Myographia nova: or, a graphical description of all the muscles in [the] humane body as they arise in dissection. Distributed into six lectures ... Together with a philosophical and mathematical account of the mechanism of muscular motion, and an accurate ... discourse of the heart and its use, with the circulation of the blood, &c.; ... / by R. Lower.

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Browne, John, 1642-approximately 1700.
Bernoulli, Jean, 1667-1748.
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Connor, Bernard, 1666?-1698.
Lower, Richard, 1631-1691.
Molins, William, active 1648-1680.
Scarburgh, Charles, Sir, 1616-1694.

Publication/Creation

London: Printed by Tho. Milbourn for the author, 1698.

Persistent URL

https://wellcomecollection.org/works/w6agn9ps

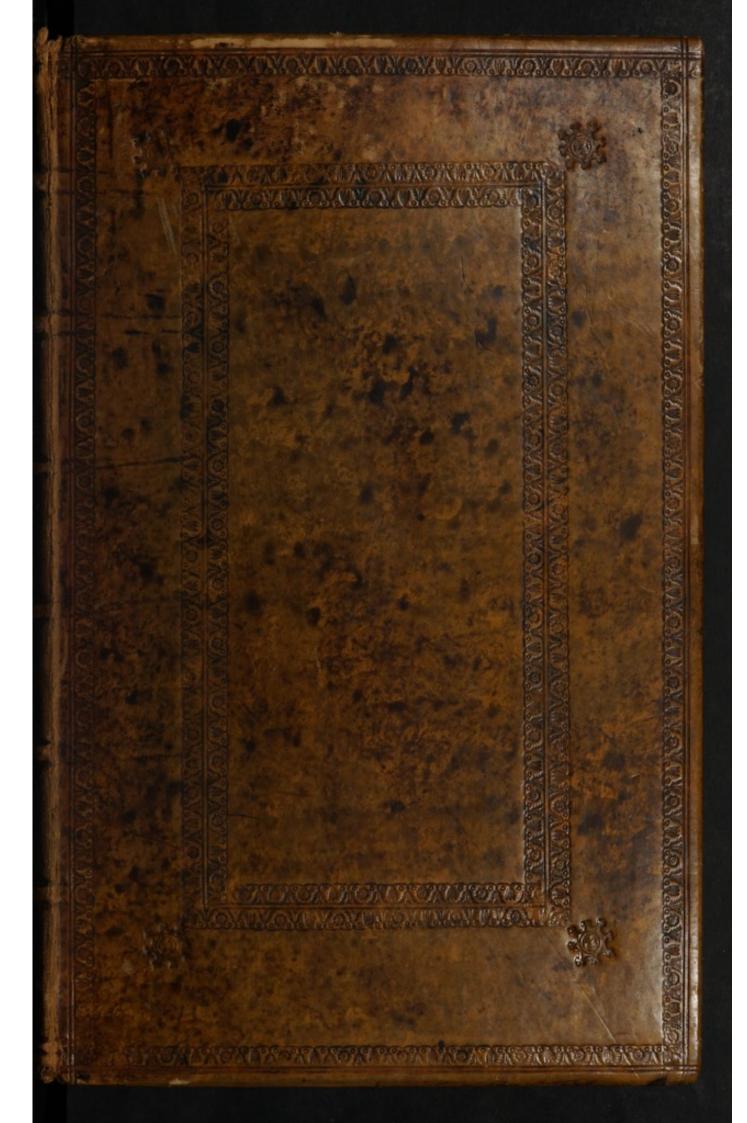
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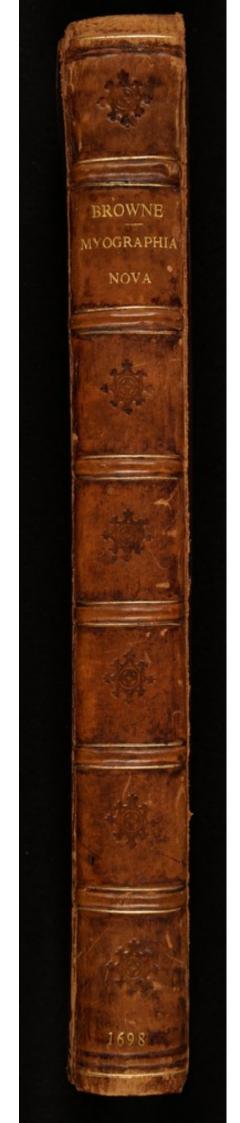
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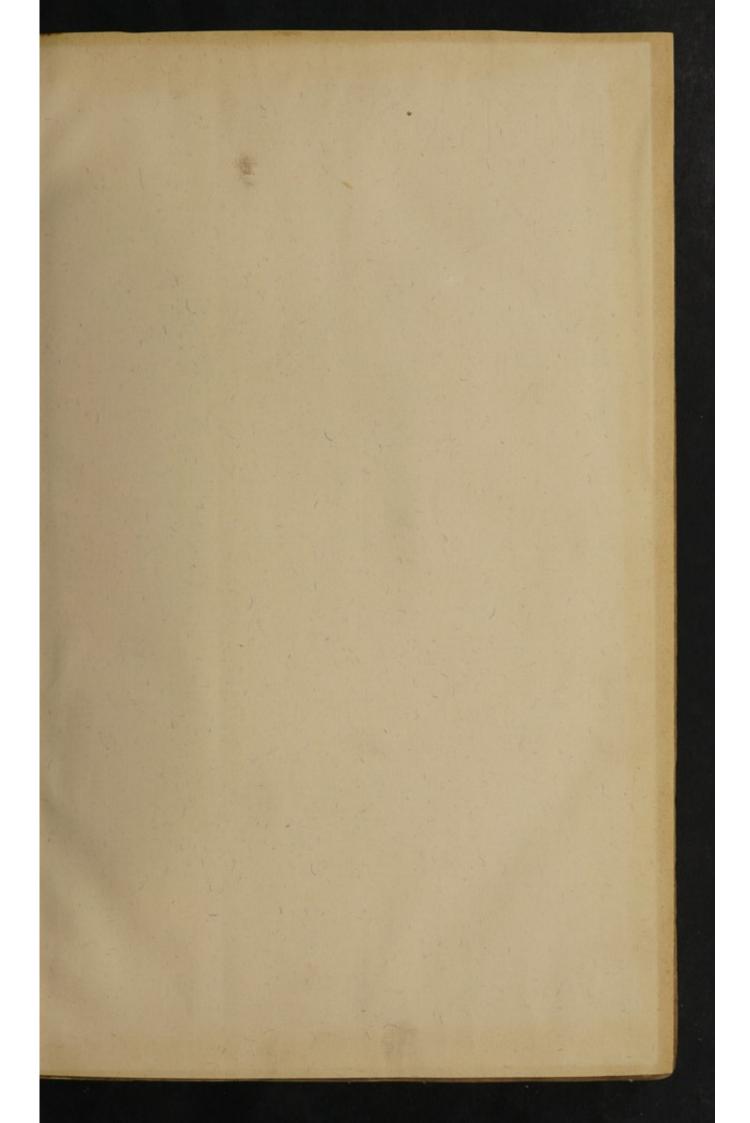


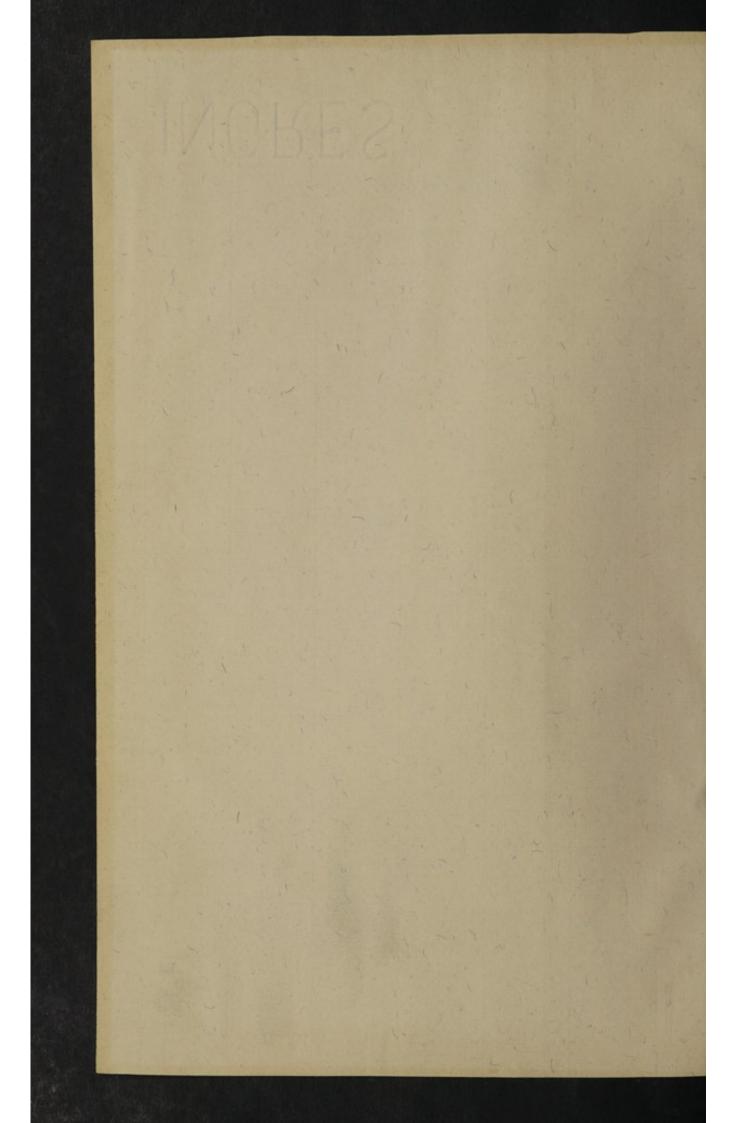


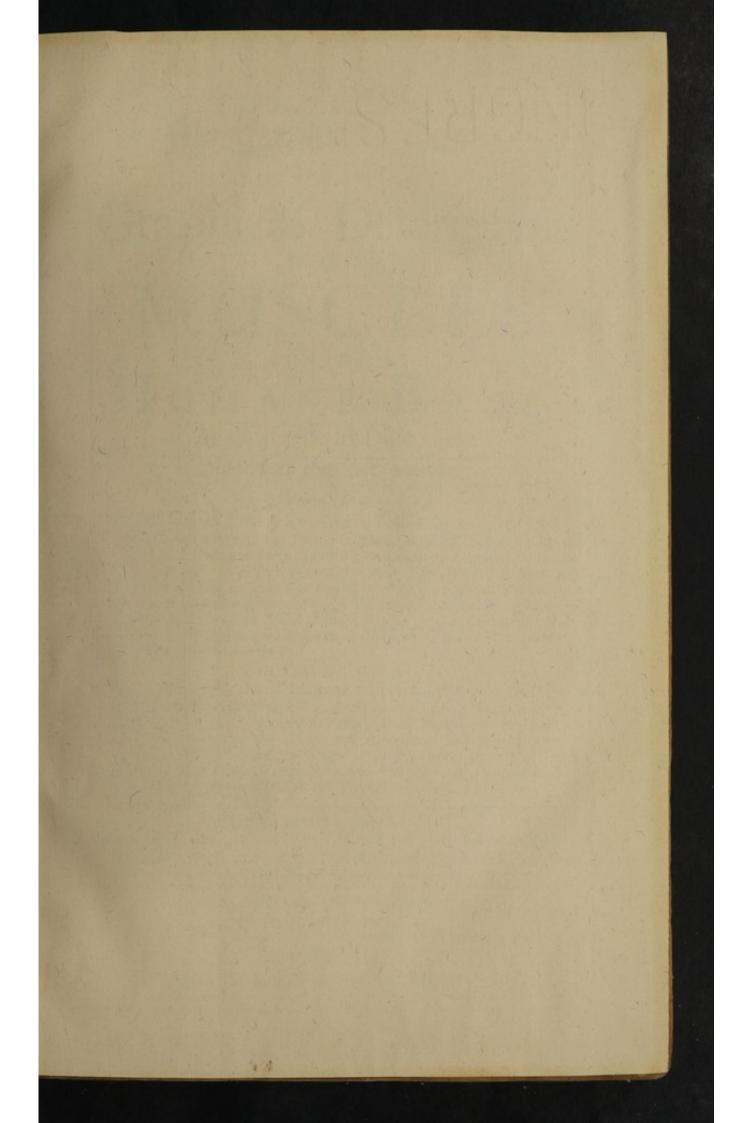


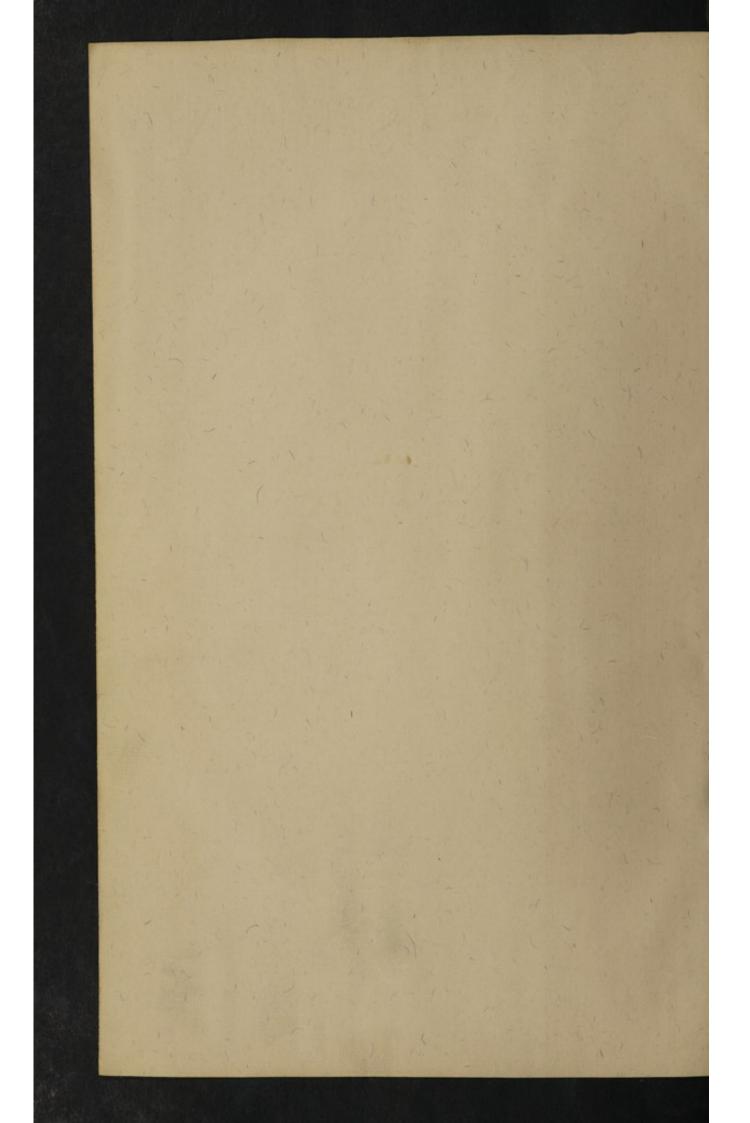


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Myographia Nova:

OR, A

Graphical Description

MUSCLES

INTHE

HUMANE BODY,

As they arise in Dissection:

Diftributed into Sir Lectures.

At the Entrance into which,

Are Demonstrated the proper Muscles belonging to each Lecture, now in General Use at the Theatre in Chirurgeons-Hall, London, and Illustrated with Two and Forty Copper-Plates accurately Engraven after the Life, not only with their Names, but their Vses, fairly delineated on each Plate, as much as can be exprest by Figures; with an Explanation of their Names throughout the whole Discourse; as also with their Originations, Insertions, and Vses, at large, in their proper Descriptions, and various useful Annotations, and curious Observations both of the Author's, and other Modern Anatomists.

TOGETHER

With a Philosophical and Mathematical Account of the Dechanism of Duscular Dotion, and an Accurate and Concise Discourse of the
Deart and its Ase, with the Circulation of the Blood, &c. and with a
compleat Account of the Arteries and Veins, as to their outward Coats,
proving them to be made with Circular Fleshy Fibres, by whose Contractions their Trunks become Narrowed, and the Fluid Particles of the
Blood are sent forwards into all the Parts of the Body.

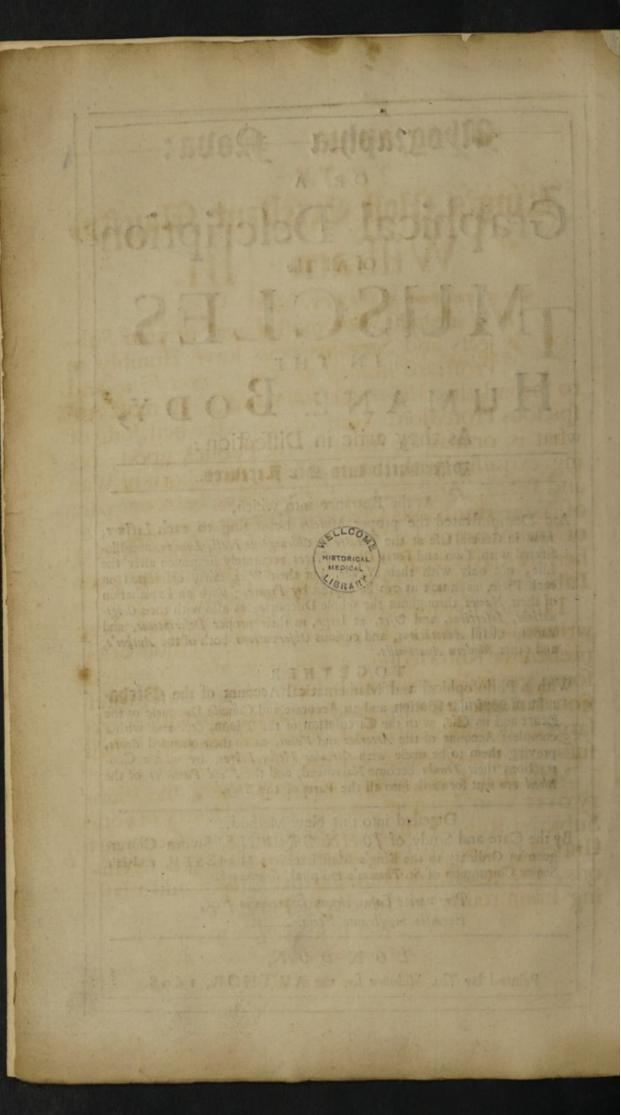
Digested into this New Method,

By the Care and Study of JOHN BROWNE, Sworn Chirurgeon in Ordinary to the King's Most Excellent MAJESTY, and late Senior Chirurgeon of St. Thomas's Hospital, Southwark.

Per varios Casus Artem Experientia secit, Exemplo monstrante Viam.

LONDON,

Printed by Tho. Milbourn for the AUTHOR, 1698.



TO THE

King's Most Excellent Majesty, William III.

May it please Pour MAJESTY,

HE meanest, but most Loyal of your Subjects and Servants begs leave Humbly to Prostrate himself at Your Sacred Feet, and to shroud this Muscular Treatise under Your most Auspicious Protection: Your Majesty is the best Judg of what is, or may be useful to the Publick good; being exquisitely skill'd in all the Arts both of War and Peace: And since it hath always been one part of Your Illustrious Character, to be an Encourager of Industry, and a Favourer of Ingenuous Arts, I hereby have been emboldned to present my poor Labours to your most judicious View.

I am not so vain as to imagine that what I have here written, will make any addition to Your most Comprehensive Knowledge; if I shall be able to correct some gross Errors, which some of my own profession have fallen into, and in some Particulars enlarged the boundaries of Anatomical Science, I shall

fufficiently have attained my End.

May that God, who hath given you the Victory over your Enemies, as well as the Hearts of your Subjects, still continue to prosper your Generous Undertakings, to Heal Our Breaches and Divisions, and at last, to Your Earthly Crown add a lasting Immortality, is the dayly Prayer of,

YOUR MAJESTY'S
Most Loyal Subject, and most Obedient Servant,

JOHN BROWNE.

TRactatus hic, cui Titulus, Myographia Nova; Or a Graphical Description of all the Muscles, &c.

IMPRIMATUR:

Thomas Millington, Præses,

Thomas Burwell,
Richard Torlesse,
William Dawes,
Thomas Gill,

Datum ex Ædibus Collegij nostri, Sept. 27. 1698.

I Conismos hosce Anatomicos, de Universis Corporis Humani Musculis, tâm in Situ Naturali, quam extră situm positis; cum eorum Nominibus, Usibusq; nec non propriis cuique adjunctis, Summo Artificio, à Joanne Browne, Regio Chirurgo Ordinario expressos, ad vivum delineatos; und cum Tractatu Cordus, Circulatione Sanguinis, Motu Musculari, variisq; Observationibus de Arteriis, & Venis, & C. Omnibus Anatomes Studiosis, Omnibusq; Medicine, Chirurgiaq; Tyronibus, perutiles esse Judicamus.

