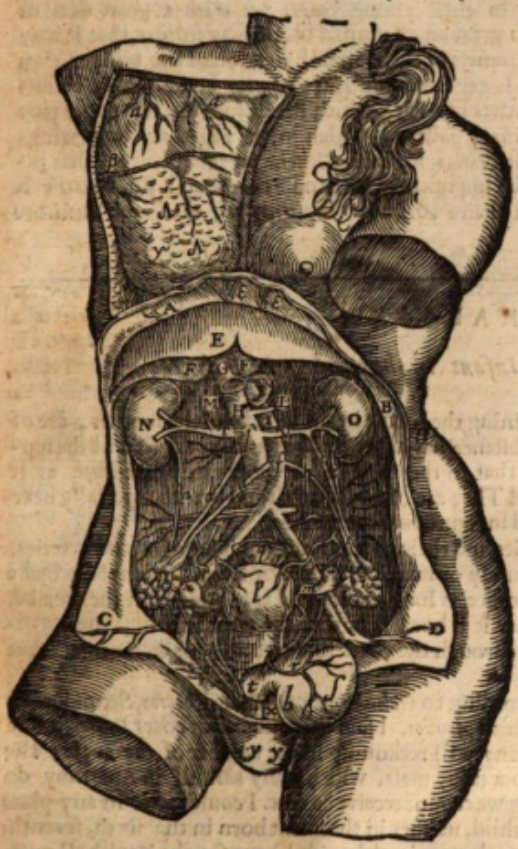
vation, that in all this paſſage there is no ſuch membrane found, as that they called *Hymen*, which they feigned to be broken at the firſt coition. Yet notwithſtanding *Columbus*, *Fallopius*, *Wierus*, and many other learned men of our time think otherwiſe, and ſay, that in Virgins a little above the paſſage of the urine, may be found and ſeen ſuch a nervous membrane, placed overthwart as it were in the middle way of this neck, and perforated for the paſſages of the courſes. But you may find this falſe by experience; it is likely the ancients fell into this error through this occaſion, becauſe that in ſome a good quantity of blood breaks forth of theſe places at the firſt copulation.

No *Hymen*.

But it is more probable, that this happens by the violent attrition of certain veſſels lying in the inward ſuperficies of the neck of the wombe, not being able to endure without breaking ſo great extention as that nervous neck undergoes at the firſt coition. For a maid which is mariageable, and hath her genitall parts proportionable in quantity and bigneſs to a mans; ſhall find no ſuch effuſion of blood, as we ſhall ſhew more at large in our Book of Generation.

From whence the blood proceeds that breaks forth in ſome virgins at the firſt coition.

The thirteenth Figure, ſhewing the parts of women different from theſe in men.



A.B.C.D. The *Peritonæum* reflected or turned backward, above and below.

E.F. the gibbous part of the liver E, the cave or hollow part F.

G. the trunk of the gate-vein.

H. the hollow vein.

I. the great artery.

K. the roots of the *Cœlicall* artery which accompanieth the gate-vein.

L.M. the fatty vein going to the coat of the kidneys.

N. O. the fore-part of both the kidneys.

T. V. the emulgent veins and arteries.

aa. the right ureter at the loweſt *a*, cut from a part which neer to *b*, ſticketh yet to the bladder, becauſe the bottome of the bladder is drawn to the left ſide.

c. the left ureter inſerted into the bladder neer to *r*.

dd. the ſpermatick vein which goeth to the left teſticle marked with *i*.

ee. the ſpermatick vein which goeth to the left teſticle with *i*, alſo. *f.* the trunk of the great artery from whence the ſpermatical arteries do proceed. *gh.* the ſpermatical arteries.