Samuel Collins, M. D. Socius & Elector, Nuperq; Præses Celeberimi Collegii Medicorum Londinensium Anatomes, Chirurgiæq; Professor Lumliensis.

Thomas Gardiner, Chirurgus Serv' ad Regem, ejufq; Chirurgus Domesticus Ordinarius, & Societatis Chirurgorum Londinensium Magister.

Thomas Liebfield, Chir. & ejustdem Societatis Guar-dianus.

Thomas Page, Chir. William Layfield, Chir. Roger Knowles, Chir.

Ejusdem Societatis Chirurgorum Londinensium Gubernatores.

ILLIAM the Third, by the Grace of God; KING of England, Scotland, France and Ireland, Defender of the Faith, &c. To all Our Loving Subjects, of what Degree, Condition or Quality foever, within our Kingdom and Dominions, Greeting, Whereas it bath been manifested unto Us, that Our Trusty and Well-beloved JOHN BROWNE, Esq; one of Our Chyrurgeons in Ordinary, bath not only with great Art, but at the Expence of much time, Delineated, Described, and Accurately Engraved in Copper Plates, A Graphical Description of all the MUSCLES in Humane Body; which Performance of His, is to Our great Liking and Satisfaction: So that We may express Our Approbation thereof, and give them all due and ample Encouragement for the future, We do hereby signific Our Royal Pleasure, Granting unto the said JOHN BROWNE, the sole Priviledge of Printing the aforesaid Treatise, with its Copper Figures Accurately Engraved after the Life, with their Names on the Muscles, &c. And strictly Charging, and Forbidding all our Subjects, to Copy or Counterfeit any of the Sculptures or Descriptions, either in great or small, or to import, Buy, Vend, Utter or Distribute any Copies, or Examplers of the same Reprinted beyond the Seas, within the Term of Fifteen Years ensuing the Date of this Our Licence and Probibition, without the Consent and Approbation of the said JOHN BROWNE, bis Heirs, Executors, or Affigns, as they and every of them so offending, will Answer the contrary at their utmost Perils: Whereof, as well the Wardens and Company of Stationers of our City of London, the Farmers, Commissioners, and Officers of Our Customs, as all other Our Officers and Ministers whom it may concern, are to take particular Notice, That due Obedience be given to this our Royal Command. Given at Our Court at Kenfington the 25th. Day of October, 1696. in the Eighth Year of Our Reign. By His MAJESTY's Command,

WILL TRUMBULL

Last only broaded des since some some sing and Subjected to Copy or Secretified my of the Salara or Deferrance, richer in grave to landiffe, to land large Transfording the Love of the time to the John Browns, Fritziel Senioners of the contract of the stitume

To the Rt Honourable Robert Earl of Sunderland,
Baron Spencer of Wormleton, Knight of the
Most Noble Order of the Garter, and One of
the Lords of His Majesty's most Honourable Privy
Councel.

MY LORD,

SI have spent a great part of my Life, in considering the Structure, Actions, and Uses of all the Muscles in Humane Body, which have been as well delightful to me in the Contemplation, as very useful to me in my way of Practice; So I am not without some Hopes, that my Labours may find a favourable Reception amongst all the Ingenuous Lovers of these Studies, but especially with the men of my own Profession, to whom the Knowledge of this part of Anatomy is so absolutely necessary, that they can neither skilfully nor fuccessfully perform many Operations in Chirurgery without it: And tho' My Lord, after all my Care to improve and finish this Undertaking, I am sufficiently sensible, how unworthy this my last Performance, is to have Your Great Name prefixt before it: Yet I have no Reason to doubt of Your Lordsbips candid Interpretation of what I have done, craving no Protection against the Detraction of those censorious Persons, who think to raise themselves upon the Ruines of other mens Credit and Reputation, and to be taken for more fagacious Men, than their Neighbours, by cavilling and fnarling at other mens Works, without making those fair and equitable allowances which all men, who are liable to be mistaken, ought to do to one another: To whom I shall therefore apply that of the Poet Martial.

Carpere vel noli nostra, vel ede tua; Either desist from carping Ours, Or let the World see what are Yours.

If indeed within the Compass of this Epistle, I should attempt to give Your Lordsbips Character to the World, with which it is so well acquainted already, I should justly incur the Censure of Greater men, than the Criticks I have to deal with; fince scarce any thing I am able to fay on this Subject, but would fall short of a true Description of your large and comprehensive Knowledge in general, and how well you understand the State and Interest, Strength and Policy of all the Kingdoms of Europe in particular, and what Measures are most proper to be taken, to keep the Ballance even amongst them. His present Majesty, the best Judge of Merit, by rewarding your Concern for the fafety of your Country and his Service, has openly justifyed your Conduct to the World, and therefore I am secure from the Imputation of being bribed into Flattery, whilst I only deliver the Sentiments of so Wife and so Great a King.

It would be injurious to the publick Good, to detain Tour Lordship any longer from Your weighty Bufiness and important affairs; if what I have writ and exposed to publick View, may afford Tour Lordship any Diversion at Your leasure Hours, and in some Measure answer the Encouragement of so Noble a Patron, I shall think my self both highly honoured and rewarded for my Pains, and shall omit no Op-

portunity of testifying how much I am,

MY LORD,

Your Lordships

Most Faithful, and most Obedient Servant,

JOHN BROWNE.

THE

PREFACE.

Kind Reader,

Know it has more than once been disputed, whether an Author may be allow'd a Competent Judge of his Own Writings; and that tho as to the Building and Contrivance, he may be in the right; (that being the Employment of his Own Genius) yet the Ornamental part thereof, as it is the Brat of Fancy, receives but a very small measure, if any at all, (either as to its own Merits or Failures)

from the Judgment.

And fince I every where find, that he is not to be accounted an Unprofitable Member of a Common Weal, by whose Care and Study others may be rais'd, and enlarge on the same Subject with much more Perfection: And tho' I may come abroad once more with an Aye not agreeable to all Humours (well knowing that it's easier to divert than please) the first darting like Flashes striking on the Fancy, whilst the other more readily yields to the Severity of Judgment and Censure : Yet in this I am satisfied, as I have not Concern enough in me to write any thing in my own behalf, or defence, fo shall I not study the Gratification or Itch of any Adverfary whatfoever. And tho' I am readily convinc'd, that the best of Authors may sometimes mistake, after his greatest Care and Study, yet I do by no means think him the better Man, that makes this an Advantage for carping at him: Altho' I must confess, we live in an Age so critical, and fo fevere, that even the Softest Ayrs are unpleasant to some forts of People, and very barsh and untunable to the Ears of others. And fince I am well fatisfied, that it has been my Misfortune to meet with some Enemies of the Plaister-box, who with no small Considence have spread abroad, (in hopes of doing me an Injury) that I am not Master of that which I print under my own Hand and Name: Yet I can tell them, tho' I may want Wit and Parts to illustrate my Writings, as some Men may do, yet I have more Honesty than to impose upon the Publick, or break into any Man's Province without his Leave; in that where-ever I have made use of any Author in this my Discourse, I have nam'd him either in the Elenchus or Description, or in my Observations, where there have been most occasion to mention him.

And fince nothing but a Command, which I could not reasonably disobey, could have given me fresh Courage of coming abroad with this Last Edition of Muscles, I could not think my Duty fully paid, till I had comply'd with the Desires of those Venerable, as well as Learned Men, who have engag'd me in it. And tho' in its self, I am well satisfied, it may earry but little Merit to secure it from the snarling of Criticks, (with whom it's as natural to bark as to breath) yet being under the Umbrage of so Impartial Judges, I think both it and my self happily shelter'd by those, who best understand whether it carries any Intrinsick Value in it,

or not.

Having brought my felf thus far into the Preface, my next Defign is; to enquire into the Subject matter of the subsequent Discourse, and that is, The Anatomy of Human Body, or, The Description of the Muscles of that Man, whose First Founder and Builder was the Almighty, who gave this Epitome of the World, that living Fountain of Blood and Spirits, which was fufficient to water and bedew all its parts with Warmth and Life throughout all the Stages of Life: That Man, whom the Great Jebovab breath'd Life into his Nostrils, and made him a living Creature; he that from the first was made the Prince of the Universe, and the Great Comptroller over all other Creatures, to whom all other Beings do pay their Obedience, and from whom they receive all their Measures and Boundaries of Government and Uniformity: That Man, who had at his command all the sublunary Bleffings he could wish for, and what his Soul could defire: Yet this is the fame Man, who (by his Fall) hath made himself the true Son of Sorrow, the Patron of Difeases, and the Subject of Outward Accidents. For, should we again take this Great Man, under his most flourishing Capacity, and allow him Master of some Thousands of Acres; what tho' he is daily transported with the pleasant Harmony of Philomels, finging pleafant and melodious Tunes in his Woods and Groves, and could challenge all those innocent Masters of Musick to divert him at pleasure; tho' he may glut his Senses with Variety of Sweets ascending from his own Gardens, and may live in a fine Palace curiously set out with the Embraidery of delightful Tapestry, yet not one of these will yield him any relief in the sharp pains of the Gout, or quit him from One Fit of the Stone, or the Collick. Nay, how oft have we seen many Great men, otherwise carefs'd with these Mundane Bleffings, even become their own Prisoners, and close chain'd to their Beds of Sickness, in the midst of their Enjoyments; and under the name of living, have shrivel'd out their Blood and Spirits into a Series of creeping Distempers, and by Time and Sickness have become nothing more than walking Skeletons? How oft have we feen Toung, tho' Great Men, who have just arriv'd at the flower of their Age, and the wish'd for fruition of their Fortunes, who in a few days have been fent to the dark Chambers of their Graves, by the Violence of a surprizing Fever, whilst others at once have been dash'd to pieces with the fudden stroke of an unexpected Apoplexy? This is the very Man, while living, that we do make it our Care and Study to keep up in repair from Diseases, and secure from Accidents; and whose Muscles, when dead, we presume to dissect, and describe in this our following Discourse.

And fince Reason and Experience have ever been the two substantial Legs on which all Men of Arts and Sciences have rais'd the Compage and Structure of their Studies; so also have they, in all Ages, been granted the best Supporters of Medicine and Anatomy. And since it is generally allow'd, that Experience makes an Artist, and that Reason gives him a Perfection, so of consequence it must be granted, that both together qualifies

him for the advantage of observation.

And because the opening of one Body is not sufficient to discover to us the inward and outward parts, as they are truly situated, or variously planted, History hath been so much our Friend, as to collect various Observations for our Improvement; where, by the use of the Knife, and the opening of many Bodies, we aslength of Time are seen to arrive at some Mastery in the Art of Diffection.

And whereas Galen assures us, that Experience is truly purchased by frequent Observation, and carefully retaining those things which appear to our view, (it being almost impossible for us to forget that which is so oft reiterated to us) so can we not properly allow that to be Experimental Knowledge, whose Singulars are not accompanied with a frequent Observation, made good to us either by Inspection, Autopsie, or a Transition to the like. Hence was it that the same Galen affirms in another place, that Observation doth preserve the Memory; that Memory sets Experience to work; and, that both together being rightly weigh'd and manag'd, do give the first step to Art. And indeed, it is from hence that so many excellent and useful Observations have been drawn from the due exercise and proper use of Medicine and Anatomy, especially where the Causes of Di-

feafes have been obscure, or the Cure thereof difficult.

And whereas Quacks and Emperical Pretenders do generally boalt, that Experience is the Fortunate Mistress, which has all-along conducted them with Security in their Practice, Men of Learning have never thought it a Crime to make use of Reason, as well as Experience, both in their Studies, and in their Practice; they very well knowing, that Experience hath sometimes fail'd, where it hath not been back'd and supported with Reason. And this made Seneca, lib. de Benef. 6. cap. 18. affirm, "That there are "many Fortuitous Cures, or Cures done by Chance, which in no respect "ought tolerably to be allow'd Remedies, any otherwise than we grant him who is troubled with an Ague cur'd by being surprizingly push'd into the Water, where the Fright more properly may be said to be the "occasion of his Cure, than any certain Remedy for the same. The same may be faid of Quacks in Anatomy, when we can fee bold Pretenders, who fearce knows a Muscle from a Cockle, shall with more Confidence than Skill undertake those difficult Cases, which Men of Art do refuse to be concern'd with. Such are most of our Mountebanks, who do undertake to Couch Cataracts, and yet are altogether as ignorant of the Fabrick and Make of the Eye, and of its Muscles, Coats, and Humours, as are those they so confidently undertake to Cure. But this ought not to be said of all Men, who undertake this Gurious Art of Couching; for We, at this day, have a Countryman of our own, fo Expert, and fo Dexterous at this Art, that no French-man, or any other Outlandish Pretender whatsoever, can be allow'd to perform that Operation more dexteroufly, or more fafely, than himself; and this is Mr. WILLIAM READ, Sworn Oculift in Ordinary to His Sacred Majesty; it being as a Signal of His Royal Favour, in encouraging fo Curious a Hand in to Admirable an Art, who, in the presence of divers of His Majesty's Physicians, and others, hath and does perform this Operation daily, with great Success and Reputation.

But to profecute our intended Defign: Since we find that Nature's Treasury is never to be exhausted, altho' new matter daily presents its self to our consideration, whoever is conversant in Dissection will find, it is an Advantage well worth his Care, and his Study; for, without it, many things would have been in doubt, and judg'd uncertain, if Light had not been borrow'd from hence, by evident Demonstration, and by

Reason, which Experience authorizeth.

And fince it is as natural as modest, for every Man to give the Palm to him who best deserves it, and that it is the Law of all Nations, to give Honour and Justice to those, who by the Sweat of their Brows, and

their

their unwearied Labours, have commanded our Veneration; fo in this I shall no ways be wanting of paying a due observance to their Names, whose Industry and Disquisition requires our Applause. And since most Nations have had a Share of thele Fortunate Discoveries, and some more famous for finding out the Uses and Offices of the Parts in general, whilst others have employ'd their Studies in making excellent Observations on the fame; fo in either, our own Countrymen have not come short of any: And tho' they have it as a Proverb beyond Sea, that we Englishmen are better at Transcription than Invention, it being much easier to transcribe and copy, than to invent and improve; yet I can tell them, We have as good Stars in England, as they can pretend to elfewhere, and which have given as great Light into Medicine and Anatomy, as any other Country or Nation whatfoever.

And tho' in former Ages, for Anatomy, Baubine, Valverdus, Laurentius, Vesalius, Veslingius, Placentinus, Spigelius, Riolan, Fallopius, Columbus, Remilinus, Bartholine, Wallaus, Cabrolus, and the like, were all esteem'd Great Masters of the Knife, and Most Exquisite Anatomists; so, fince their time, the Study both of Medicine and Anatomy hath been much more cultivated, with much greater perfection, by the curious Endeavours and industrious Labours of Borellus, Swammerdam, Stene, Bilfius, Regnerus de Graaf, Diemerbroeck, Du Verny, and others. Where we may observe, that scarce few or none of them come abroad without

mentioning our English Worthies.

Have not the Renowned Harvey gain'd an Immortal Fame all o'er the World, for his first finding out the Circulation of the Blood, and his noble Discoveries about the Generation, ex ovo? In what Veneration and Esteem was Sir Theodore Mayern, in all Schools and Universities beyond the Seas? How great was the Name of Sir George Ent amongst them ? How acceptable was Dr. Needham de Formato Fætu ? what general Esteem Wharton de Glandulis, and Glisson de Hepate? What Veneration has all Willis's Works? And how highly valu'd is Lower de Corde, Charlton's Oeconomia, &c. and Briggs's Ophthalmographia ? All which are English Originals. What Venerable and Renowned, as well as Learned Readers, have we had, both in the College, and in our Anatomical Theatre at Surgeons Hall, even to the wonder of other Nations, and to the great honour and satisfaction of our own, who, while living, wore the Cap and the Gown, as the Glories of their Faculties, and now dead, have their Memories bloffom in the Beds of Fame? among whom (in my time) were the ever to be celebrated Sir Charles Scarborough, Dr. Needham, Dr. Tern, and Dr. Croun; and now Dr. Browne and Dr. Tyfon, both which have much encreas'd the Honour of Anatomy by their Learned Lectures both on the Muscles and the Viscera, in that it's not only become a great fatisfaction to those who have the honour of hearing 'em read upon Dead Bodies, but a greater pleasure to those who understand 'em. Nor are our Physicians less admirable and eminent than Others, in their Physical Books, where Willis, and Browne, and Sydenham, and Gliffon, with feveral others, are allow'd to out-do any that have writ on the fame Subjects before them.

And tho' there have been made many Efforts, and happy Essays, about the Nerves, and their affording and communicating their Juices and Animal Spirits to every Muscle of the Body; and tho' it is as evidently understood, that every Muscle is supply'd with Arteries and

Veins

Veins, to import and export the Blood throughout all parts of the Body, and that notwithstanding the great Borellus, and many other Ingenious as well as Studious Artists, in our time, have bid fair for fresh Notions, and natural Conjectures; how the Nerves and Arteries do furnish the Muscles with Spirits and Blood; and how the Veins and Lymphaducts do fend back the Bloods Superfluities and Lympha from them; and that the Branches of these Vessels being so minutely distributed throughout each Muscle, having their terminations so small, and so thin, and fo subject to rend, that it is a matter of no small difficulty to trace them to their terminations and infertions. And tho' many other things in Anatomy have been found out purely by the benefit of Microscopes, scarce otherwise to be discover'd by the naked Eye, yet, at this day, I could never read or hear of any that have found out, much less traced these Vessels to their infertions, altho' oft-times attempted, and carefully profecuted, by the help of any Microscope whatsoever. Now, that both Nerves, Veins, and Arteries are most certainly distributed into each Muscle of the Body, is a Truth beyond contradiction; and if fo, it may reasonably be allow'd and suppos'd, that these their small Capillaries are interwoven and intermix'd with each other before they do terminate; and if this be granted, then what Borellus and others write hereof, it cannot be fuppos'd an Absurdity to allow, that they may terminate in Glands; and that if the ends of these Vessels be so small, and so thin, as not to be shewn by the best of Microscopes, the Glands also, which are made out of their Terminations, must necessarily likewise be very small, and very fine, and by the same reason not to be traced or found out by the help of any Microscope. Nor will it feem irrational for any one to allow that these Vessels do thus terminate, since, as I said before, the Glands are made out of their Terminations, between which is kept up a certain Communion with each other in these small Bodies: And if a Gland, as is well observ'd, doth confift of an infinite number of very minute Veffels, and if the branches of Veins, Nerves, and Arteries be divided before they terminate into an infinite number of most invisible Twiggs, (as is most certain they do) when from any one Twigg of each fort is derived a vast number, and all these so derived, are mix'd and interwoven one with another, why may we not allow, at least metaphorically, fince in their distributions they do imitate the Composition of Glands, that they do terminate in small Glands. And thus far has the matter been driven by Bolton, and others before him: I hope this may four on others, in making a farther progress in the tracing them out towards their Infertions and Terminations. I shall only touch upon some further Annotations relating to the Nerves, Veins, Arteries, and Tendinous Fibres mention'd in our following Difcourfe.

I begin with the Covering of the Brain, which is no otherwise than a contexture and co-unition of many small Glands, who have their Blood allowed them from the Arteries, and Veins; by which they do discharge the same; having also granted them Excretory Vessels, whence issues this their Liquor, which is separated from the Blood, where they are seen to gather and encrease in little Bundles o'erspreading these Membranes, which as they are advanced in the Body of the Animal, they do divide themselves into various Branches, and spread themselves all over it, so that there is scarce one part thereof freed from them. The Nerves al-

to are so closely intertext, and so dexterously intermixt in the Body, that Anatomists call these intertextures Plexus, or Webbs, they being plainly view'd dividing themselves into various Ramisscations, the use of which Nerves is, to dispense and distribute a Liquor which does bedew all the Fibres of the Body, even to their terminations; which Liquor, without all question, is form'd out of the most subtile and volatile parts of the Blood, and generally goes under the name of Animal Spirits, from its

Subtilty.

And whereas we readily fee that the greatest part of the Nerves do end in carnous or fleshy bodies, which are cover'd over with fine Membranes, which faid bodies we commonly call Muscles, so must we grant, that thele Muscles have both Arteries, Nerves, and Veins allow'd them; but how these are rank'd in them, is worthy our remark and observation. They at first appearing to our view as so many collective Bodies, run as it were into one Chord or String, whilst at other places they are found more loofe, and kept at a distance, especially where they take in their Arteries and Veins, after which also they plainly appear to grow closer again, and in the end do form a Tendinous Chord. The first and second or these we commonly call Tendons, or the Heads and Tails of Muscles; whilst those parts which are more loosely made, and into which both the Arteries and Veins do disperse themselves, are more properly call'd, the

Bellies of the Muscles. I having thus touch'd upon the Nerves, Arteries, Veins, and the carnous parts, with a relation to the Tendinous Fibres, we shall next look into those Fibres which are seen to run parallel in all these Bodies, where we may find, as they are implanted into them, they do frame an obliquangular Parallelogram in the Body of the Muscle, whilst the other Tendons, which are more closely put together, do naturally refemble two Strings drawing this obliquangular Parallelogram to its opposite fides. And whereas the Tendons of Muscles are nothing more than the connexions and meetings of fimple Fibres, which we commonly call Tendinous Fibres, fo the Interspaces made in the Belly of the Muscles are all of them fill'd with Arteries and Veins; and hence arifeth the difference of their colours, for that as the common colour of the Tendons of the Muscles is usually of a whitish brown; so their Bellies for the most part appear red, which redness of Flesh in these parts is no otherwise occafion'd, than is that of a Glass fill'd with red Wine, in that as the Glass is made red by the colour of the Wine put into it, fo also does this Flesh become reddish by the Blood that it constantly receives from the Arteries and Veins belonging to it; all which will plainly appear by injecting warm Water into the Arteries and Veins, whose Branches being plentifully disperst throughout these sleshy parts, altho' they allow it that reddish colour it plainly feems to bear, yet by frequent injecting into the faid Vessels, as I said before, and repeating the same, you will evidently difcover the redness to abate, and lose its colour, and at length naturally express the same colour with the other parts of the Tendons.

Nor are the Muscles made of Arteries, Veins, and Tendinous Fibres only, but have Nerves also given them, which branching and passing into their outward Coats, are fometimes feen to reach the Tendinous Fibres, and the Tendons themselves; yea, many times they are found to be inferted into the very Bodies of the Muscles: And Borellus allows it as a

gene-

general Observation, with many other Excellent Anatomists, that let 'em enter into any part whatfoever, they commonly are feen terminating with the Tendinous Fibres: And whereas it is farther allow'd on all hands, that these Tendinous Fibres have Cavities in 'em, like that of a Pipe (altho' this is not apparent to the Eye) yet Reason and Experience do both convince the same, in that when we allow a Muscle to act, we apparently discover its Fibres become shortned, and its self at the same moment becomes thicker. Nor indeed can we conceive how flexible Fibres can encrease and grow larger, and yet become shortned at the same minutes were it not that somewhat of Liquor must pass into their Interspaces, which, as it goes along or enters, may be allow'd in time to reach its terminations. And this is hence further made good, in that when each Tendinous Fibre receives a Branch of a Nerve into it, and this Branch communicates Animal Spirits into the Cavities of the faid Tendinous Fibre, and these Animal Spirits are the most subtile and agitated parts of the Blood; whenever therefore these are suppos'd to enter the Cavities of the Tendinous Fibres, they fill them so as to shorten them; even as Air which is blown into a Bladder is feen both to fwell and shorten it at the fame time. And then again, if we confider that the Belly of the Muscle is plentifully stor'd with Arteries and Veins, we cannot allow, that the Tendinous Fibres can be rais'd or fwell'd without compressing or lessening the Cavities of these Arteries and Veins: Whence it consequently follows, that the Blood must be propel'd and discharg'd out of them. And as a Conclusion to the whole, it's frequently observable, that when the Blood stagnates in the Arteries or Veins, the Tendinous Fibres have not Force or Vigour enough from the Animal Spirits to cause any farther propulsion of the Blood; and the want of which doing is the only occafion of their not being any longer dilated or shortned: And hence we may therefore presume to propose, that there are two things plainly requir'd towards the raifing these Tendinous Fibres of the Muscles; first, that the Animal Spirits must have their free course through the Nerve entring the Muscle; for daily Experience makes good, that where any Nerve is cut, or bound up very tite, the Muscles which receive any Branches from it must certainly become flaccid; nor can you make its Fibres ever fwell by your best Tryals of Skill you can make. Next, that the Blood must have alfo its free course through the Arteries and Veins belonging to the Muscles; for fince the Tendinous Fibres cannot be dilated without pinching or ftreightning the Arteries and Veins, and these cannot be streightned with out voiding or discharging their Blood, it must hence follow, that if the Blood stagnate, or makes a stop here, it must prevent the raising of the Tendinous Fibres. Again; the Tendons of the Muscles are for the most part fasten'd to some Cartilage or Bone, and this is the Reason why the shortning of the Tendinous Fibres makes one part move to that, to which the faid Tendons are fasten'd: Thus, when one part of the Tendon is fasten'd to an immovable part, and the other is annex'd to a movable part, it must necessarily follow, that whenever the Muscle is shortned, the movable part is brought to the immovable: And whereas there is fearce any motion in a part which has not allow'd it its opposite motion, so is there scarce a Muscle in the Body, but what has its Antagonist; and, as a general Rule amongst Anatomists, it is observed among these Antagonistical Muscles, that when one is shortned the other is extended, in that the shortning of the Muscle which acts must necessarily produce an extension of its Antagonist, or of that which acteth not.

Having thus clear'd up the Parts of a Muscle, and shewn you its true Uses and Operations, what remains, we recommend to the Reader in the Body of the Book, where he will meet with the Advantage both of the Names and Uses of every Muscle properly described in one view, as much as can be exprest by Figures; with an Excellent, and Philosophical, and Mathematical account of Pouscular Potion, with the Use of the Heart, and Circulation of the Blood, &c. the Whole being adorned with various Eminent Annotations, and Curious Observations, for the benefit of every Student, and such others, who may delight themselves with these Anatomical Studies. If the Reader perchance may meet with any Slipps, either from my Pen, or the Press, throughout the Whole, he is desired to make a favourable Construction on them, or pass them by, without any Malicious Contrivance, or Invidious Research

From my House, at the Golden Key near the Mews, at Charing-crofs, July 12, 1698.

Vale.

To my very much Esteemed Friend,

Mr. JOHN BROWNE, Sworn CHYRURGION to His MAJESTY,

On his MYOGRAPHIA NOVA.

SIR,

NATOMY, wherein you have so excellently well adorned your Province, is not only of great Use in Chyrurgery and Medicine, but also in some

parts of Phylosophy; and is moreover subservient to Religion.

Its shews its Phylosophical Usefulness, when it demonstrates by how admirable and divine Mechany the Animal Fabrick is raised; and when it explains the Power, and the wise Conduct, by which the whole Oeconomy is managed: Which indeed is so wonderful, that from thence the excellent Physitian and Naturalist, Galen, found himself obliged to rise up into the most sublime Praises and Admiration of the CREATOR. Hence his Books, which were written de Usu Partium, are clearly a Divine Hymn or Song, by which he celebrates the immense Wisdom, Providence and Goodness of the Almighty.

So that the Knite and Lectures of a skilful Anatomist, cannot but preach Religion even to the very Atheist, when he sees the stupendious Make of Living Creatures, when he consider the Subtilty, the Variety, and wise Contrivance of Parts in the most minute, as well as in the largest Animals, by which all their inward and outward actions and Motions, their Sounds, their Voices and Words were formed and exerted. All which, nothing less than an Omnipotent Being could Effect.

For the Prattle of the Roman Effigies, called Citeria, the Utterance of Words by the Earthen Head of Albertus Magnus, or by the Brazen Head of Roger Bacon, were, tho' subtile Artifice, but faint Resemblances: And the Articulate Speech, together with the raising and resolving of proposed Questions by the American Parrot, was plainly Diabolical, and therefore not from Animal Sense or Energy.

The Flying of the Wooden Pigeon of Architas, or of the Wooden Eagle of Regiomontanus, which took Wing (if I may so say) and mounted up into the air, and shewed the Emperor, who was then going to Norimberg, the way thither: The Walking of the Statues of Dædalus, and the Steps of the Iron Image in Africa (which advanced several Paces to make its Address to the King of Morocco, and with bended Knees presented a Petition to him in behalf of the Artificer) were all (as most other Automata are) ingenious Contrivance, but yet very imperse Imitations of Living Nature, accomplished by Weights and Screws, and Wheels, or by Quicksilver, and the subtile Vapours of Inanimate Spirits.

But the most exquisive Art cannor frame such Instruments, and insuse those internal Powers into them which are necessary for Animal Actions: Nor is Nature (which is only Matter and Motion) able, without the Instuence and Direction of a living Spirit, to excite their spontaneous Motions: Neither sould such a Spirit be originally made, but by the Hand of God, who in the beginning, made the Seed of all Bruits of an Atherial and Fiery Matter, and the Soul of Man of a Supracelestial Essence.

Now Anatomy is able to flew us, that not only in the Seeds of Vegetables, but in the Seeds of Animals also, the individual Species is compendiously and actually couched; and by consequence, that all Generation is still the Work of the CREATOR, who made the orft Seed.

So that your Anatomical Administrations, are more Theological than every one imagines, and do elegantly display the Wisdom and Art of the Divne Potter,

who formed the beautiful Statue of Man out of Clay.

And not only those Muscles which enable the Mouth to Speak, and the Hands to write, but all of them (which were so wonderfully made by God, and are so neatly deli-

neated by you) do empower and instruct us to speak and sing Hallelujahs.

And they induce me to esteem and praise this your Mulculary Tract, wherein by imprinting the Name upon, and adding the Ule to each Muscle, you render the Study of this part of Anatomy So easy and delightful, that not only Students in Medicine and Chyrurgery, but also Ingenious Gentlemen, who are curious, and desire to uns derstand how they Move and Act, will be incouraged to enquire into it, and to study it.

They will be pleased with the Contemplations which Muscular Motion may raise and suggest unto them; and will admire the Arguments that some Animals, which we commonly call Irrational, do frame by the managment of their Muscles, to

prove their Right Reasoning.

So the Wolt-Fish, when he perceives the Design of the Fisherman, and the danger of his Nett, shoots to the bottom of the Water, and furrows the Sand with his Tayl, till he hath lodged himself in it below the reach of the Nett.

So likewife the Pontian Fox, who lives by his Wit, when he fees a Booty near, claps and involves his Head between his Legs, and erects his Tayl, and bends it at the Top, so as to make the Resemblance of a Bird, by which he emboldens the Fowl to approach him, as one of their Kind, and so makes them his Prey.

So that they feem to confirm the Opinion, that the Supream Faculty of the Huimane Soul; and that which diftinguisheth Man and Brute, is a Mind (a Power above that of Rational) capable of Supernatural, and Heavenly Contemplation, Gc.

But there is a more surprizing Consideration of the Muscles, that without the Use and Motion of that admirable Engine, the Hand, Mankind would quickly lofe that Dominion which God bath given him, over all other Animals: His Strength would not defend him from the Sting of Punees, nor his Wildom guard him from the Infults of an Aye, or the Kicks of an Als: The wild Beafts would bunt him, and make him their Game, fo that he would in the next Generation, ceafe to be, or become as it were a Bruite.

In Sum, whether we respect the useful, or pleasant Knowledge of Muscular Motion, 'twill be highly Satisfactory to the Studious; therefore this your Ingenious and Curious Way of exposing it, merits both publick Air and Eulogy, which is the just

Sentiment of a Lover of your Art and Industry.

Edmund Dickinson, M. D.

Lately Physitian to the Persons and Families of King Charles II, and King James II.

To His Worthy Friend,

Mr. JOHN BROWNE,

Sworn Chyrurgeon to His Majesty.

SIR,

Have at last Answer'd your Desires in this Impression, the there was no need of it, after our learned President and Censors, and those other worthy Physicians had recommended it to the Publick. I confess, the representing the Names of the Muscles in the Humane Body, and their Ules in one View, may be of great Advantage in your Profession, and deserves Incouragement: But as it leads to higher Considerations, I am oblig'd to commend your great

Industry.

The peculiar Frame and Uses of the Muscles in Man (particularly of the Hands) are wonderful, as they are requisite not only in the fine Operations of your Art, but also in Agriculture, Navigation, Writing, Manufacture, Building, and all forts of Mechanic Arts, (which the Brutes are not capable of) to which the exquisite Fabrick of those * of the Legs in some of these assist. But besides, * In Tabi the Formation of the Lumbricales and Perforantes in the Hand (de- 36, 37. fcrib d Tab. 22, and 24.) was requifite in the fine Stops of the Orpan, and other musical Instruments in the Service of the Great Creator, as the Muscles of the * Tongue and Larynx are subservient to * In Tabi those Hymns and Praises we duly offer to him; whereas the Beasts 8,9,10. (who were not designed for that Harmony) have only one particular Note to call to their Kind, or be distinguisht by. It was the Consideration of this, that made Galen so sensible of the admirable Oeconomy of the Body in his Trast de Ulu partium; and Mr. Hobbs confesses the same (Lib. de Homine Cap. 1.) where representing Epicurus's Opinion, about the Autochones or Terrigenæ, he is ashamed of it, (as I also knew by his Conversation); and, like a Convert of the more learned Harvey on that Subject, as to the Formation of the Focus, and its Nourishment afterwards by the Breasts, ends the Chapter in these Words; Qui machinas omnes, tum Generationis tum Nutritionis satis perspexerint, nec tamen eas a Mente aliqua conditas ordinatalq; ad lua qualq; Officia vide. rint, ipli profecto fine mente esse censendi funt.

The Make indeed of the Parts of the Humane Body, at first view, is very surprizing; and the rude Dissections in the time of Galen, the Inspections of the Viscera, and the Sacrifices of the dark Ages (which obtain'd universally) gave many Glimpses of the Great Author; but the Improvement of Anatomy in our times, and the Helps we have

by Microfcopes of Viewing more thoroughly the curious Formation of the Parts, Jets us in a much better Light, and raifes our Admiration higher. The Consideration hereof may afford excellent and convincing Liquments against the growing Atheism of our Age, and may frevail more than those of a Metaphysical Nature on the Sceptics or Halfwitted Philosophers amongst us; and I doubt not, but by a Mecanas that may incourage here a Set of ingenious Anatomists, the learned Mr. Boyle's noble Design in his Lectures might be compleated. I confefs, I have Sometimes thought of Tublishing a Tract, against the Epicurean Sect, that has lain by me for some years, about the Origine of Man, (before I shall those I have premised about the Uses and Dis stempers of the parts of the Eye) and I question not but the Argument, with the fore-mentioned Affiftance, might be fo managed as to make Atheism as ridiculous as those excellent Frelates and others of our times have done Superstition and Idolatry. I could wish in Ora der hereunto, that Anatomical Studies were incouraged and brought to the greatest Perfection, and the Description and Uses of all the parts accurately fet forth; and as you have taken a great deal of Pains in this Treatife, fo I could wish (wherein I hope you will excuse the Liberty of Friendship) that there might be a further Progress in the Graphical Description of the Mulcles, and that their admirable Series Fibrarum (as they ferve to fo many feveral Motions of the Body) were delineated in the Mathematical Method of the learned Steno, if any Taille-Douce can reach it.

But you have Apology enough of your side, on the Account of the great Charge and number of Patrons required toward it; and therefore I shall only add (with thanks for your present ingenious Performance) that I am,

S I R,
Your faithful Friend and Servant,
William Briggs, M. D.

Fellow of the College of Physitians in London, and Physician in Ordinary to His Majesty.

To the much Valued and Worthily Esteem'd,

Mr. John Browne,

Sworn Chirurgeon to His MAJESTY.

SIR,

Have, as my time would permit, perused your Book of Muscles, and observed your Method in the Description of them; which seems to agree with the best of Authors I have met with, and I do think it the most useful Book of the Kind I have seen; not only for a shorter way of informing soung Students in Physick and Surgery, but for refreshing the Memories of others more verst in such Exercises: And as you have shewed great Labour, Ingenuity and Industry by your very Pertinent and Apposite Additions, (to what you have done before) so I hope it may prevent many Injuries which might happen to Mankind: For I have observed those of your Profession, (or rather Pretenders to it) who were most deficient in Anatomical Knowledge, were most hold with their Knives and Lancets (which I have too often seen).

Therefore I do not think I do ill to mention it here, because it seems to me to be absolutely necessary, that whosoever shall attempt to make use of his incision Knife or Lancet upon any part of a living (Humane) Body, ought to know what lies under the Skin or Place within the reach of the Point of either of them, or the Distance he intends they shall Ast in; for in the common Use of letting Blood, the want of Knowledge in the Origination of some Muscles, and Insertion of others, their Tendons are often prickt, not only to the loss of Limbs, but Life its self: (I do not mention wounding of Arteries, &c. which are equally dangerous.

The Consideration of which, one would think should be a sufficient Caution to all, who have Occasion for Chirurgical Operations, to choose such Persons as experimentally and distinctly know the Nature and Difference of the parts, &cc. and how they do lye, that they may be sure to avoid doing a Mischief to the Person they intended to do good to; at least this is my Opinion, who am a Lover of Anatomy, and of all those that are Improvers of it, and think my self obliged to Thank You, for the great Pains you have taken therein. And,

I am SIR,
Your Grateful Friend, and Affectionate Servant,
Edmund King, M. D.

Physician in Ordinary to the Late King CHARLES If, Fellow of the College of Physicians of London, and of the Royal Society.

M. JOHN BROWNE,

Sworn Chirurgeon to His Majesty.

On His Myographia Noval

SIR,

N the coming abroad of your last Edition of the Muscles, I endeavour'd to thew how Surprising, Incredible, and how Indefinite the Powers of thefe Machines are, That even our dayly and most unheeded Actions were no less astonishing, than they are the real Effects of these very tender and delicate Bodies; and that none could doubt, but that an exact manbering of those Mechanical Powers is a great Step towards a farther discovery of their Fnergy 'Tis true, such Occasions of Admiration have not altogether escap'd the Notices and Observations both of Ignorant, and more Discerning People; the Phylosophers and Physicians have admir'd, and the rest of Mankind have been d servedly astonished at such incomprehensible, the most obvious Phænomena; the last have remained quiet, and resolved All most devoutly into the infinite Power of the Omnipotent Creator; while the first amuse themselves and the World with a fanciful Story of these astonishing Appearances, being performed by their Contraction, that because when we inquire into the Action of a Muscle, we obferve that it Swells, is Shortned, and That which is tyed to it, is brought from its Place, and follows the Motion of the Contracted Muscle, which is eafily feen by all the World, whether Phylosophers, Physicians, or People of a lower Form and Degree in Understanding; but to Soon as we come to enquire, how a Contracted Muscle is in that State, and so as to draw some bundred weights along with it. bow the Power that propels the Blood drives round a Body in bulk, and Resistences in Motion, equal to some three hundred weight; then we find our men of Learns ing as much at a stand, as the most ordinary of the Gazing and Admiring Mob; nothing is talk'd of, but ill made Similes, unaccountable Explosions, Gun-powder Plots, strange Conflicts of unknown Salts, and a thousand more such Rude Things, as some Gentlemen would put upon us; but the great Fault of all is, that the Laws of this Mechanism are too generally brought us from very daring People, that never thought of mechanical Powers, and are not able to determine the Motion of any two Bodies, in the most easy Circumstances at any other time. But all this is of last Year, and therefore let me, in short, commend the History of Muscles you have now given us; concerning which, I must say you are more modest. than some People that have more exalted Thoughts of their own Understanding, that you know your own Strength better than they in an Attempt, where almost all

the learned have suffered Shipwrack, and that instead of bullying the World into a Belief of your singular Knowledge in this Matter, you oblige it with the learned Bernulius bis Essay of Muscular Motion, because you are very conscious, that what soever bas been said on that Subject by any One but himself, and the most famous Prodigie of Calculations of this Kind Alph. Borell. ought to be forgot among Phylosopers and Physicians, as the most charitable Offices can be done to the Names of such Authors; and that indeed, so great and hard an Undertaking is only to be finished by men of the like Qualifications and Learning, that these Great Men set first out with: I will not have the ill Nature to bring up. on the Stage, some Experiments that have been very lately, but very ill made, on a design to clear up this Matter; 'tis sufficient that they are known, and therefore to come nearer to the following Book, I do believe it is very Ingenuous, Honest, and well meant; you continue the Plates of the Muscles of the former Book, only you make them carry their Names on each of their Fore-heads, that, since Health and Sickness generally proceed from them, you may the more easily perform your Design you have to shew, from Your and other men of Practice Observations bow they have been burt, and what Means have been used to restore them to their former healthy Condition, which, to Say no greater things of this Undertaking, will be of use enough to young Beginners, whatever advantage older People of Modesty may reap thereby. You establish the Muscles that have different Offices for the various Performances in our Bodies, and wifely conclude, that such a Muscle is hurt, when such an Action is empair'd or entirely destroy'd: In Tumours you shew, that when they are of an extream Hardness, and the Liquors are more powerfully perm'd up, bow they have been refolv'd, and how the stagnating Juices have recovered their Motion; how ulcerous Matter that is thin to a degree, and did corrode the Fibres and more solid parts, has been chang'd, brought to a better Confistence, and is made more nourishing; bow Hurts receiv'd in one part, produce Effects, that Alarum us more, and in places very remote from where the Accident at first happened; how Muscles seem totally to be destroyed, and yet to grow up again, as I my self have seen the Glutzei almost perfectly excirpated by a Cannon-Shot, and yet to recover in a very little time, confidering the Furt. "Tis true, this is all done without either affigning the Causes of Muscular Motion, evincing the particular bignesses of parts of stagnating Matter in small and Capillary Branches of Arteries, and the Weaknels of the Propelling Power: You do not discover the Degrees of Meagreness of the Blood's Lympha, or its decay of Spirits that maintain this Thinness of Matter and Undigestion; and yet your Work is very useful in telling us how far the Instances you do recite, have succeeded, and by this means may establish or reform former Practices, tho not so certainly as when Hints are given th' other Way: A further Proof of this may be an Instance of a Gonorrhaa I gave you, which evidently proves, that this Iffue of Matter, howfoever considerable it has been seen, does only proceed from the Yard, tho' this very Reason is brought by Authors for the Impossibility of its coming thence : The Experiment establishes the Fact, and if on the other way