ii. the two teſticles. *ll*, a branch which from the ſpermatick veſſels reacheth unto the bottome of the wombe. *mm.* the leading veſſel of the ſeed which *Fallopius* calleth the *tuba* or trumpet, becauſe it is crooked and reflected. *n.* a branch of the ſpermatick veſſel, compaſſing the leading veſſel. *oo.* a veſſell like a worm which paſſeth to the wombe, ſome call it *Cremaſter*. *p.* the bottome of the wombe called *fundus uteri*. *q.* a part of the right gut. *r. ſ.* the bottome of the bladder whereto is inſerted the left ureter, and a vein led from the neck of the wombe neer unto *r*. *t.* the neck of the bladder. *u.* the ſame inſerted into the privity or lap. *x.* a part of the neck of the wombe above the privity. *yy.* certain skinny Caruncles of the privities, in the midſt of which is the ſlit, and on both ſides appear little hillocks.

The Figures belonging to the Dugs and Breaſts.

ææ The veins of the Dugs which come from thoſe, which deſcending from the top of the ſhoulder, are offered to the skin. *ß.* the veins of the dugs derived from thoſe which through the arm-hole are led into the hand *γ.* the body of the Dug or Breaſt. *δδ.* the kernels and fat between them. *εε.* the veſſels of the dugs deſcending from the lower part of the neck called *jugulum*, under the breaſt bone.

This neck ends at the privities, where its proper orifice is, which privy parts we must treat of, as being the productions and *appendices* of this neck. This *Pudendum*, or privity, is of a middle substance, between the flesh and a nerve; the magnitude is sufficiently large, the figure, round, hollow, long. It is composed of veins, arteries, nerves, descending to the neck of the wombe, and a double coat proceeding from the true skin and fleshy pannicle; both these coats are firmly united by the flesh coming between them; whereupon it is said, that this part consists of a musculous coat. It is one in number, situate above the *Peritonæum*. It hath connexion with the fundament, the neck of the wombe and bladder by both their peculiar orifices.

It hath a middle temper, between hot, and cold, moist and dry. It hath the same use as a mans *Præputium* or fore-skin, that is, that together with the *Nymphæ* it may hinder the entrance of the air, by which the wombe may be in danger to take cold. The lips of the privities called by the Greeks πτερυγώματα, by the Latines *Alæ*, contain all that region which is invested with hairs; and because we have faln into mention of these *Nymphæ*, you must know that they are as it were productions of the musculous skin, which descend on both sides, from the upper part of the share-bone downwards; even to the orifice of the neck of the bladder, oft times growing to so great a bigness, that they will stand out like a mans yard. Wherefore in some they must be cut off in their young years, yet with a great deal of caution, lest if they be cut too rashly, so great an effusion of blood may follow, that it may cause, either death to the woman, or barrenness of the wombe by reason of the refrigeration by the too great effusion of blood. The latter Anatomists, as *Columbus* and *Fallopius*, besides these parts, have made mention of another particle, which stands forth in the upper part of the privities, and also of the urinary passage, which joyns together those wings we formerly mentioned. *Columbus* cals it *Tentigo*, *Fallopius*, *Cleitoris*, whence proceeds that infamous word *Cleitorizein*, (which signifies impudently to handle that part.) But because it is an obscene part, let those which desire to know more of it, read the Authors which I cited.

Alæ. πτερυγώματα.

Cleitoris, tentig.

CHAP. XXXV.

Of the Coats containing the Infant in the wombe, and of the Navell.

THe membranes or coats containing the Infant in the wombe of the mother, are of a spermatick and nervous substance, having their matter from the seed of the mother. But they are nervous that so they may be the more easily extended, as it shal be necessary for the child. They are of good length and bredth, especially near the time of deliverance, they are round in figure like the wombe.

Their substance, magnitude, figure, and composure.

Their composition is of veins, arteries, and their proper substance. The veins, and arteries, are distributed to them (whether obscurely or manifestly, more or fewer) from the wombe by the *Cotyledones*, which have the same office, as long as the child is contained in the wombe, as the nipples or paps of the nurses after it is born. For thus the wombe brings the *Cotyledones*, or veins, degenerating into them through the coats like certain paps to the infant shut up in them.

The number.