of reasoning we were to demonstrate, it might be made very plain, that the place they have settled for it, is more Remote and out of Sight, but is a great deal more incapable to give any such Supply then the Penis its felf; and I hope I shall sometimes shew you, that twice the Quantity, that ever has been observed to come that way, may flow from this very barren Fountain. After all, your Way is that kind of Knowledge, we call Experimental, which is very convincing, and certain too, if the Experiences have the requisite Conditions: It is surely more hard to prove a priori, (as Phylosophers call it) than by the Weather-Glass or Guerick, or Mr. Boyle's Air pumps, that the Air is a heavy Body, that It makes a firm and strong Resistence, like a Wall, that it cannot be penetrated by other Bodies, but that even this imperceptible Nothing it self is confin'd, and upon Trials, is able to break other very strong Bodies for its Pas-Sage: Just so it should prove a very hard Task, to persuade the most of people of the wonderful and stupendous smalness of some Bodies, that the they are of such a smalness, that they do not come under Trials of our bare Senses, yet there are still Bodies smaller than Them: I say few could apprehend such Paradoxes by all the Demonstrations about Divisibility of Matter in Infinitum; but the Proof will still be easier, by observing how the Beams of our Luminous Sun do insimuate themselves into the common Glass of our Windows, and yet with that Force and Quickness of Motion, that we are not able to look upon the Author & Original of so great splendour Himself, thorow the same Avenues that he delights us, and clears up our dusky Cells; I say, we find no difficulty to grant, that the Glass has Passages or Pores by which the Sun's Rays make their Entry; next, that the Bodies that pass these Pores are very subtile, and of a very fine Make, because these very Pores that are the Passages, are not to be discern'd by us, even when we have the Assistance of the best Micro-Scopes; And lastly, we still discover, that the parts of these Rays are Smaller than the Particles that make up the Air, which cannot be forced thorow thefe Pores, by the greatest Motion we can give them. And since these are the plain and settled Advantages of Experimental Knowledge, that it can discover Truths without any Trouble, to less discerning Understandings, I must believe, that the same Argument will hold for Your practical Surgery of Muscles, which I am convinc'd will instruct Many, and give Hints to Some to demonstrate such Truths, by a more noble Series of Propositions. For my one share, I think it my Duty to declare my Thoughts when Requir'd, which I now do with more Freedom and Liberty than People may think necessary; howsoever it is, I discharge my self, and do wish as sincerely, that they may be of publick Use, as that I am,

Your most Humble Servant,

William Cockburn, M. D.

A Member of the College of Physicians,
and a F. R. S.

To His Esteemed Friend

Mr. John Browne,

Sworn Chirurgeon to His MAJESTY:

ON HIS

Myographia Nova.

I cannot fathom its Divinity; How God made Man, to us you have (made known, Each inward Motion by your Lines are shewn; Tou teach us how to know our felves, that we May tread the Paths of true Philosophy : When Man he made, He, with his Godlike Art, Fill'd with Amazement each contrived part, So finely put together, rarely made, Fill'd full with Use, for Art, as well as Trade; Where the more noble Brain is placed above, With Opticks to foresee the effects of s Love: How Reason ballances, and do's dispense, What ere we gain of Motion or of Sense: Whilft Nature's Magazine, (the noble Heart) Sends forth its Crimion Liquor thro' each part, And each Arterial Tube propels the Blood, Into the purple Veins, which it makes good Like Lines to Centres, and do justly pay Back what they had, tho' by another way: As Tydes of Waters, rowling from the Main, Whose force being pincht, make their Restax again; So be that Nature's Course observes and knows, Will soon allow the Blood in Circles slows: Thus we perceive each Artery, Vein and Nerve, Each single Muscle does with Liquors serve, How each by Import, and by Export too, Conveigh their Juices in us to and fro;

OUR Undertaking's fo sublime to me, | How Life preserves its felf, how our parts move, Flow all our Actions own a Pow'r above; How each concenters to keep up our File, And fills with Strength, by fresh repeated Chyle, Each wearyed Limb, and with fresh Spirits give Sufficient to support, and make us live: Thanks first to Providence, who does dispence, A Guard unto our Reason, and our Sense; And when we move, or alt, or Wills incline, To Subjects useful, or to Pow'rs Divine, Let each his Goodness in the main adore, That first gave Life and Being to each Pore; And while our Muscles move, let's sing his Praise, Whose Force and Energy He hourly raise: And for your Pains in raising of the same, And telling us their Use, and whence they came, Their true Insertions, and their Uses rare, With which no Author yet did e're compare; Thanks to your Skill, your Pains, and learned Art, All which are shewn in this laborious Part: Let Criticks belch, and Mom's contemn your

Wise men will speak your Worth in lofty strains, Whilst Fools despise your Book for want of brains, A just Encomium, from your friend, would be Esteem'd by Such; a down right Flattery: My Pen's not worthy to proclaim your Fame, Your Works themselves will eternize your Name.

Sic ait George More.

To His Learned and most Ingenious Friend

Mr. JOHN BROWNE,

Sworn Chirurgeon to His Majesty:

On His Excellent

Myographia Nova.

(grudge to pay Tribute to your rich That Nature does unfold in every part; The Head, the Hand, the Liver, Lungs & Heart, The Gall and Spleen, the Secrets; how they give Strength to each other; how from each receive.

Man's made Monarchical! His Brain, Tongue, Do frankly yield unto the Heart Supplies ; (Eyes, Not like to Costive Subjects that repine At parting with a little Paultry Coin To th' Royal Aid, but as wife Anglers (hight) By yielding Baits, bring th' ufeful Fish to bite: 50, thefe Pay Taxes, and fecure thereby, Their Tranquil Peace, and vital Property. Till now, Anatomists were in the dark,
And e'en by Guess perform'd their dang'rous work;
But here the Way's so clear'd, that e'ery Man, As bath but Sence, may th' greatest Errors shun; For you each Muse LE have explain'd to view, Their Forms, their Names, and various Uses too: The Little Colorlo can's think, or fpeak, or act, But as your curious Method doth direct. Vefalius, Riolan, Veilingius, and Laurentius, Bartholin, (who could command The Rnife as well as any.) might hence Learn Chirurgick Truth, from Error to discern. To this learn'd Labour, Parbey's felf would bow, And Clook, his own large Volume difallow, Were they alive to fee it. .

O loves true Worth, can never | The Regal Pfalmodist might well exclaim, In Honour to the great Jehovah's Name, That (fragil) Man is wonderfully made; ('Tis fit be Should, who is th' Almighty's Shade;) Had be but seen this Work, 't might rais'd int A Sacred Rapture of a higher Strain; (Him, Enforc'd him in that Holy Extalie, T'embrace thy Work, breath Bleffings upon thee-I Wonder Still the more, the more I Lock (My Worthy Friend) on your Seraphick book; A Treasure vast, and every Way Jo Good. So High, yet Plain, and easily understood; That Elephants may frim, and Lambs may wade In its fafe Drean, and no re be difmay d. Who fays the Stars want influence? Since we know, At your blefs'd Birth (your future fame to fiew) There did afcend bright Cor Leonis, and As Patrons of your haff Brain and Hand, The Pregnam Stilbon, and foft Venus Joyn, Your Horoscope 12 ennoble by a Trine. My Muse is much too Barren to commend, Tour Peerleis Pains, (tho' I it well intend); Nor, need you a Dull Minor Shepherds Lays, ? Since mighty PAN adorns you with his Bays, And few ral Senior Gods your Merits praise. The Dufes Seats, Great Britains radient Eyes, Unto your Skill offer just Sacrifice;
To Honour you, what's wanting Less in Love,
A Choire of Angels Court Tou from above, To bear You to Elixum, where you may Meet mightier Friends, than in this mortal Clay.

> John Gadbury, Student in Physick and Aftrology.

T O

Mr. JOHN BROWNE

CHIRURGEON to His MAJESTY,

On His Myographia Nova.

SIR,

Am so fully convinc'd, That We are come far short of the true and full Knowledge of the Muscles, that I have always put inter defiderata Rei Anatomica, an exact Myology. I would call that Exact, which besides, the explaining the Names of the Muscles, and their different Infertions, should most accurately lay open the Structure of the Muscles, either Simple or Compound; and by exposing to View the several Plana Fibrarum, should shew the Order and Disposition of each Muscle, for this or that Motion. I must confess this Matter to be of great Extent, and to handle it as it ought to be, I am fensible one must have a great Knowledge in Geometry and Mechanicks: I am satisfied also, That the History of the Muscles, ought not to be given separately, (as it has been hitherto) but that it would be much more convenient, to joyn to it the Description of the Bones, Cartilages and Ligaments, without which, 'tis impossible to have a compleat Science of the Motions of Animals. I wish with all my Heart, that You, and some other Ingenious Persons, would joyn their Endeavours, to undertake such a Work, which would certainly acquire to the Authors thereof, an immortal Reputation: This is what there should be Application made to, and not to lose time in tranflating into English, a Gross Volume of Anatomy, whereof I confess I never could understand, either the Beauty or Wefulness.

In the mean while, I am glad to learn, that you are about Reprinting your Myology, or Treatife of the Muscles. What you have added to the former Edition, by causing the Names of the Muscles to be
engraven on the Plates, may serve to shorten the Study of those who
are desirous to learn Anatomy; but especially, by adding thereto, their
Action and their Uses, I doubt not, but you will still make this last
Edition more useful, and more acceptable to the Publick.

I am, SIR,

Your most affectionate Friend, and humble Servant,

Peter Silvestre, M. D.

And of the College of Physicians, London.

To the Ingenious

Mr. John Browne,

ON HIS

Graphical Description

OF THE

Muscles in Humane Body.

The utmost Limits of Chirurgic Art;
Still had We gazed on the rare Machine,
Wonder'd! but ne're its Cause of Motion seen;
If thou had'st not the Mighty Work begun,
Which thou at length hast as exactly done:
Thou hast at once laid open to our View,
Each Muscles Use, Name, Situation too;
The Whole so curiously is perform'd,
Thou seem'st t' have Heav'n it self for Knowledge storm'd,
And gain'd from thence so competent a Share,
None but a second Solomon that Dare,
Skill in Anatomy with Thee Compare;
But for the Time to come, thy Works will be,
The only Touch-Stone of true Surgery.

Raptim Posuit,
Amicus,
Amico,
Amicè,

Nathanael Tull.

To His much Esteemed Friend,

Mr. JOHN BROVVNE, Sworn Chyrurgeon in Ordinary

King's Most Excellent Majesty,

Upon this last, and Compleat Edition of His Book.

Was Wifely spoken by a Learned Tongue, Mans Life is fort, but liberal Art is long. Who to the Top of Knowledge would atcend, Must to a fingle Science chiefly bend His studious thoughts: In vain we spend our hours In quest of All, when One our Time devours. The Skilful Author of this curious Book. His Measures from that famous Maxim took: Does with fresh Vigour his Design pursue, And once again his rare Attempts renew; Has now, at length, to just Perfection brought The unfinish'd Product of his Early Thought. So Nature in her pregnant Womb proceeds, Her best and Noblest Ofspring slowly breeds; And Art, which is not Taught in Natures School, Blunders, miscarrys, and mistakes its Rule. One, who has fix'd his Name amongst the Wife, In a few Words much Learning doth comprize: Know well thy Self, Examine whence thou Art, And what diffuses Life thro' every Part: Next of thy Body view the wondrous Frame, How Moist and Cold allay the vital Flame; How branching Nerves to every Part convey The Spirits, which the Will's Commands obey. Then on the Muscles fix thy wondring Eye, And on thy Self this Learn'd Description try:

Enert

Exert their Force, their various Motions prove, And thou wilt find, as He describes, they move. Learn how the Blood its Circ'ling Course maintains, . And never stagnates in their spreading Veins. As from the Ocean, Springs derive their Birth, Thro' hollow Caverns, in the fpungy Earth, And then in rapid Streams return again, In long Meanders, to the briny Main: . So, from the Heart, each Vein is fill'd with Blood, Then to its Centre, rouls its purple Flood. Men vainly hope in Knowledge to Advance, Who attribute the Works of God to Chance. Fach Part so aptly to its Use Design'd, Argues the Wisdom of the Eternal Mind. Dull, stupid Atheist! Curst with want of Sense, Which thy beloved Atoms can't dispence; They are the perfect Image of thy Mind; Both Senseless, Rambling, incoherent, Blind. If any Light can thro' thy Darkness Shine; Here view thy Self, and own the Power Divine.

Thomas Walker, B. D. Fellow of Sidney-college, Cambridge.

To His much Esteemed Friend,

Mr. JOHN BROWNE

Sworn Chyrurgeon to his Majesty,

ON HIS

MYOGRAPHIA NOVA.

Appy the Man, whom Meditation's Rays Can warm, to found the Grand Creator's Praise; Like Memnon's Statue, from the teeming Morn, Strange Life and sweet harmonious Strains are born. Nature's fo vast, and so delightful Field, A fruitful Crop, a mighty Theme doth yield; All which by no one Soul can be confin'd, Except that Soul of Souls, th' Eternal Mind: Yet humble studious Reason may adore, Ev'n here the facred Footsteps, and explore The hidden Author, by th' apparent Force Of Wisdom, beaming thro' whole Natures Course. Some from the Earth may find a Thought to spring, Shall raise the Soul on Contemplation's Wing; Some from the Sun and Moon, and Stars may claim A Spark, that shall their wondring Minds enflame; Some from the lofty Hill, and humble Dale, Shall learn to Bow their Hearts, and Heaven to scale; The Waves for their Instruction sweetly flow, Conspiring Winds to their Conviction blow: The Seasons, Arguments to them afford, And Day and Night declare their Mighty Lord; Ten thousand thousand Tongues the World doth move, To praile the Glorious Architect above. Nor is the Microcolmos filent here, But, like her Great Example, every where Belpeaks the Gracious Hand, the boundless Art Of him, whose Image is her better part. Who can describe, or who, but BROWNE, Explain The Mystick Chambers of the Noble Brain? The glorious Fabrick of the Eye pourtray, That Judge of Nature, Harbinger of Day? The Talking, Tasting, wondrous, warbling Tongue, Tun'd to her Maker's Praise in raptures Song?

Richly enshrin'd, like Enstern Potentates, In Crimion Cabin, fenc'd with Ivory Gates? The curious Ear, that Port of Discipline, Her Anvil, Hammer, Drum, and Maze Divine? But above all, the Sately, Princely Heart, That Spring of Life, and Magazine of Art? To whom all Veins their Crimson Tribute pay, From whom the same still flows another way. But who the Muscles wondrous Force can tell, That Dance, and Fence, and Run, and Leap so well? That Ride, and Swim, and Write, and Take, and Give, And See, Taste, Hear, and Feel, and Smell, and Live? That Speak, and Kneel, and Lift the pious Hand, · And Astuate, and Cherish, and Command: All Parts and Organs, tho' fo rich, fo rare, Lye useless, if the Muscles work not there: These are the Ministers, that still dispence The Bodies Will, the Mysteries of Sense: They Raise, they Shut, they Open, they Uphold, They Yield, Refift, Envelop, and Unfold: All that is Done, or Born, they Do, or Bear; But, how they're clad, how work, why, what and where, This BROWNE alone most evidently shews, In lasting Brass and everlasting Profe.

Josbua Barnes, B. D.

Professor of the Greek Language, and Senior Fellow of Emmanuel-College in Cambridge.

This TABLE sheweth the Names of the Muscles as they do arise in Dissection, and as they are contained in the Lectures.

Bliquus Descendens, Obliquus Ascendens. ReEtus, Pyramidalis, Transversus, Cremasteres, Dartos. Musculi Clitoridis, Directores, Acceleratores Urina, Frontalis. Corrugator. Occipitalis, Orbicularis Claufor, Elevator Palpabra, Claufor Oculi Superior, Claufor Oculi Inferior, Recti Quatuor Oculi, Obliquus primus Oculi, Obliquus secundus Oculi, Elevator Auris. Detractor Auris, or Triceps, Adductor Auris, Abductor Auris, Externus Tympani Auris, Internus Tympani Auris, Abductor Nasi alas, Elevator Nasi alas, Claufor Nafi Externus, Claufor Nafi Internus, Nasi Claufor Communis, Zygomaticus Riolani, Abductor Labii, Depressor Labii Inferioris, Constrictor Labiorum, Platysma Myodes, or Quadratus,

Buccinator, Masseter, or Mansorius, Temporalis, or Crotaphites; Mastoideus, Biventer, or Digastricus, Coracobyoideus, Sternobyoideus, Sternothyroideus; Hyothyroideus, Styloceratohyoideus, Pterygopalatinus, Sphænopalatinus, Mylohyoideus, Geneiobyoideus, and wall to hoon? Mylogloffus, initional Piramiel amon Ceratoglo flus, Geneioglossus, Hypfiogloffus, or Bafiogloffus, Stylogloffus, Lingualis, Crycothyroideus Anticus. Defophageus, or Sphineter Gula, Stylopharyng eus, Cephalopharyngaus, Sphenopharyng eus, Crycoarytanoides Posticus, Crycoarytænoides Lateralis, Arytanoides, Thyroarytanoides, Pterygoideus externus, Pterygoideus Internus, Longus, Scalenus, or Triangularis, Pectoralis. Subclavius, Serratus Major Anticus,

The Table.

Serratus Minor Anticus,
Intercostales Externi,
Intercostales Interni,
Levatores Ani,
Sphincter Ani,
Sphincter Vesica,
Detrusor Urina,
Diaphragma,
Cor, cum Vasis suis, &c.

Here let the Body be turned upon the Face.

Cucullaris, or Trapezius,
Latissimus Dorsi,
Rhomboides,
Levator Patientia,
Rotundus Major,
Superscapularis Superior,
Superscapularis Inferior,
Nonus Humeri Placentini, or Rotundus,
Subscapularis.

If you intend to take off the whole Arm with the Scapula, the Diffection of these following Muscles will with more Ease be performed.

Deltoides,
Biceps,
OEtavus Humeri, or Teres Minor,
Brachiæus Internus,
Gemellus Major,
Gemellus Minor,
Anconæus,
Palmaris,
Caro Musculosa Quadrata,
Flexor Carpi Interior, or Ulnaris,
Flexor Carpi Exterior, or Radialis,
Flexor fecundi Internodii, or Perforatus,
Flexor tertii Internodii, or Perforans,

Flexor tertii Internodii Pollicis, Pronator Radii Teres, Pronator Quadratus, Flexores primi Internodii digitorum, Flexores primi Internodii Pollicis, Flexor ejus dem secundus, Elexor Secundi Internodii Pollicis. Primus, Secundus, Tertius. Quartus. Minimi digiti abductor, Pollicis Abdustor, Pollicis Adductor. Interossei Manus, Extensor Carpi Exterior, or Bicornis, Extensor Carpi Interior, or Ulnaris, Extensor secundi & tertii Internodii digitorum. Supinator Radii Longus, Primi Internodii Extensores, Extensor Offis tertii Pollicis, Abductor Indicis, Supinator Radii brevis.

Here you return to the Body its

Serratus Posticus Superior,
Serratus Posticus Inferior,
Splenius, or Triangularis,
Trigeminus,
Transversalis,
Spinatus,
Recti Majores,
Recti Minores,
Obliqui Superiores,
Obliqui Inferiores,
Longissimus Dorsi,
Sacrolumbalis,
Cervicalis Descendens,
Sacer.

The Table.

Semispinatus, Quadratus Lumborum, Psoas Magnus, Psoas Parvus.

If you please to take off the Thigh from the Trunk of the Body, by dividing the Os Ileon from the Os Sacrum, the Diffection of the sub-sequent Muscles will the better be performed.

Iliacus Internus,
Glutæus Major,
Glutæus Medius,
Glutæus Minimus,
Pyriformis, or Iliacus Externus,
Obturator Internus,
Quadrageminus, or Quadratus lumborum,
Obturator Externus,
Membranofus,
Sartorius,
Gracilis,
Rectus,
Vaftus Externus,
Vaftus Internus,

Biceps, Seminer volus, Seminembranofus, Triceps, Lividus, Gafterochemius Externus, Plantaris, Gasterocnemius Internus, or Soleus, Suppoplitaus, Flexor tertii Internodii, or Perforans, Tibieus Posticus, Flexor Pollicis, Flexor fecundi Internodii Pollicis, Flexor fecundi Internodii, or Perforatus, Abductor Pollicis, Adductor Pollicis, Abductor Minimi Digiti, Transversalis Placentini, Tibiæus Anticus, Peroneus primus, Peronaus fecundus, Extensor Pollicis, Extensor tertii Internodii Digitorum, Extensor secundi Internodii Digitorum, Interoffei Pedis.

The Names of the Authors

Concern'd in this

TREATI

Aquapendens, T. Bartholine, 7. Baubine, P. Borellus,

B. Bonacurtius, A. Benivenius,

M. De Blegney.

G. Briggs,

P. Barbett. R. Columbus,

B. Cabrolius,

G. Croune,

S. Collins, G. Cockburn,

B. Connor,

Jsb. Diemerbroeck,

M. Donatus,

G. Falloppius,

P. Forestus, Galen,

Reg. De Graaf,

And. Guainerius, Hippocrates,

Fab. Hildanus,

Jac. Hollerius,

A. Laurentius,

A. Lustanus,

P. Lycosthenes,

7. Oetheus,

7. C. Placentinus,

P. Pigray,

A. Paræus,

F. Platerus,

7. Riolanus,

M. Rulandus, St. Riverius,

D. Sennertus,

Adr. Spigelius,

C. Scarborough,

N. Steno,

7. Swammerdamus.

7. Schenkius,

Jac. Silvius,

7. Valverdus,

A. Vefalius,

7. Vestingius, Vidus Vidii,

Du Verney,

F. Valeriola, Valescus,

T. Williffius,

G. Wierus, R. Wiseman.

ERRATA.

Olio 22. line 26. read plucking bim, f. 26. l. 14. r. became, f. 34. l. 23. r. motions, f. 53. l. 1. r. Jugale, f. 38. l. 4. r. Platyfma Myodes, f. 66. l. 24. r. easing, fol. 73. l. 6 r. petrofe, f. 77. l. 23. r. apposite, f. 81. l. 14. r. appositely, f. 16. l. 19. r. mben, f. 34. l. 10. r. Lobes, f. 99. l. 23. r. Forcipes, f. 102. l. 6. r. Prague, f. 16. l. 24. r. tbickning, f. 93. l. 4. r. reaching, f. 103. l. 24. r. of one, f. 115. l. 15. r. distance, f. 16. l. 20. r. facile, f. 120. l. 13. r. Inferiores, f. 95. l. 22. r. ofening it again, f. 127. the second Story is left out by missay, f. 151. l. 20. r. Extension. r. Extension.

TREATISE

OF

Muscular Dissection.

A Letter to the Learned Dr. WILLIAM BRIGGS, Fellow of the College of Physicians, and Royal Society, and Physician in Ordinary to His Majesty.

A General View being first taken of the Frame of the Humane Body, the Mechanism of Vital, and other Muscular Motions, is Examin'd, both in a Physical and Anatomical manner.

By his Friend,

Dr. CONNOR, Fellow of the Royal Society, and one of the College of Physicians.

SIR,

Have receiv'd your Letter, wherein you desire me to give Mr. Browne what small account I can of the Mechanism of Muscular Motion; to be, as you mention, an Ornament to his Treatise of Muscles. Mr. Browne himself did write to me before to the same purpose: I was desirous to be excus'd from appearing in Print in another Person's Book, having nothing extraordinary to say that would be an Ornament to his Work, or a Reputation to my felf. I might, Sir, very justly excuse my lelf to you, having shew'd your felf so well vers'd in the Structure and Motion of Muscles, in your ingenious Dissertation of the Eye; for Mr. Browne would have more reason to apply himself to you, than to me, because what you would have me say of Muscular Motion must be imperfect and deficient; not only because I had but Two Days to write it, before Mr. Browne's Book was publish'd, but likewise because the Subjest it self is very abstruse and difficult.

Motion, the Life of Bodies, is as unconceivable as the Origin of Matter in which it refides: To call it the Body that moves, the Body moved, a relative Mode between both, or the pure Will of a Supreme Mover, is too abstract to be mention'd in a Physical Disquisition. I will not enquire what Motion is, but what is its cause, particularly in Humane Body. It will perhaps feem easily answer'd, That Bodies are the cause of their own motion, fince no body can be moved without the check or impulse of another: But it will appear very intricate to unravel the different Nature and Properties of Bodies; I mean, the particular bulk and figures of their Particles, by which they produce the various Phanomena, or different

motions, we observe in the World, particularly in Animals.

Before I endeavour to illustrate the Motions we observe in Animals, chiefly in our felves, I will take a strict and short view of the whole frame of the Humane Body, to find how its wonderful Make is curioufly contrived, to perform the Functions delign'd by Nature for its own prefervation. Our Machine is an unimitable piece of Architecture; it is supported, as Buildings are with Pillars, Architraves, and Rafters, by folid and durable Bones wonderfully joynted together, like Joyners Work, with Tenons and Mortaifes, and fasten'd with strong Ligaments, for fear any piece of the Prop should be shov'd out of its place, and the Superstructure fall to the Ground. Between the joynted ends of the Bones lies a Lymphatic or Oily Juice, which, like Greafe in Coach-wheels, makes their motion more glib and easie; and the Marrow in their Cavities keeps them from being brittle, by rend'ring them limber by its Unctuous quality.

Over the Bones are spread several Lays of Muscular or Fleshy Substance interwoven with Nerves, Membranes, Fat, Glands, and Blood-veffels: These Muscles, like so many distinct Ropes, serve to pull and move the Bones, and the reft of the Body; for there is no visible motion in the whole Body perform'd, but by a Muscle, or a Muscular Fibre, tho' most other Fi-

bres have their fyftaltic or imperceptible contraction.

Within this noble Fabrick we find three Apartments, the Belly, Breaft, and the Head: they are lin'd with Membranous Coats, and contain their respective Viscera or Vital parts. In the lower Apartment are lodg'd the Stomach, Guts, Mesentery, Latteal Vessels, Pecquet's Receptacle of the Chyle, the Liver, Pancreas, Spleen, Atrabilary Glands, Kidneys, Bladder, Parts of Generation, the Caul, the Vena Porta, and a great many Lymphatic Glands. The Gulet, Stomach, and Guts are one continued Canal from the Mouth to the Fundament: The Stomach receives the Meat chew'd in the Mouth through the Gulet, and digests it into Chyle; the Chyle passes into the Guts, where it meets with two Liquors to diffolve it farther, one from the Pancreas, and the Bile from the Liver; it is pressed down along the Guts by their peristaltic motion; the grossest part, or Excrements, are carried to the Fundament, but the thinnest and white part of it, call'd properly Chyle, passes into the Lacteal Vessels, which gape into the sides of the Guts, from thence it continues its Journey to the great Receptacle of the Chyle above the Kidneys, and being there joyned and thinned by leveral little Streams of Lympha, it ascends thro' the Thoracic Duct to the Heart, where it is chang'd into Blood. The Kidneys strain from the Blood its Superfluous Serum, and fend it to its Cistern the Bladder. The Liver cleanses the Blood of Gall, and discharges it into the Guts, to help digeflion: the Vena Porta carries the Blood from all the floating parts of the Abdomen, into the Liver; and all the Lymphatic Glands of the Belly fend their Lympha to the Thoracic Duct, from whence it is convey'd to the Heart, to be mix'd anew with the great Torrent of the Blood, from which it was first strain'd.

The Breast, or second Apartment, is separated from the Belly by a Partition, call'd the Diaphragm; it is the Seat of the two chief Fountains of Life, the Heart and Lungs. The Heart is a strong Muscle with two Cavities, the right and left Ventricle: the right Ventricle receives the whole Mass of Blood thro' the great Vena Cava, from all parts of the Body, and fends it by the Pulmonary Artery into the Lungs, where being rarified by the Air forced into them by Respiration, it passes thro' the Pulmonary Veins into the left Ventricle of the Heart, which drives it with great force into the appending Aorta, or great Artery, and from thence thro' millions of Ramifications into all the parts, and even into the minutest Fibres of the whole Body; from whence it returns back to the Heart, as Rivers run to the Ocean from whence they came. The Heart is therefore the Center of motion in us; it fends the Blood to the whole circumference of the Body, and like a Pump, or rather a Syringe, it forces the same back again, that by a constant circulation from Center to Circumference, and from Circumference to Center, it may enliven and nourish all the parts of the Body; for whenever by inward Discases, or by any great Wounds, this Circu-

lation is interrupted, Death must necessarily ensue.

In the uppermost Room of all is lodged that Marrowy and fost Substance the Brain, the Seat of the Soul, and the Origin of all the Senses ; it is wrapt up in two Membranes; the stronger one, call'd Dura Mater. flicks in feveral places to the infide of the Skull; but the thinner cleaves every where very closely to the outside of the Brain. The Brain it felf is divided into two parts; the upper and fore-part, which is the largest, is call'd properly the Brain; the lower and back-part is call'd Gerebellum, or little Brain: The Substance of both is much alike, as for its Use and Contexture, for the outfide of both is Glandulous, and of an Ash-colour : It ferves to strain from the Blood that thin airy Fluid call'd Animal Spirits. The Pith or infide of both is very white, and fomething harder than the first; it is nothing else but the Origin of all the Nerves that fuck up from the ambient Glands the Spirits which they separate from the Blood, pour'd in among them from the Carotid and Vertebral Arteries. The Basis of this Pith or Marrowy Substance is call'd Medulla Oblongata, which with the Marrow of the Back-bone is in a manner but one continued Brain, or one common Stock, out of which all the Nerves of the whole Body take their Origin; for Ten pairs of Nerves part from the Brain alone, and Thirty pairs from the Spinal Marrow, which make up all the Nerves of the whole Body; for there is not one Fibre in the whole Body that does not receive fome Twig of a Nerve from one or other of thefe Forty pairs: I may indeed except the Bones and the Heart, for I cou'd never discover any Nerve in their Substance, which makes me believe, as I have hinted in my Experiments about the Heart, that the motion of the latter does not depend of the Nerves of the Brain. Every one of the Forty pairs of Nerves is a bundle of an infinite number of smaller ones, each of which is hollow, and conveys the Spirits either from the Brain or Spinal Marrow, to the place in which they terminate, and thefe Spirits caule Sense and Motion where they arrive, for without them we neither could feel nor move any part of our Body; as is visible in Palfies and Apoplexies. There are in the Brain feveral other Parts they give Names

Names to, but because the Use of them is incertain, they shall be namelets: for, to tay that the Soul refides in the Glandula Pinealis, the Memory in the Corpus Callosum, the Imagination in the Corpora Striata, Appetite to Women in the Nates or Testes; that Vital Motion depends of the Arbor Vitæ of the Cerebel; would pass better for Poetical Fancies, than for Phyfical Enquiries. I cannot notwithstanding forget the four Ventricles, three of which are in the Brain, and the fourth in the Cerebel: They have all Communication with one another in the Basis of the Brain; they serve to drain away the superfluous Humors; they pour them into the Funnel of the Brain, from whence they are discharged, not into the Nose, as was formerly believ'd, but through two Sinus's into the Jugular Veins, and from thence streight to the Heart. I do not doubt but Tobacco, or other Medicaments given to make one fneeze, will cafe the Head, not by difcharging any thing from the Brain, as is vulgarly thought, for there is no manner of Passage from the Brain to the Nose, all the holes being stopt up by the Olfactory Nerve, but because this Snush carries away, the Mucus or Slime that stagnates in the two frontal, the two maxillar, and the two Sphenoide Sinus's, all which open into the Nostrils, and are lined with the same Membrana Pituitaria that the Nose is.

All Parts of the Body have correspondence with one another, the Brain with the Heart, the Heart with the Brain, and the whole Body with them both: By this Communication the whole Body fuffers when any one part is disorder'd; as, in a Pain of the Toe, all over out of order; for a Toe is made up of all the same integrant parts that the whole Body is, the Fabrick of the whole Body being made of Bones, Griffles, Ligaments, Muscles, Fat, Glands, Veins, Arteries, Nerves, Lymphatic Vessels, Membranes, and Fluids; and all these are to be found in the Toe alone : so that as our Body is generally faid to be an Abridgment of the whole Universe, so a Finger, Toe, or other Parts, are in a manner our whole Body in little, tho' their Figures be different: And I cannot conceive or explain the Allion or Motion of a Finger, or of any other Part whatfoever, without I have a clear Idea of the Frame and Functions of the whole Body, no more than I can understand or methodically cure any One inward Difesse without a gene-

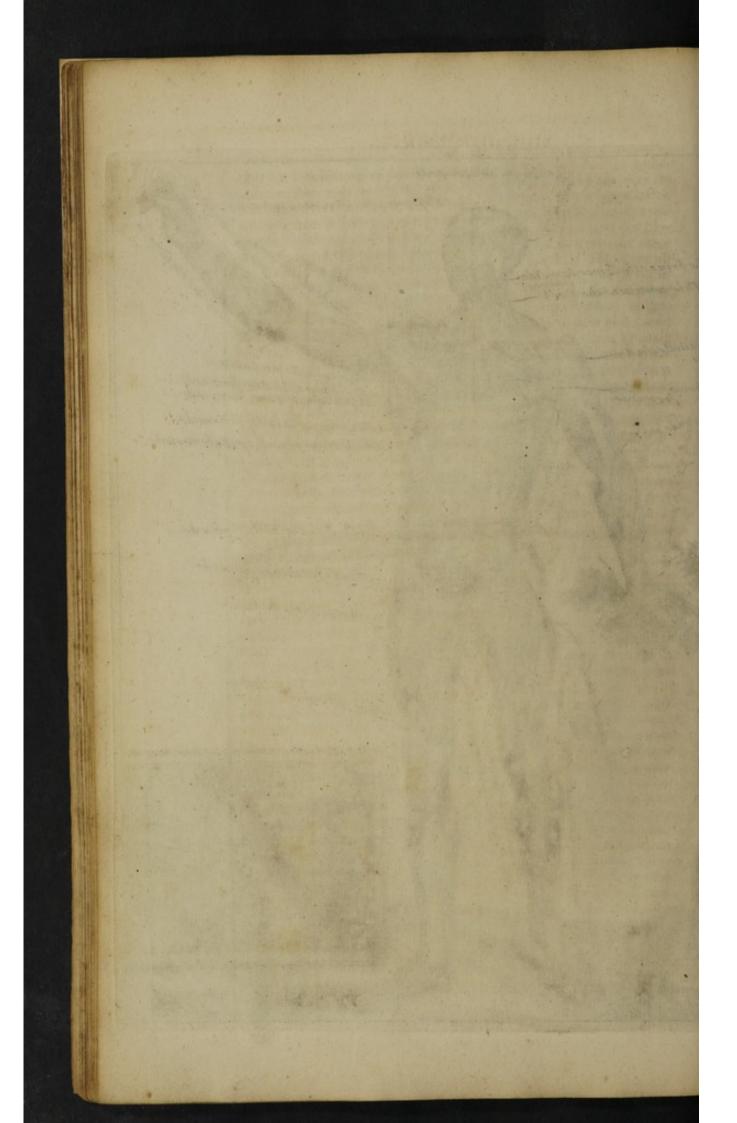
ral Idea of the Source of all Difeales.

Having thus, Sir, shortly survey'd the Frame of the Humane Body, it is requisite to examine the Springs that set the Machine going; for it is as necessary to observe the Mechanism with which a Wateb moves, as it is to know the Excellency of the Workmanship, particularly when its motion is apt to be disorder'd, as often that of the Humane Body is by Difea-

Jes, and wants to be mended.

The two great Agents in our Body are, the Motion of the Fluids, and that of the Solid Parts: both depend immediately of one another; for as the Fluids, I mean the Blood and Spirits, give motion to the folid parts, fo they mutually receive all their motion from them: Just as a Man that fwings himself upon a flack Rope receives in himself the motion he gives it. The first motion in our Body after Generation in the Womb, is that of the Fluids ; for the Punttum Saliens, or the little Stamina of the Heart, cannot move it felf, but it must receive its first motion from the Fluids contain'd in its Subliance: These Fluids receive their first motion from the vivifying Sparkles or ferment of Man's Seed, convey'd to them in Coita, and this primitive prolific motion is continued and fomented in the Germen, by the ambient heat of the Mother's Womb, until the Carina, and all the





other Organs, gather strength enough to move one another. Thus the little Muscular Filaments of the Heart being sirst moved, they must necessarily, in contracting themselves, press and crowd one another, and consequently squeeze from between them, and from their little Ventricles, the Humour that moved them sirst, and drive it into the appending Arteries, to make room for another succeeding Humour, supply'd from the Liquor in which the Carina, or the whole Embryo, swims: This new fermenting Humour, with its innate Air, being admitted into the Fibres of the Heart, must give them a second Pulsation, by which it is forced farther, as the sirst was, into the Arteries; and other small rarised Draughts succeed constantly, which renew and continue the Pulsation of the Heart: by which it appears, that the Fluids and the Heart move one another

reciprocally.

Having en passant hinted the Origin of Vital Motion in the Fætus after Conception, I may now enquire into the genuine Cause of all other Muscular Motions in us, whether voluntary or involuntary, after we are born. All Anatomists agree, that Muscles and Muscular Fibres are the Instruments of all visible motions in our Body; for Parts that have lost their Muscles by Wounds, or that have had never any, as the Skin, Brain, Liver, Lungs, Spleen, Kidnies, Teeth, Nails, Hair, Ears, Testicles, never move visibly; and all parts that are provided with Muscles, or even with Muscular Fibres, as the Stomach, Guts, Gulet, Iris, Sphinsters, the Bladder, are perceived to move. But it is not enough to know that Muscles move all other parts of our Body; we must discover, if we can, what moves the Muscles themselves; otherwise we have no more satisfaction in observing the motions of our own Body, than in feeing a Boat in a calm day brought up against the Current of the Thames by the Tide, without knowing what forces the Tide it felf up. It is plain, that if a Muscle is contracted, it must necessarily draw towards its Belly or middle, the Bone or other part it is fasten'd to: And if we could find out the Physical Cause of this Contraction, perhaps it would give us as much reason to admire our own Make, and the Wisdom of our Maker, as any other Effect in Nature.

It is evident, that a Muscle cannot move it self, no more than any other Body; it must therefore be mov'd by some new matter that comes into it: there is no matter whatsoever that can come into it, but Blood and Animal Spirits; and consequently the motion of a Muscle must either proceed from the Spirits that slow into it through the Nerve, or from the Blood convey'd thither by the Artery, or from both Blood and Spirits together. It cannot proceed from the Blood alone, because when the Nerve is cut or obstructed, and the Spirits cannot come into the Muscle, its motion ceases, as it appears in a Palsical Limb, which, tho' the Blood circulates freely thro' it, has neither Motion nor Sensation, for want of Spirits. Likewise when the Artery is cut or ty'd, and the Muscle receives no Blood, tho' the Spirits have free access to it, yet the motion of the Muscle ceases; from whence it evidently follows, that Muscular Motion proceeds both from the Animal Spirits and from the Blood, met together in the Body of the Muscle; but how they perform this surprizing Effect, is

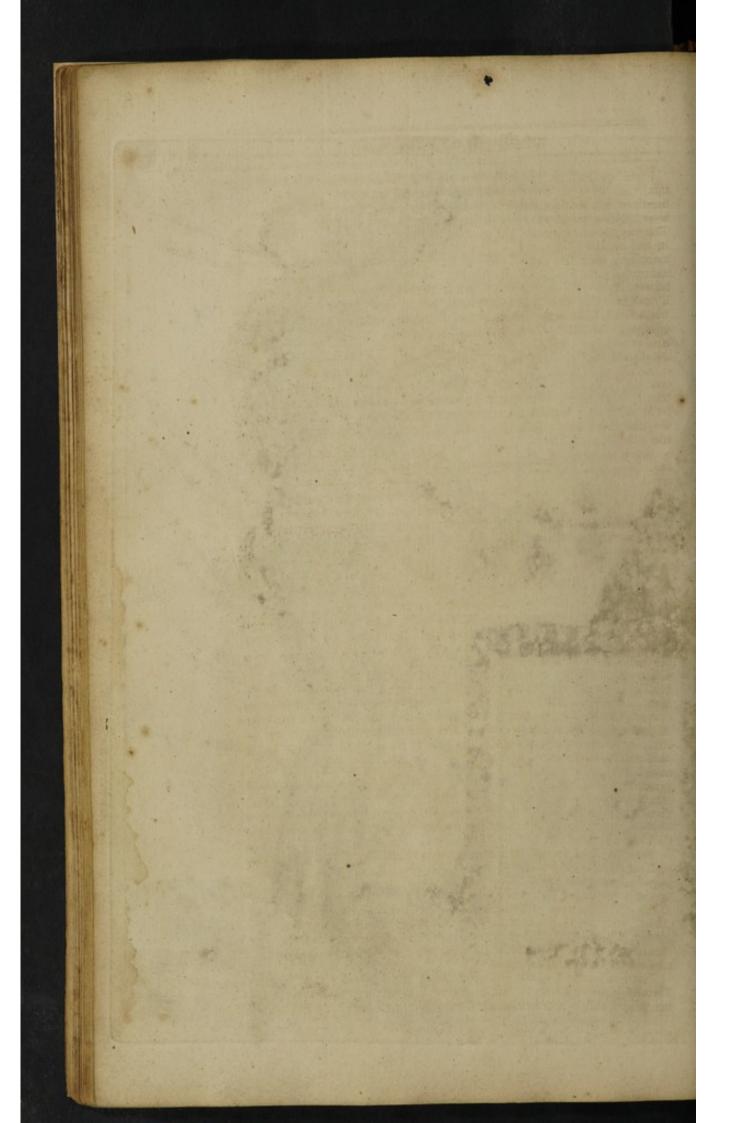
what is very intricate to explain.