These coats are three in number according to *Galen*; one called the *Chorion*, Secundine, or afterbirth; the other *Allantoides*; the third *Amnios*. I find this number of coats in beasts, but not in women, unless peradventure any will reckon up in the number of the coats, the *Cotyledones* swollen up, and grown into a fleshy mass, which many skilfull in Anatomy do write, which opinion notwithstanding we cannot receive as true. I could never in any place find the *Allantoides* in women with child, neither in the infant born in the sixth, seventh, eight, or in the full time, being the ninth month, although I have sought it with all possible diligence, the Midwives being set apart, which might have violated some of the coats.

But thus I went about this business, I divided the dead body of the mother croswise upon the region of the wombe, and taking away all impediments which might either hinder, or obscure our diligence, with as much dexterity as was possible, we did not only draw away that receptacle or den of the Infant, from the inward surface of the wombe, to which it stuck by the *Cotyledones*, but we also took away the first membrane which we called *Chorion*, from that which lies nextunder it, called *Amnios*, without any rending or tearing; for thus we powred forth no moisture, whereby it might be said, that any coat made for the containing of that humor, was rent or torn. And then we diligently looked, having many witnesses and spectators present, if in any place there did appear any distinction of these two membranes, the *Allantoides* and *Amnios*, for the separating the contained humors, and for other uses which they mention.

But when we could perceive no such thing, we took the *Amnios* filled with moisture on the upper side, and having opened it, two servants so holding the apertion, that no moisture might flow out of it into the circumference of the *Chorion* or wombe, then presently with

with ſpunges we drew out by little and little all the humidity contained in it, the infant yet contained in it, which was fit to come forth, that ſo the coat *Amnios* being freed of this moiſture, we might ſee whether there were any other humor contained in any other coat beſides. But having done this with ſingular diligence and fidelity, we could ſee no other humor, nor no other ſeparation of the membranes beſides.

He ſhews by three ſeverall reaſons that there is no Allantoides.

So that, from that time I have confidently held this opinion, that the infant in the womb, is only wrapped in two coats, the *Chorion* and *Amnios*. But yet not ſatisfied by this experience, that I might yet be more certain concerning this *Allantoides*, having paſſed through the two former coats, I came to the infant, and I put a quil into its bladder, and blew it up as forcibly as I could, ſo to try, if by that blowing I might force the air into that coat which we queſtioned, as ſome have written. But neither thus could I drive any air from hence, through the navell into the controverted coat, but rather I found it to fly out of the bladder by the privities. Wherefore I am certainly perſwaded that there is no *Allantoides*. Moreover I could never finde nor ſee in the navell that paſſage called the *Urachus*, which they affirm to be the beginning and originall of the coat *Allantoides*. But if it be granted, that there is no ſuch coat as the *Allantoides*, what diſcommodity wil ariſe hereof? ſpecially ſeeing the ſweat and urine of the infant may eaſily, and without any diſcommodity be received, collected, and contained in the ſame coat, by reaſon of the ſmall difference which is between them. But if any object, That the urine by its ſharpneſs and touching will hurt the infant: I will anſwer, there can be no ſo great ſharpneſs in the urine of ſo ſmall an infant; and that, if that there be any, it is tempered by the admixture of the gentle vapor of ſweat.

Beſides, if you conſider, or have regard to the uſe of ſuch an humor (which is to hold up the child, leſt by its weight it break the ties, by which it is bound to the womb;) we ſhall finde no humor more fit for this purpoſe than this ſerous, as which by its thickneſs is much more fit to bear up a weight, than the thin and too liquid ſweat. For ſo we ſee the ſea or ſalt-water carries greater weights without danger of drowning than freſh rivers do. Wherefore I conclude that there is no need, that the urine ſhould be kept and contained in one coat, and the ſweat in another. The Ancients who have writ otherwiſe, have written from obſervations made in beaſts. Wherefore we make but only two coats, the *Chorion* and *Amnios*; the one of which, ſeeing it contains the other, they both ſo encompaſs the child, that they veſt it on every ſide.