We cannot conceive that the Blood and Spirits do move the Muscle by the rapidity of their Circulation, or by the quantity of Motion they both receive from the Heart and Arteries; and yet all the motion not only of the Blood, but likewise of the Spirits, is immediately derived from the Impulse of the Heart and Arteries together; for the Spirits borrow no motion from the Brain or Nerves, these having none of their own for want of Muscles; and they give only a free pattage to the Spirits thro' them: So that if every Muscle was moved only by the quantity of motion, its proportion of Blood and Spirits receiv'd from the Heart, Mujcles would not have the hundredth part of the motion we observe in them.

It would be thus impossible that a Man, by the force of his Muscles Maffeters, should raise a Hundred pound Weight in his Teeth; that by the strength of the Muscles of the Hand he cou'd break a Horse-shoe in two, or list up a heavy Chair in one Hand, with a Man fitting in it; that Tumblers, Vaulters, Rope-dancers, cou'd move their Bodies with that activity and force; that Porters cou'd carry Five or Six hundred pound weight upon their Backs; that one Man alone cou'd lift above ground a Brass Cannon of Fourteen hundred pound weight, as one of the King's Seamen has lately done. The quantity of this motion far exceeds that of the Heart; and to make it more clear, let us take any one Muscle, for example, the two Masseters, or Grinders, that move the lower Jaw; they raife, as I mention'd, a hundred weight. To compare their motion with that of the Heart, there is no manner of proportion; for the motion of the Heart can hardly raife the weight of Threefcore pound; or if I should be so favourable as to allow the Heart force enough to raise a Hundred pound, which is more than I can demonstrate; yet still this would not prove that the Maffeters could raise likewise the same weight, because all this motion granted to the Heart is not, nor can be, communicated to every Stream of Blood and Spirits that flow into every Mufele; because it is divided and subdivided into as many thousand little Portions of Motion as there are Ramifications of Nerves and Arteries, and Streams of, Blood and Spirits in them. So that if a small Artery contains only the hundredth part of Blood that the great Aorta holds, it will hardly have. or at most can but have, the hundredth part of the motion that the Heart has. Now, the bulk of both the Maffeters is not the thousandth part of the bulk of the whole Body, and confequently does not receive the thoufandth part of the Blood and Spirits; from whence it evidently follows, that the motion of the Maffeters would not be the thousandth part of the motion of the Heart, and that instead of raising one hundred pound weight by the Teeth, they would not raise an ounce and a half; which is almost a lesser force than is requisite to move the Muscles themselves, or, at least, the Jaw-bone they are fasten'd to. From all which I may reasonably conclude, that the power or motion of any Muscle does not proceed from the rapidity with which the Blood and Spirits circulate through it, nor from the quantity of motion these have received from the Heart; fince the motion of the Maffeters exceeds a thousand times the degree of motion they can receive from their proportion of Blood and Spirits fent 'em by the Heart and Brain; and fince the degree of motion in the Heart of the Seaman, that lifted the Brais Cannon of fourteen hundred pound weight, compar'd with the force of the Blood and Spirits of his whole Body, is at most but as one to fourteen, or perhaps as one to thirty.

Since therefore we see that the quantity of motion of the Mufeles far surpasses that of the Blood and Spirits, and that this addition of motion cannot be attributed to the Muscle, which is only passive in it, nor to the Heart, as I have shew'd already; I most necessarily suppose, that the Nature of the Blood and Spirits is such, that when they meet in the body of the Mufele, they acquire new degrees of motion, which separately they could not have; to understand which, we must have a clear notion of the Structure of a Mufele, and of the nature of the Animal Spirits.





I need not infilt long upon the Strutture of a Mufele, it being very well known that it is a fle fly Rope with two small and compact Ends, and a large Belly, being a bundle of a great many smaller Ropes or Fibres, wrapt up together in a common Mem. brane, closely interwoven towards the Head and Tendon, and flack in the middle. The ropy Fibres are stretch'd in length from Head to Tendon, and are traversed in the middle chiefly, by a few small Filaments, to make their contexture more firm, not unlike that of a Net or Cane Chair. Every Fibre is a little Tube, and receives the Blood and Spirits into its Cavity; for the Blood does not circulate between the Interffices of the Fibres, as some believe, but in their very Cavities, which is made manifest when I cut a Muscle in length, there hardly is feen any Blood; but when I cut it across, there gushes immediately out of every Fibre a great quantity. So that I may fay, that the Cavity of every Fibre of a Mufele has its Nerve, Artery, and Vein to attend it ; the Nerve and Artery furnish Spirits and Blood, and the Vein serves to carry back to the Heart what has not been employ'd in nourishing or moving the Fibre. The Head of the Muscle is fasten'd to one Bone, and the Tendon to another, and no Muscle begins and ends in the same Bone; for then it would only serve to bend, and not to move it. Those Physicians therefore seem to be mistaken, who think the contraction of the Muscle to be the canse why Bones are bent in the Rickets, fince this cannot be, unless the Mujcle began and ended in

As for the nature of Animal Spirits, it is very difficult to determin it. Some maintain, there are none at all; others, that affirm there are, can never shew them, nor try any Experiment in living or dead Bodies, to discover their origin. It cannot notwithstanding be doubted but there is a finid Substance that passes through the Nerves, tho' we fee no Cavity in them to let it pass; yet I cannot be perswaded that it is the most volatile Spirit, or the most refined part of the Blood, as most Physicians are of Opinion, because if it did in the least partake of the nature of the whole Blood, or of any of its Principles, Earth, Water, Salt, or Sulphar, it must be feen in the Nerves, as the Blood is in the Arteries, or Lympha in the Lympheduits : for let the Spirit of the Blood, taken out of it by Chymistry, be ever so often distilled again, and refined by Fire, it will still be kept in Vessels, and pour'd off from one

Bottle into another, will appear in the form of a visible Liquor.

The famous Dr. Willis did not scruple to fay, that the Animal Spirits did partake of the Nitre of the Air, blown into the Blood from the Lungs by Respiration; and that these Nitro-aerial Spirits, as he calls them, meeting the fulphureous part of the Blood in the lank Belly of the Muscle, slashed, which he calls Explosion, like Gunpowder, which is made of Nitre, Sulphur, and Charcoal: by this Explosion the Muscle is contracted or shortned, which contraction is Muscular motion. With refpect to this learned Author's Memory, I cannot conceive that the Nitre of the Air can get into the Lungs in that great quantity, as would be necessary to perform all the motions of the Body; for if it did come into the Blood in that wast quantity, far from rarifying the Blood, and heating us, it would coagulate the mass, and chill the whole Body, as the Spirit of Nitre, the diffolution of Nitre in Water, and all Preparations whatfoever of it, taken inwardly, conftantly do. Befides, granted the Animal Spirits were Nitrous, how can the Particles of Nitre, meeting the Sulphurcous part of the Blood in the Muscle, flash, without some sparkles of Fire fitto kindle for the Explosion; for Gunpowder, tho' it is made of this Saltipetre and Sulphur, never blows it felf up without a priming or foreign Fire to impart to it its first motion or flame.

Now, Sir, fince you will have me give you my blind Conjecture, I am rather of opinion, that the Animal Spirits are nothing else but the pure Body of the Elastic Air, pour'd into the Blood from the Lungs, without any Nitre at all. This Doctrine, tho' perhaps new to you, feems to me to fuit better than any other Hypothesis with the Effects of Respiration, with the motion of the Heart, with the rarefaction of the Blood, with the plenitude of the Veins and Arteries, with the effects of Cupping-glasses, with fwooning in hot places, with breaking Wind backwards, with the filtration of the Spirits in the Brain, with their invilibility in the Nerves, and with the Mechanism of Muscular motion.

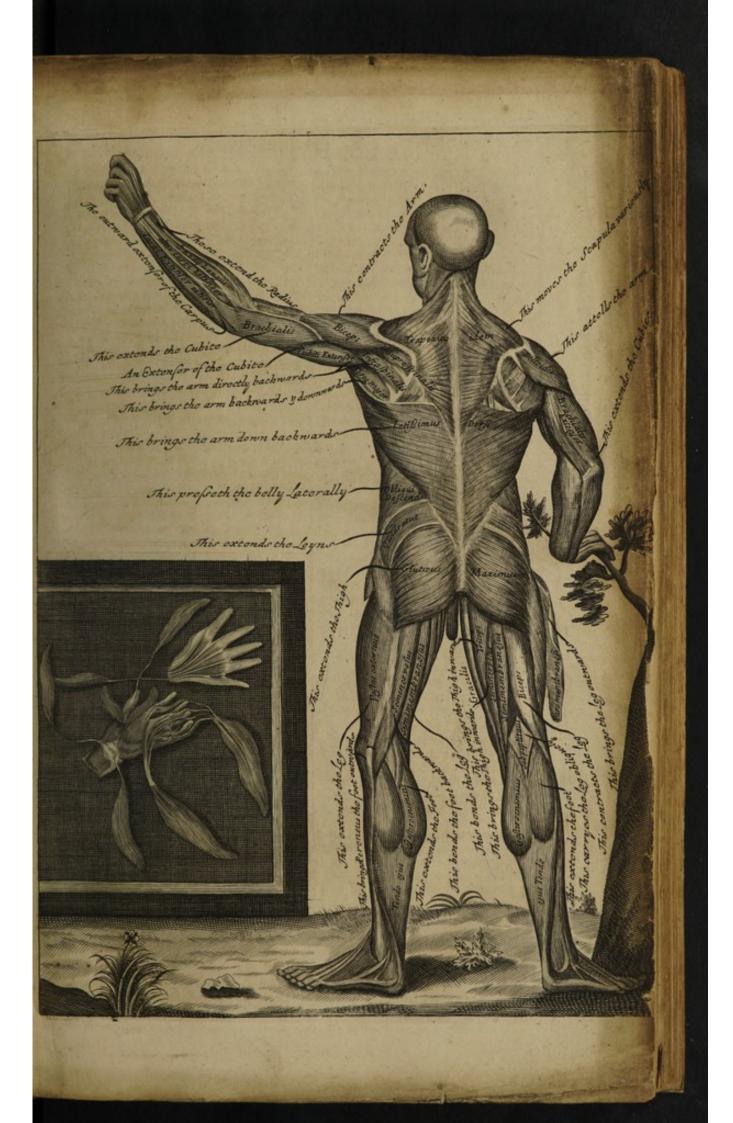
I have endeavour'd to refute the Doctrine of the Nitre of the Air in my Latin Differs. Mell-Treatife de Antris Lethiferis, and have proved in the same Book, that the body of co phyl. p. 72. the Air not only is breathed into the Lungs, but that likewife it paffes farther from

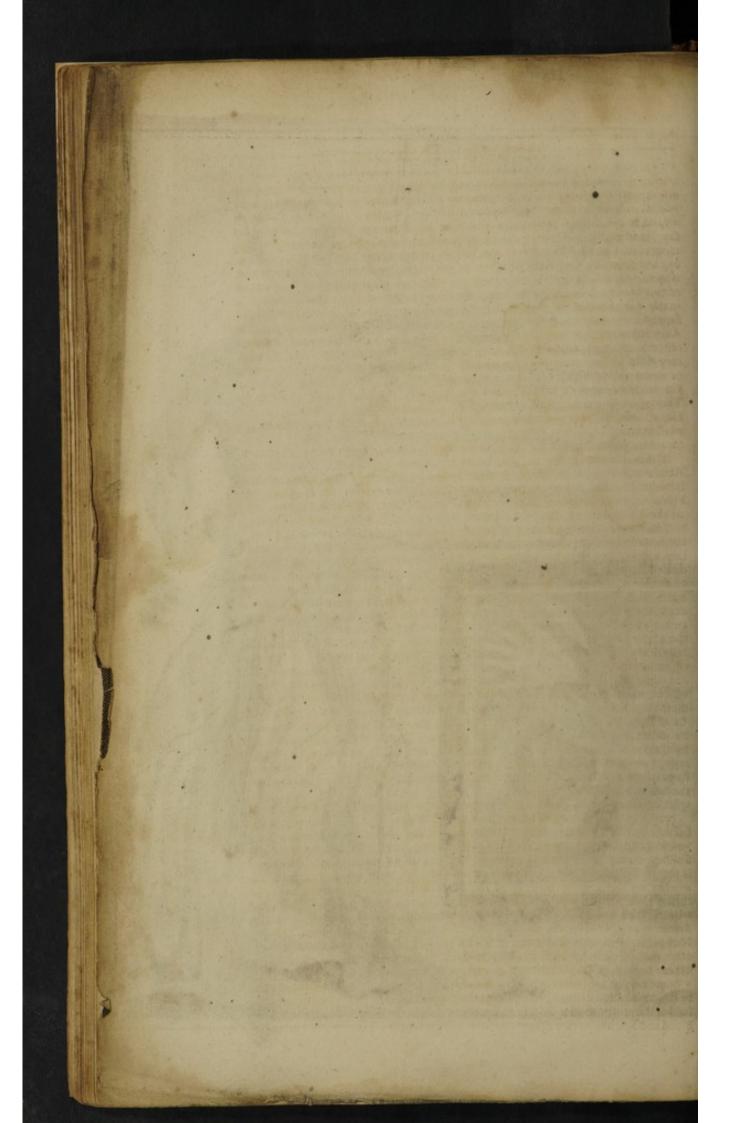
the Bronchia, and their appending Bladders, into the mass of Blood: this is evident, because if the Lungs of a dead Animal be well clear'd from the Cleds of Blood with an injection through the Pulmonary Artery, we may blow the Air from the Winepipe through the Lungs into the left Ventricle of the Heart. Besides, it cannot be doubted but the Air will find way into the Blood thro' the fame Pores of the Lungs which the thick fleams of the Blood, which come out in Expiration, pass through; and through which gross Damps, Peftilential Vapours, and, as they fay, the Nure of

the Air make their way into our Body.

To conceive the Effect this Air operates in our Blood, it is fit to take notice, that Air is capable of being condens'd and rarified, that is, a Pint of Air can be preffed into the compass of a half-pint, and a half-pint can be dilated so far as to fill a whole quart, when all pressure is taken away, as we observe in the Air-pump. The Air is always condensed in a cold place, and rarified in a hot one : for if you fill but the fourth part of a Bladder with Air, and afterwards feal the mouth of the Bladder that the Air should not get out, then put the Bladder in hot Water, the little Air contained in it will spread so violently, that it will burst the Bladder, if the Water be very hot. Since therefore the Air expands it self two ways, either when the pressure of the Atmosphere is taken away, as in a seal'd Bladder, in the Air-pump, or when it is in a warm place, as in the Bladder dipt in hot Water, we may easily believe it will do the fame in our Body, for both Reasons : First, because when it has passed out of the Lungs into the Heart, and into hellow Vessels, it is in a manner out of the reach of the pressure of the ambient Air, and consequently must dilate it felf upon that account alone; besides, it mixes it self with hot Blood, which boils and ferments in the Arteries and Veins, and its expansion must likewise encrease considerably for this reason. But the Air cannot expand it felf in our Bodies without expanding and vivifying at the fame time the blood in which it is contained; this is the reason that the Blood that has passed through the Lungs is much more thin, more florid, more frothy, and more rarified than any other; here needs no Nitre to thin the Blood, the Elafticity of the Air will do more effectually all that is attributed to its pretended Vertue. For little streams of Air being received into the Blood through all the Bladders of the Lungs at once, will ratific fufficiently that quota of Blood which the Lungs then contain, and the Air that is to come in by the next Inspiration will rarife the succeeding waves of Blood; so that the Circulation of the Blood and Respiration keeping time with one another, the Blood cannot want Air enough to be fermented and rarified. It is not enough that the Air should rarifie the Blood in the Lungs, but it is likewife necessary that the same Air should circulate with the Blood through all the Veffels and Parts of the body, otherwise it would coagulate, and would be too thick to continue its circulation; for the Air keeps the fulphureous parts afunder, and hinders them from meeting, to prevent a coagulation: it is this Air that swells the Blood to fill up the Veins and Arteries while we are alive: for when we are dead, and this Air is evaporated, the Veins alone are hardly half full, and the Arteries are quite empty. It is the Springiness of this Air that makes the Blood and Flesh swell when Cupping glasses are apply'd to any part of the Skin; it is this Air that fills up all them Bladders we fee in Butchers Meat newly kill'd; it is it that fills the Stomach, Guts, and all the hollow places of our Air is, in fhort, the Spirit and Life of the Blood, as Blood is the Life of the Body. for without it the Chyle cou'd never be changed into Blood, the Principles of the Blood could never be exalted, nor kept in motion; and we fee that when one is bled, that Blood which boil'd a minute before in his Veins, when its Air flies away, turns immediately into a dead Clod, without fermentation or fluidity.

Let us now examin how much this Air may ferve us to explain the Mechanism of Muscular motion, and let us trace the Blood impregnated with this Air from the left Ventricle of Heart, into the Substance of the Brain: The Brain is a Spenge without any visible Cells, and a Gland without any visible Acini; so that its Pores, and the Cavities of the Nerves, are too small to admit any Part or Principle of the real Substance of the Blood within them. Having, after long Enquiry, computed Substance of the Blood within them. Having, after long Enquiry, computed exactly the disproportion between the grofness of the Paris of the Blood, and the minuteness of the Glands of the Brain, and of their appending Nerves; and having considered the suitable Proportion between the same Glands and Nerves, and the Air contained in the Blood, I never could conceive, that any other Substance was fine or fubtile enough, to make its way thro' them, befides the thin der which they





are supplyed with from the Blood: by which I am obliged to believe, that the Animal Spirits are nothing else but the pure body of the Air strained from the blood in the Glands or Strainers of the brain, and conveyed into the Cavity of the Nerves. I cannot fay, that the Animal Spirits are fuch pure Air, but that they may perhaps be moistened with some thin Vapour from the Blood. Since therefore the Air about us, and that which we breath, cannot be feen by our naked Eyes, it is no wonder why the same Air should not be visible in the Nerve, when we cut it. The Motion of this Airy Fluid in the Nerve, cannot naturally be quicker than that of the Blood in the Arteries; because the Brain cannot sieve the Spirits, faster than the Arteries supply it with Blood and Air; so that the Circulation of the Blood, and that of the Animal Spirits must keep due time with one another, unless the Motion of the latter be immediately haffned by the Influence or free Command of the Mind in voluntary Actions, as in Leaping, Dancing or Running; or unless some outward Body, or inward Disease gives the Nerves and Spirits some sudden motion; as when a Pin pricks unexpectedly the Toe, a Viper or Tarantula bites, a Scorpion stings, a Tendon is wounded, a Vomit gnaws the Stomach, Phrensies distract the Mind, Convulsions the Body, and Madness both. These outward Impressions, or inward Storms encrease prodigiously the rapidity of the Spirits, far beyond their na: tural Motion.

If, Sir, you will grant me, as I hardly conceive how it can be denyed, that the Animal Spirits are nothing but Air: I need not depend of the natural Motion of the Blood nor Spirits, nor of the pretended Verine of a supposed Nitre, to explain the Power of Muscles, or the multiplyed Force of Muscular Motion; for the Elasticity of the Air alone is capable of performing this Effect in the following Manner.

The Animal Spirits, that were before a rarefied Air in the Blood, are now a condensed one in the Nerves; for the Air is always condensed when it is pressed into a narrower Compass, as the Nerves are in respect of the Arteries; this condensed Air passing from the Extremity of the Nerve into the loose and flack Cavity of the Fibres of the Muscles, and meeting there, as it did before in the Lungs, the warm Blood poured in by the extremity of the Capillary Artery, it must necessarily expand it felf, and the Blood both; I mean, the Blood and Spirits must acquire together a new degree of Rarefaction in the belly of the Fibre; It is not poslible for them both to be thus rarefied without swelling the belly of the Fibre, nor can the belly of the Fibre be dilated, without drawing its two ends nearer one another, as when a bladder is blown up with breath, its two ends draw towards the Centre; and consequently, all the Fibres of the Muscle being swelled up in the same time, which Swelling I call Muscular Motion, the bone or part to which they are fixed, must be pulled towards the Belly of the muscle, and the motion of the bone must be visible, unless in the same time it is pulled with equal force in the opposite side, by an Antagonist muscle: For then the bone, like the mast of a Ship pulled all about by Cables of equal Strength, will rest without any visible motion, tho, all the mufeles are in Contraction in the same instant, until either by cutting a muscular Rope of one side, or by determining more Spirits into the Antagonist of the other, the ballance is broke: then the bone must be visibly moved by the prevalent Contraction of one of the Antagonists.

No body can doubt, but that the belly of the muscle is swelled in its Contraction, because if you put your open Hand into a pot of Water, and then shut your Fist, you will find the Water rise, by the swelling of the muscles of the Hand: This Swelling cannot come from any new blood that comes into the muscles; for the blood is rather driven out of them in their contraction, as we experience in bleeding, where the Vein bleeds better when we shut our Fist than when we keep it open; so that the muscle is never more empty of blood than in its contraction: From whence therefore could this swelling come, but from the rarefaction of the Elastic Spirits in the Cavity of the muscular Fibres? Another convincing reason, that the Muscles are swelled in Contraction, is a Person that has one Limb sound, and the other palsical; the palsical Limb is wither'd, and considerably lesser than the

other, because it wants Spirits to distend the Muscular Fibres.

Some perhaps will allow, that the Animal Spirits are pure Air, and that they rarife the blood, and diftend the mufcular Fibres; but they will still ask, How can this sudden Rarefaction in the Muscle multiply so prodigiously the natural motion of the Blood and Spirits, as that the two massets will raise in the Teeth a hundred pound

(d)

weight !

weight? However the matter of Fact is undoubtedly true; and we need not be formuch furprised at it, when we see Weights infinitely more considerable raised every day by the Spring of the Air: Is it not with this Rarefaction, that Gnn powder blows up huge Rocks and Fortreffes? That Cannons shatter Walls regularly fortifyed? That great Spouts are raifed in Rivers, and in the main Sea? That a bladder half full of Air put into hot Water, burits? That a bladder quarter full of Air, put into the Air Pump, raifes a Weight ten thouland times heavier than the Air that swells it? What wonder therefore is it, that two large, tho' short mufcles, as the maffeters are, made up each of above two thousand little fiftulous Cords knit fast together, and each Cord swelled and contracted by rarified blood and spirits, and acting all in confort at once, should raise a Weight of a hundred pound. Since, if Itake a common strong Rope that is dry, and fasten one End of it to a high Beam, and let the other End hang down perpendicularly to the Ground, afterwards tye to it just near the Ground, any weight, that the Rope can raise with-outbreaking, then wet all the Rope with Water; in a little time the Rope impregnated with the water, will so contract it felf, as to raise above Ground this weight, beit ever so heavy. If therefore common Water, without Rarifaction, or any other visible Motion, only that of Fluid, foaked up in, and between the Threads of a dead Rope, shrinks and shortens it so visibly, notwithstanding the resistance of so great a weight; what must not rarified Blood and Spirits do in the hollow Strings of a living Muscle?

It would be too long here, to enquire into the Cause of Voluntary and Involentary Motion; I will only say, that Motion cannot be Involuntary; because the Muscles that are subject to it, as the Heart, Diaphragm, and intercostal Muscles, receive Nerves from the Cerebel, as Dr. Willis has afferted, but because they have no true Antagonists; for a great many parts borrow their Spirits from the Cerebel, that are subject only to voluntary Motions, as the Tongue, Eye, Mouth, and all the Face, which receive Branches from the fifth, fixth, and eighth pair of Nerves; and the Heart moves involuntarily, after all the Nerves, I mean the eighth pair, and the Intercostals, that are pretended to come to it from the Cerebel, are entirely cut. The Motion of the Heart must be then necessarily continued by the Blood and Air, that come freshly rarifyed into it from the Lungs. If, Sir, I had more time, I could perhaps illustrate and prove this Opinion with a great many other material Arguments; but since I undertook it only to answer your Request, I hope you will be pleased to make Apology for what I told you must be descent

in it, I am,

SIR,

Your very Obedient Friend and Servant,

Bernard Connor.

London, Brown-low-ftreet, July 16th. 1698. Have thought bere convenient, to set before this Treatise of Muscles, the Honoured Dr. Connor's Philosophical Account of the Dechanism of Duscular Dotion, for the Curiofity and Satisfaction of such, as are not only desirous to know bow Muscles move all other Parts of the Body, but likewise to be informed of the Genuine Causes of their own Natural Motion. I need not here enlarge on the Drs. Skill in Anatomical Disquis sitions, his Travels all over Europe, and his Chymical and Anatomical Lectures and Experiments in both Universities. and here at London, for some Years last past; with what he hath Published of these Matters, have given sufficient Testimony of his Capacity in all the Parts of Physick: I will therefore begin my own Description of the Series and Structure of the Muscles in the Manner following.

Lecture I.

In which are contain'd the MUSCLES of the Lower Belly, and its adjacent Parts.

Obliquus Descendens,] Cremasteres, Obliquus Ascendens, Dartos, Musculi Chitoridis, Rectus. Directores, Penis. Pyramidalis, Transversus,

Obliquus Descendens:

The Oblique Descending Muscle.

OTHING but an Almighty Contrivance could have preffeth the Framed and Interwoven fo Artificial, and fo ex- Belly laterally. quisitely useful a fleshy Compress or Bandage for the Lower Belly, which serves not only as a warm covering to it, but brings it also into a round Shape, and Form: And for our greater admiration hereof, altho' at the first view, this Carnous

Expan-

Expansion seems as it were made all of a piece, yet it is to be divided into several pair of Muscles, by such Masters of Anatomy who have been conversant in Dissections, where we may plainly see, as they appear in divers shapes, so do they carry in them various courses of Fibres, all which demonstrate their being framed as so many different Machines design'd for diversity of Tonick Motions, here planted on purpose for enwrapping the Bowels lodg'd within their enclosures, and securing them in their proper Places,

and due Centres.

Nor has Nature been less careful in appointing them their several apartments, for their readier exercises of these their separate motions, some of these being planted laterally, and yet seen to joyn with the Right Muscles, as are the Oblique Descendent, Oblique Ascendent, & the Transverse Muscles; all which, as they have Tendons marching upwards towards the middle of the Abdomen, so are they inserted, and centred with a Membranous Expansion into the Linea Alba, and are afterwards annext to the Right Muscles, serving as Braces to keep up these their Triangular Coverings; at the bottom or Bafis of which, the Pyramidals are seen to arise, who in their ascent, making one long Tendon, inserting its self into the Navel, or fometimes feen terminating, either above, or below it, into the Linea Alba, where they are implanted under each other, making a thick Arch as it were, tho' in truth, they are melted into divers Arches, not only for guarding the Inward Parts from Cold, but for the exemplifying and enlarging their Dimensions, in making more room for the Bowels (as the Liver, Stomach, Guts, &c.) to move in, when ever they may be deprest by the Diaphragm in Inspiration.

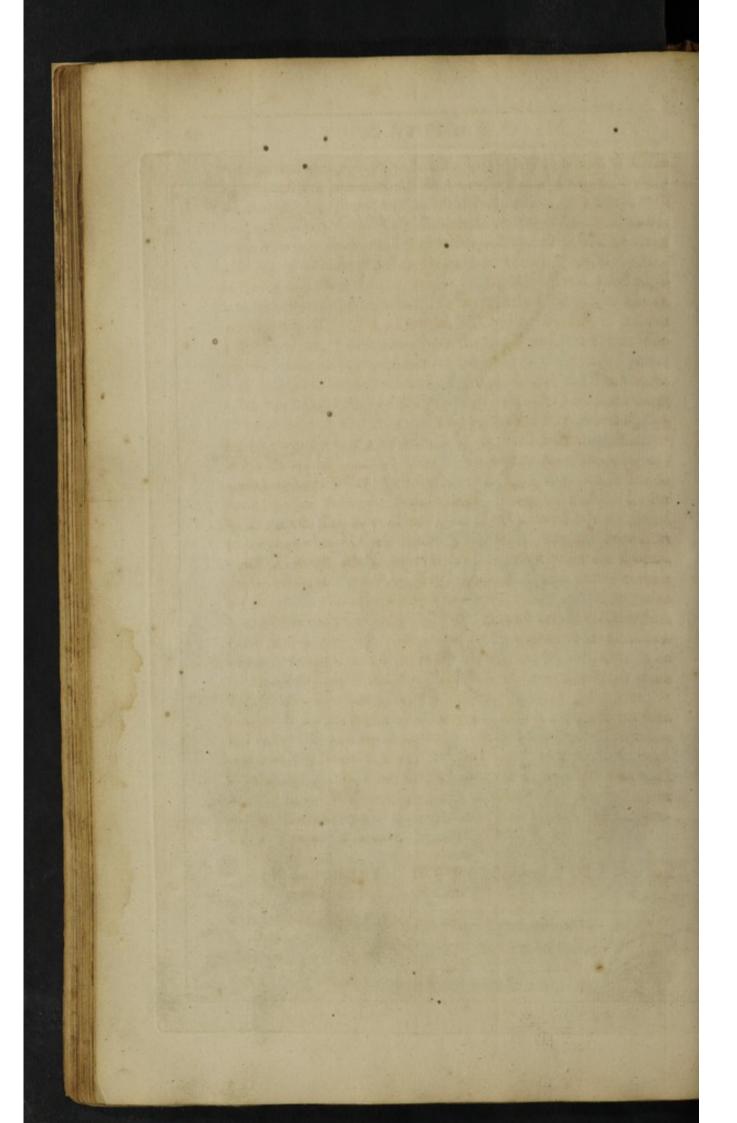
And as most of the parts of the Lower Belly are floating, loose, and relaxt, so also are they spongy and greasy, their Texture being loose, and they being bedewed with an infinite number of Vessels, are many times seen to run into putrefaction; for when the Aire once enters their substances, they are soon seen to consider the blood which gave them life, by their being too long exposed thereto; and these parts being at any time deprived of the Bloods motion, which carries in it both Life and Heat, there must

naturally follow a Mortification in the Parts.

And if we consider, that the Peritonaum is seated just above the Omentum and Mesentery, the two only Repositories of Fat, by which 'tis actually separated from the Parts by heat, 'tis easily understood that these parts continually oyling and bedewing the Fibres of the Peritonaum, do so soften and extend it, that they readily.

make

TAB. I Prælectio prima



natt-

blows, or any other accident. And the Abdominal Muscles, whose fleshy Expansions do garnish the lateral parts, whilst their Aponeurosis do take possession of the fore parts of the three Regions, have three of its Muscles seen perforated towards the Groins, for the passage of the Spermatick Vessels; and as the Tendons of the Oblique descending Muscles do pass downwards, and the Oblique Ascending do pass upwards under them, and the Transverse do cover the Flanks, so those of the right Muscles do march upwards all along, the sides of the Linea Alba; by which various situations and dispositions, they are seen to poize and ballance all the parts of the lower Belly, when ever they become contracted in the time of Expiration; and being thus closely and firmly put together, they most certainly do keep the Belly in a perfect level.

And if we consider these as we ought, we may hence make a ready guess at the Original Causes of Ruptures, which do commonly happen in these parts; especially if we do observe their Mechanism, wherein we may find something worth our curiosity, considering, that Violent Blows, great Shakings, long Courses, Excess of Venery, Dancing, Vaulting, and the like, are not only capable of moving the Guts, but of removing them also, and turning them from their proper Originations and Connexions; where, in many, or most of them, we find the Guts are prest or beat down by the Diaphragm & the Abdominal Muscles, which by their violent and reiterated shakings may oblige either the Kell, or the Guts, so to strike against the surface of the Peritoneum, that they have many times been seen to break through the inward parts thereof.

Having thus made some useful Annotations about the Muscles of the Lower Belly in general, by way of Introduction, We now come to describe them as they are seen to arise in dissection, beginning with this, both in respect of its largeness, and its Situation, it taking its Name from its rank of Fibres marching obliquedly downwards, being partly sleshy and partly Tendinous, and as tising from the 6th. 7th. 8th. and 9th. Ribs indented, or indenting themselves into the carnous Dentisorm processes of the Serratus Major Anticus, and as Diemerbroeck writes, sometimes seen to arise from the 10th. & 11th. Ribs, and is also membranous from the Transverse processes of the Lumbal Vertebres, and passing to the Linea Alba, and Os Pubis, by a broad Tendon, it is let into the middle of the Abdomen, and is not to be separated from the subjacent Tendons of the Oblique Ascendent Muscle, without difficulty. This Muscle for the most part being sleshy in its Origis

nation, and inserted with a Membranous Expansion into the Linea alba, is perforated by the Cremasters, and in them are included the Spermatick Arteries and Veins near the Os Pubis.

Observat.

This Tendon being either rent or stretcht with the next under it, and the Intestines or Kell passing through them into the Inguen, or Scrotum, occasions either an Intestinal or Omental Rupture.

Annotat.

To dissect this Muscle aright, you must divide the Latissianus Dorsi from him very low, that you may more readily arrive at his Lumbal Origination; then, by passing your Probe between the two Tendons, you are to divide the upper from the lower, the whole Length of the Abdomen.

Ule.

Columbus and Laurentius write the chief Use of this Muscle, is to contract the Trunk of the Body, and promote free Breathing; and that contrary to all other Muscles, these of the lower Belly appear crooked when they do not work, and that they turn in-

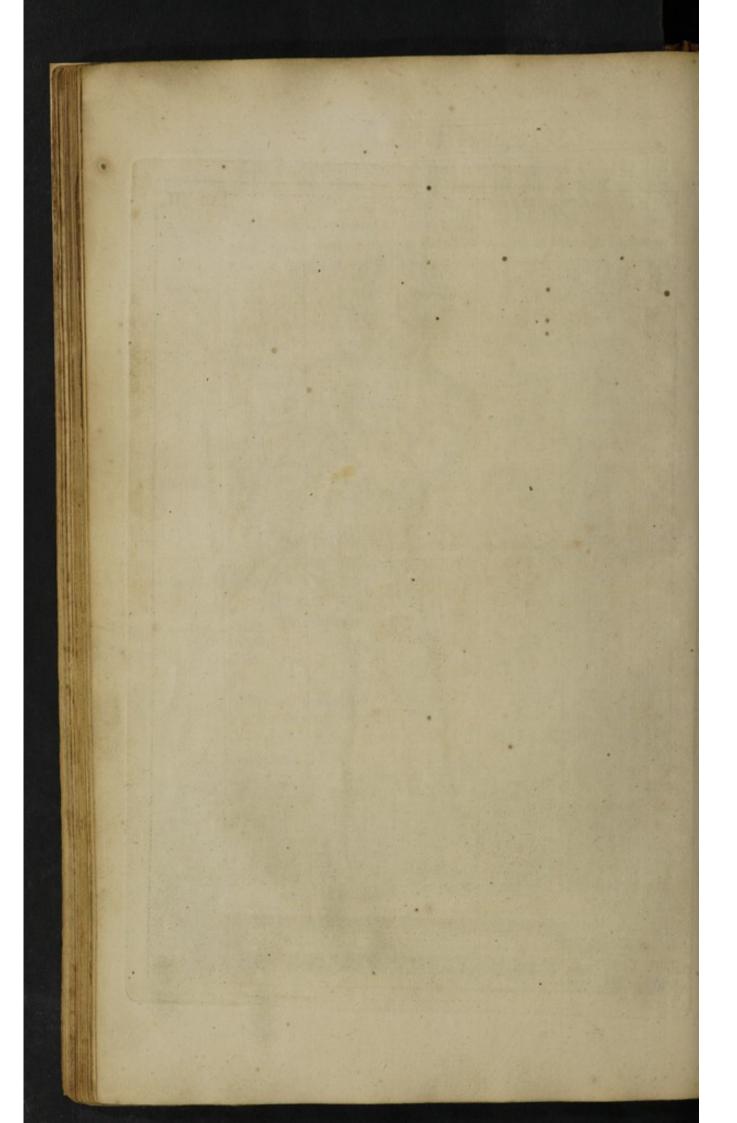
wards when they do.

Hiftory.

In the Year 1684, coming from Windfor, I was sent for to diess one Mr. Dorington,, who was run through the Body by Sir W. C. at the Bell Tavern in Westminster, where finding a good part of the Kell hanging out of the Wound, beginning to turn colour, I immediately cut it off, and having cleared the Wound from Blood, I stitcht it up, leaving empty Spaces between each Stitch for the Blood, or any Ichor to discharge its self by, and with convenient Boulsters and Compresses I concluded my first Dreffings, having prescribed him an Emulsion, a Traumatick Drink, with a Cordial Julep to refresh his Spirits, &c. The next day I called (Mr. Page, and Mr. Cockain, who were then Master and Warden of our Company) to my Assistance, as is usual in these dangerous Cases; and tho' we then found him in so very low and weak Condition, that his Excrements came involuntarily from him, and that he was troubled with continual Faintings and cold Sweats, which gave us sufficient Cause of Julpecting his Recovery; yet by Gods Bleffings, and my Care of him, I perfectly cured him, and he is very well, and in perfeet Health at the Writing hereof:

This you have shewn at Tab. I, in its place, and in Tab. II. it is laid. bare with its Membranous Part.





Obliquus Ascendens, or the Oblique Ascendent Muscle.

HIS is planted under the former, with Fibres obliquely This helps alcending from the Appendix of the Os Ileon, it having a in Compresthree-fold Origination, first fleshy under the 11th. and 12th. Ribs, whose advantageous Situation conduceth much towards the clofing of the Trunk, by its Contraction in Expiration, whence arifeth a Relaxation of the Diaphragm, it being reduced to an Arch, and the Guts and Stomach being elevated by the compression of the Abdominal Muscles, are reduced to their proper places, as Dr. Collins observes. Its second Origination is Tendinous, and ariseth from the Spines of the Os Sacrum, and the Transverse procelles of the Logus; the third being fleshy, and arising from the Appendix of the Os Ileon, and inferting its felf with a Membranous expansion into the Linea Alba, receives a persoration by the Cremaster Muscles, and Spermatick Vessels, somewhat above the former, as is frequently shewn by Diffection.

I conceive that these Oblique Ascending Muscles lodging just under Observat. the former, and running counter with them in their Fibres, do

keep them in Oblique Ascending Angles.

Again, when the feveral Abdominal Muscles do variously con- Annotate tract themselves inwards, they are allowed to press down the Excrement, and fend it forwards, and at the same time said to reduce the Stomach and Guts to their proper places, they being Antagonists to the Diaphragm; which, while moving, they bring it into a plain, when it enlargeth the Trunks capacity, making a way for the Lungs to fill themselves with Air, and pressing down both the Stomach and Guts in their expansions, by which the Chile is gently dispatch into its Duct; and when the Diaphragin leaves off, these Abdominal Muscles begin, by loofning it, and bringing it into an Arch, upon which the Belly becomes lank by the Contraction of these Muscles, they forcing the Stomach inwards and upwards.

In Fabrit. Hildan. Obs. 39. Cent. 2. We read of a Man about forty Years of Age, being troubled with a great pain of his right fide, reaching even to his Spurious Ribs, without any apparent Intemperiety, fave only an hardness that was found between the Abdominal Muscles, being deeply seated there, and by its continued pain, it gave a sufficient reason to suspect an Abscess there arising, which ought to be laid open; which being carefully done, the

Hiftory.

Mat.

matter flew out plentifully, and the Symptoms abated, and the Patient happily dismist from his Pains, with a perfect Recovery.

This you have at Tab. II, with its Semilunary Line, and at Tab. IV, you have the same laid bare.

Rectus Abdominis, or the Right Muscle of the Lower Belly.

This brings the Belly forwards.

Observat.

HIS pair of Muscles being covered with right Fibres, well and strongly made, and sufficiently lined with Flesh, have their Names given them from their Rectitude of Fibres; this ariseth from the Os Pubis, and running along the length of the lower Belly, from the Enfiformal Cartilage, is inserted into the sides of the Sternon, where the last true Ribs have their Cartilages: Its Infertions are various, it fometimes shewing three, sometimes four, and sometimes three and a half, which sometimes appear above, and at other times seen below: The Paragraphs of this Muscle are also very observable, for where you find four Paragraphs, you will scarce meet any Pyramidals. Some Authors write, that these bring the Penis from the Ribs, and that they seem to swell when we rise out of our beds, and fill outwards; others fay they help towards the bringing the Trunk inwards, and that by their double Contractions, they bring the Brest to the Os Pubis, and the Os Pubis to the Breft.