Falloptus in ſome ſort ſeems to be of this opinion; for he only makes two coats, the *Chorion* and *Amnios*; but he thinks the infant makes the water into a certain part of the *Chorion*, as you may perceive by reading of his Obſervations. Both theſe coats are tyed between themſelves by the intercourſe of moſt ſlender nervous fibers, and ſmall veſſels penetrating from the outer *Chorion* to the inner *Amnios*. Wherefore unleſs you warily handle theſe coats, you may eaſily tear the *Amnios* in ſeparating it. They are of the ſame temper with other membranes. Their uſe is different, for the *Chorion* is made both for the preſervation of the veſſels, which it receives from the womb for the generating of the umbilicall veins and arteries, as alſo to keep whole and ſafe the parts which it inveſts.

Their temper and uſe.

But the *Amnios* is to receive and contain the excrementitious and ſerous humors, which the childe ſhut up in the womb is accuſtomed to evacuate. But this coat is very thin and ſoft, but ſtrong and ſmooth, leſt by its touch it might hurt the infant, whereupon it is called the Lambskin-coat.

CHAP. XXXVI.

Of the Navell.

What the Navell is.

THe Navell follows theſe coats; It is a white body, ſomewhat reſembling the wreathen cord, or girdle of the Franciſcan-friers, but that it hath not the knots ſtanding ſo far out, but only ſwelling in certain places, reſembling a knot, only lifted up on one ſide; it ariſes and takes its originall from a fleſhy maſs, which we expreſſed by the name of ſwelling *Cotyledones*, and goes into the midſt of the lower belly of the infant, yea verily into the midſt of the whole body, whoſe root it is therefore ſaid to be. For even as a tree by the root ſucks nouriſhment from the earth, ſo the infant in the womb draws its nouriſhment by the navell. The greatneſs of it in breadth and thickneſs, equals the bigneſs of the little finger. But it is a foot and a half long, ſo that children are brought forth with it, encompaſſing their middle, neck, arms, or legs. The figure of it is round. It is compoſed of two arteries, one vein, and two coats. It hath theſe veſſels from that great multitude of capillary veins and arteries, which are ſeen diſperſed over the *Chorion*. Wherefore the vein entring in at the Navell, penetrates from thence into the hollow part of the Liver, where divided into two, according to *Galens* opinion, it makes the gate and hollow veins. But the arteries, carried by

The Navell is the center of the body.

The figure and compoſure.

Lib. de format. fœtu in utero.

by themſelves the length of the Navell, caſt themſelves into the *Iliacæ*, which they make, as alſo all other, that from thence the vitall ſpirit may be carried by them over all the infant. It hath its two coats from the *Chorion*.

But ſeeing they are mutually woven and conjoined without any *medium*, and are of a ſufficient ſtrength and thickneſs over all the Navell, they may ſeem to make the infants externall skin and fleſhy Pannicle. I know very many reckon two Umbilicall veins, as alſo arteries, and the *Urachus*, by, or through which the urine flows into the coat *Allantoides*. But becauſe this is not to be found in women, but only in beaſts, I willingly omit it, becauſe I do not intend to mention any parts, but ſuch as belong to humane bodies. Yet if there be any, which can teach me, that theſe parts, which I think proper to brute beaſts, are to be found in women, I willingly confeſs, and that to his credit, from whom I have reaped ſuch benefit.

There is only one Vein in a childs Navell, but no Urachus.

The other things that may be required concerning the Navell, as of its number, ſite, connexion, temper and uſe, may eaſily appear by that we have ſpoken before. For we have apparently ſet down the uſe, when we ſaid, the Navell was made for that purpoſe, that the infant may be nouriſhed by it, as the tree by the root, by reaſon of the continuation of the veſſels thereof, with the preparing ſpermatick veſſels made by God for that purpoſe, to whom be honor and glory for ever and ever. *Amen.*

The End of the third Book.