Annotat.

Again, as they take their Originations from the Os Pubis, and the Sternon, and insert themselves into the Linea Alba, marching all along lengthways, through the middle of the Abdomen, by their Contractions they are said to bring their Insertions inwards, by which motion, they are allowed also to promote the Peristaltick motion of the Guts, in their discharge of the grosser part of the Excrement.

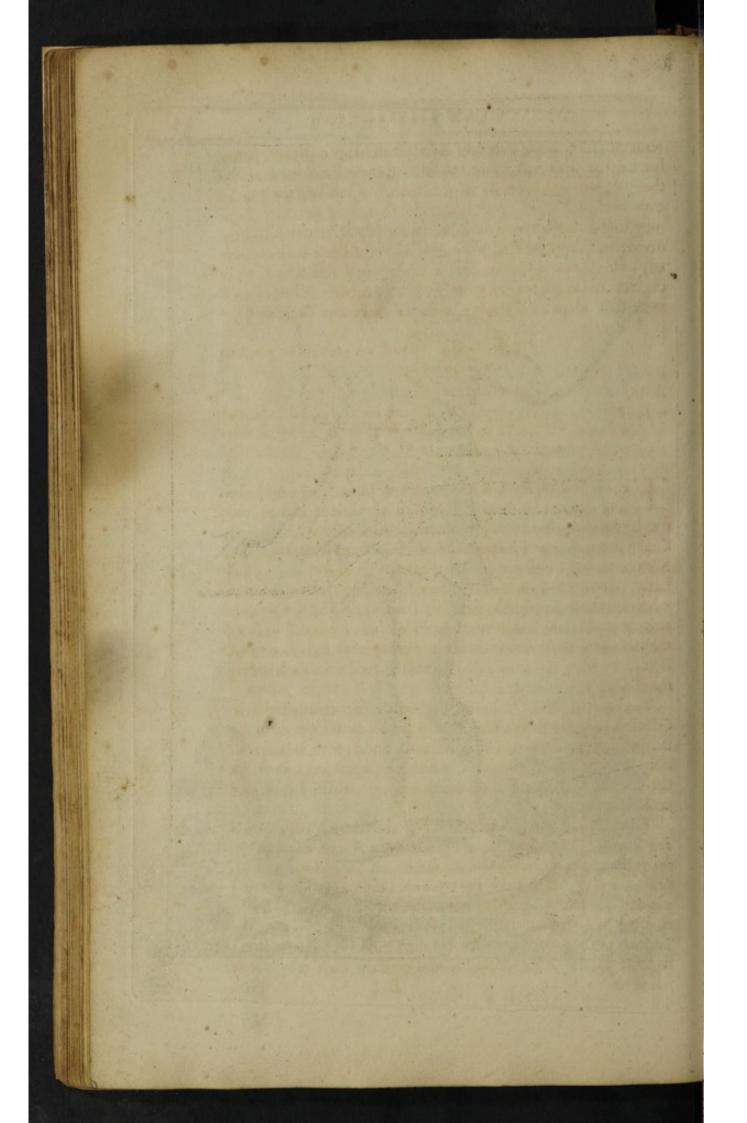
Again, as they march along in straight lines, and the Oblique Descendent in Bevil lines, and the Oblique Ascendent in Oblique Ascendent lines upwards, and the Transverse crossing the Belly, towards the Flanks; all these being closely put together, do make a warm Covering for the Bowels lodg'd within its Dimensions.

Observat.

And as a very useful Observation to all Students in Anatomy and Surgery, the Fibres of these Muscles, are to be always had in

remem-





remembrance, when ever any Abscess shall happen in these parts; for he that shall make any Incisions in these Parts, contrary to their Fibres, will not only divide them, but weaken the Muscles ever after; and he, who ever he be, that shall open an Abscess, hapning in this Right Muscle, with an Oblique Incision, must necessarily divide its Fibres, as well as he that makes a direct Incision into any of the Oblique Muscles; and he that opens the Transverse Muscles with an Oblique Incision, must necessarily cut their Fibres, as much as he that opens the Pyramidals when he cuts them Transversly.

> This you have at Tab. III, and at Tab V. you have the same laid bare.

Transversus Abdominis, or the Abdominal Transverse Muscle.

HIS Pair takes their Names from their Situations lodging under the former, and are penetrated above with the selly done the Cremasteres, and are allowed a three-fold Origination; first, Fleshy, from the inner Extremities of the Bastard Ribs; secondly, Membranous, from the Transverse Processes of the Loins; and lastly, from the Spine of the Os Ileon, inserting themselves with a Membranous Expansion into the Linea Alba, which is a Contexture made up, and interwoven out of all the Tendons of the Abdominal Muscles, which being run together into one entire Body, do very much affift each others Motion in compressing the Belly.

Bartholine writes, That this was made for compressing the Observat, · Colon: Most Anatomists allow, that this Pair of Muscles do bring the Belly inwards, they being of much Use in their Contractions, and by being also of a moderate Thickness, do assist the former in keeping the Bowels warm, which are lodged under them.

This Muscle also being perforated above the Oblique Ascending Muscle, through which the Cremasters and Spermatick Vessels do país, and the Perforations of the Oblique Descending, and Oblique Ascending Muscles of the Abdomen being thus framed and planted one above another, not in Araight, but in Bevil Lines, running and croffing the Belly, do hinder the Prolapsion of the Intestines into the Scrotum; for by their Fibres running-counter to those of the Right Muscles, and crossing each other, they

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are plainly seen to bind the Guts in their proper places, as the Fibres of these Transverse Muscles running o'rethwart, do the same in their right Angles securing them laterally.

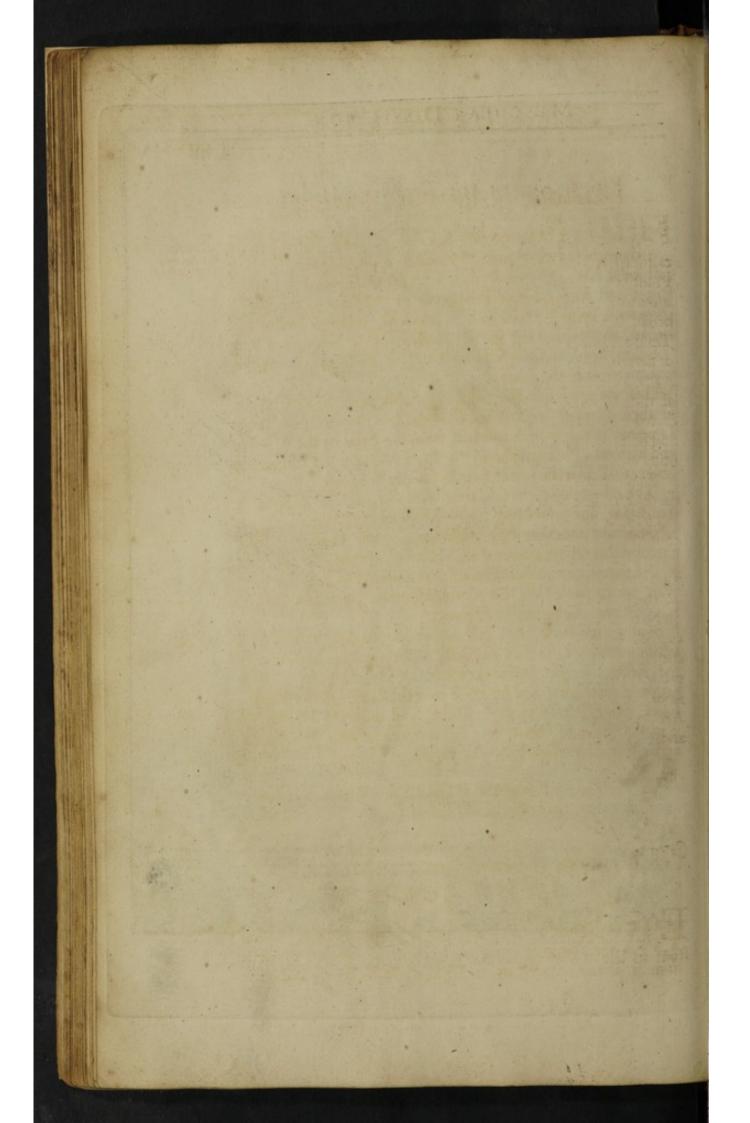
Observat. Chyr.

As for the usual Accidents which generally happen in these parts, I find none more dangerous than Mortification, which is evermore accompanyed with Pain, Fever, Strangulation. and sometimes the Iliacal Passion, where the Excrements are often forced against their own weight to mount upwards, and feen to come towards the mouth; the Caufe of which cruel Symptome proceeds from the Guts, being inflamed by the Excrements therein lodged, which it communicates by inflaming the Ends of the Muscles, especially arriving at this of the external Oblique Muscle, which by reason of its Tendinous Frame, fails not to shut up the Gut, and augment the Inflammation by a reciprocal Action, which caufeth Interruption of the Course of the Blood and Spirits in that part, from whence comes the Reflux of the Excrements, Blewness and Mortification, which may eafily follow from the Loss of their Motion, from whence can ensue nothing but Divulfion, Pain, and Loss of Life. There's yet another Lividity, which many times is feen to arile from too hard Preffure of these Abdominal Muscles, frequently caused by handling the Belly too much, and too hard, and rough, as is often feen done, in endeavouring to bring the Stone down to the Neck of the Bladder, which unprofitable, as well as unneceffary Tryals, are oft-times the Occasions of many Bruises, imprinted on the inward Parts, as the Guts, the Kell, &c. in which the Blood many times stagnates in the Vessels, and thence is feen to arise an immediate Mortification, and Change of Colour. The Chyrurgeon therefore being here caucioned of these bad Symptomes, should make it his Business, as much as in him lay, to prevent them; or wherever he be fent to any where, he has all these appear to him, he ought rather to retire, than undertake such a Patient, lest he brings his Reputation into no small Danger.

This you have at Tab. V. loth in and cut of its place, with the Peritonaum.

מון בחל ניניונו ות פוביי ככוכר





Pyramidalis, or the Pyramidal Muscles.

FALLOPPIUS, the first Inventer of these Muscles, gives them these two Names, Pyramidalis from its make, it being downwards. fashion'd like a Pyramid, with a broad Basis, and a narrow Point, and Succenturiatus, it being as an Assistant to the Oblique Ascendents, helping them in their Motions; it ariseth Fleshy and broad, and narrowing its felf by degrees, it becomes a long Tendon, Implanting its self into the Navel, or sometimes above, or beneath it to the Linea Alba.

These are often seen wanting in those who have the Origination of their Ascending Muscles, not from the Ileon, but from the Strong Ligament, which passeth inwards from the Spine of the Os Pubis, and hath four Pharagraphs in the Right Muscles; 'tis commonly observable, that the left of them is usually the least.

The Inventer of them says they were design'd for compressing

the Bladder, and promoting the discharge of the Urine.

Columbus writes that they affift in raifing the Penis, but Fludd confutes this Opinion from their Situation; for they do not reach it, and therefore cannot reasonably be suppos'd to help that part, with which they have no Correspondence; another Reason is, they are also found in Women.

Nature has shewn her self a very industrious, as well as a curious Mistress, in thus variously planting these Muscles over the Belly, for the better keeping the inward parts in their proper Enclosures; and by these their substantial stelly Expanfions, defending them from Cold, and outward Injuries, in Arching some of them, and running others into right Lines, and allowing these a Pyramidal Figure.

> This you have at Tab. III, and Tab. IV. in its proper place, and the same laid bare at Tab. V.

Cremasteres, or Suspensorii, or those Muscles which keep up the Testicles.

ACH Testicle is furnished with a proper Muscle, which has the Name of Cremaster, from Keeuda Suspendo, given it up the Test from its Use of keeping up the Testicles; as De Graaf, and other

Uſe.

Anatomists write: It is tyed to the outward Membrane of the Vaginal Coat, on either side: In Man, it has its Origination from a Ligament belonging to the Os Pubis; but in Dogs, and other Creatures, their Beginnings are seen to arise from the Tendons of the Transverse Muscles, with somewhat of Obscurity, whose stellar Fibres are seen to march the whole Length of the Vaginal Coat, especially in its back part; for which reason, its outward Coat appears asperate and sibrous, whilst its inward (which respects the Testicle and its Vessels) is light, and bedeward with a waterish Moisture, as De Graaf writes, and is strongs by annexed to the lower parts of the Testicles.

Ufe.

The Use of this Coat is threefold; First, that the Testicles in cold weather may be nourished and cherished by these their Coverings; Secondly, to keep them up, lest being at any time over loaded, their weight might make them sall down, and hereby hinder the Spermatick Vessels in their Operations, as have some times been seen in the Act of Venery: And

Bartholine tells us, of one who had this Muscle so strong, that by the Strength of its carnous Fibres, he could move his Testicles either way as he pleased; as some are seen to move their Scrotums, and others their Fronts, by the Use of the Muscular

Fibres, lodged under the Skin thereof.

Histories.

Bartholomeus Cabrolius, Obs. 3. writes of one without Testicles. Riolan in Anthropograph. Lib. 11. Cap. 31. writes of a Young Man, of 25 Years of Age, who, when he publickly dissected in the Schools, shew'd a Body with one Testicle.

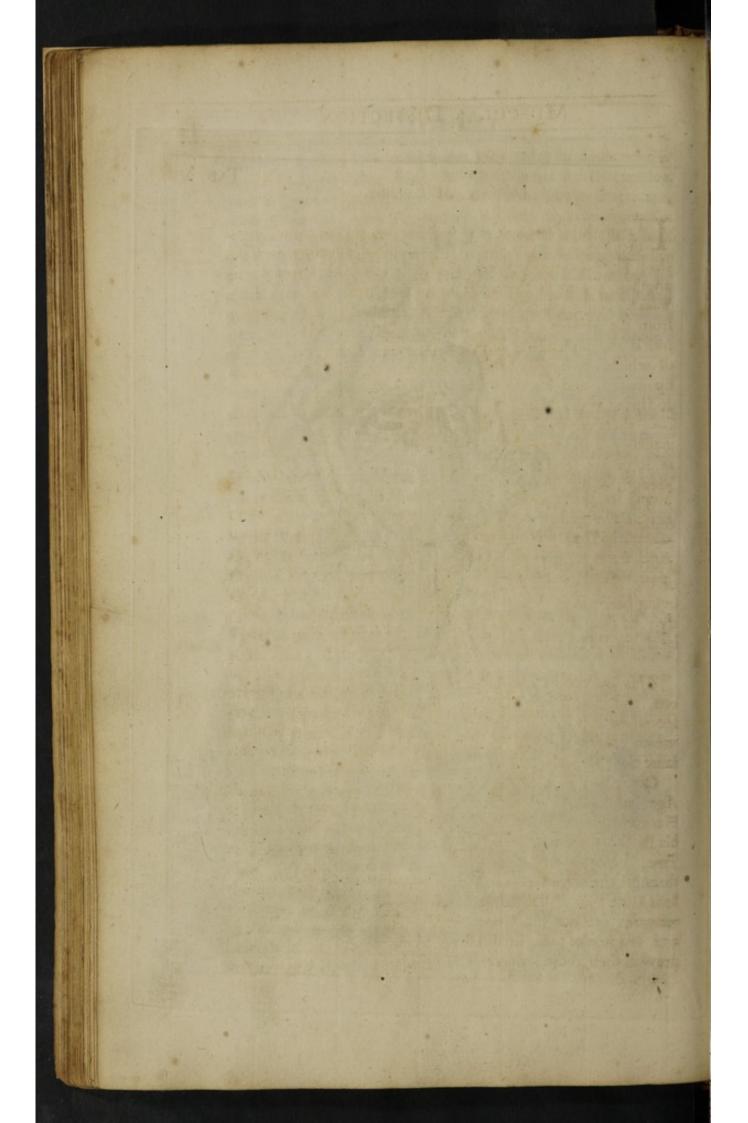
De Graaf writes, in his Book de Org. Vir. That he diffected a Man with one Stone, without any Cicatrice in the Inguen or Scrotum; and tho' his Wife had four Children by him, yet being askt whether her Husband had ever two Stones, she told

him he never had more than one.

Some, on the contrary, have had three Scones, and this has run so in many Families, and these are generally allowed Masters of great Letchery. And there are some Anatomists, that write, that in the Illustrious Family of the Colings, many have had three Stones. Fornelius and Forestus have many such like Observations; among which, he tells you of one at Antwerp, who had three Stones, and was taken Notice of for being a very lascivious man.

This you have at Tab. VI. Fig. III.





Dartos, or Corium.

I Thath this Name of Dartos by Celsus, a dieas Corium, or rainther a dieas discussion, one of the four Skins, covering the Testicles; The Scrotum being nothing else, but one Skin covered with another, the inner thereof is seen to be made up of a Fleshy Panicle, being thinner than the other: It takes its Origination from the Membrana Cannosa, it being a Muscular Membrane, surnish'd and replenish'd with many carnous Fibres; by the help of which, its neighbouring Coat is seen to contract and purse up its self, and by the Contraction of both, they do narrow and bring in the dilated Dimensions of the first Coat of the Scrotum; there are those who have been seen to have these so strong, that they could take in, and let out their Cods at their pleasure, as some are seen to make their Foreheads contract, by the Strength of the Fibres of the Muscles lodged under them.

The Coats investing the Testicles, are allowed to be either common or proper, by Regnerus de Graaf. The first of which we commonly call the Bursa, or the Bag, from whence its generally supposed, the rest of the Coats do take their Names of the Scrotum; this being made purely of a Cuticula and Cutis, being here much thinner than that of any other part of the Body; its clear'd of Fat, to prevent its Extension, which would

be no small Hindrance to it in progressive Motion.

arile

This its second Coat, helps the first in making its Contractic Observations, and runs it into Folds and diverse Wrinkles, as we may see when it is exposed to the Air, or hath been in the Water; which causing these its Fibres to contract themselves, do at the same time shrivel up the Cod, and lessen its Dimensions.

Obs. 57: Fabrit. Hildan. We read of one about 40 Years of History. Age, who was troubled with the Strangury, &c. which painful Fits were several times repeated in few Years, with Pains in his Belly; sometime after, his Water lest coming through his Penis, but now and then forc'd it self through his Cod, and through the Region of his Pubis, where it made many fistulous Ulcers for its Discharge, and through which he ever afterwards let out his Urine, without any Pain or Trouble; and as some of these small Ulcers seemed to dry up, new ones grew in their room; after this, a new large Abscess was seen to

afile in the left fide of his Scrotum: He coming to Bafile in very great pain, foon after, it broke, whence iffued much Matter, and after which, a Stone appeared to view; which being Extracted. weighed at first above an Ounce; but being dry'd, it afterwards weighed less than five Drachms; the Stone was porous, and of a Cineritious Colour, not much irrelembling a Pumice stone, dipt in the water; yet this Man received lo good a Cure, that he could retain his Urine (notwithstanding his former Ulcers) with out any involuntary throwing out of the fame.

This is not to be shewn by any Figure.

Musculi Clitoridis, or the Muscles of a Glandiform Corpuscle.

the Clisoris.

This extends THE Clitoris comes from an obscene Word, KA Tropia gav Fricare, or Contrect, or Tickle, or Handle: It being a small round body, fram'd of Nervous, and spongy Parts, arising out of the upper parts of the Os Ischium, as out of two Crura, or Thighs, meeting at the Commissure of the Share Bone: It having various Names given it by Authors; Hippocrates calling it Columella, from its likeness to the Uvala's hanging down; Avicen calls it Virga Muliebris, which some Women have made use of as their natural Penis; Baubine names it Venus's Darling; Columbus, and others call it, the Place of Love and Pleasure: And if among thele, I presume to call it Natures Tricker, I shall not suppose my self much in the wrong; in that, (like that of a Gun) when ever this part is rais'd, or swell'd up by the warmth of Womens Embraces, (like a flash in the pan) it readily raises their Letchery by a close perfrication of this part, in the time of Coition, in which it willingly receives the strutting Penis, with its elaborated Blood and Spirits, into the most amorous Chambers of their natural delight; and were it not that these Parts were absolutely endew'd with so exquisite a sence of Delight and Love, in their venereal Embraces, there is no Woman would undergoe the burden of a nine Months Travel, and at the end of that, the cruel Pains of the discharge of the Fatus, were it not but now and then in the midst of her troubled thoughts, She entertains and refreshes her self, with the reiterated Motions, and kind Embraces of those who first occasion'd these her lively Pains.

Various indeed are allowed the Dimensions of this part,

it being plainly more apparent in some Women, than in others: Hence Regnerus de Graaf assures us, that in an extraordinary Loose of Nature, he hath observed in middle aged Women, the Clatoris to hang down like an Internode of a Finger, and without the Deduction of the Lips of the Matrix, it has been apparently seen with the Divarication of its Muscles: Plazzonus writes, he saw the outward part of the Clitoris produced into that bigness, which equall'd the length of four Fingers: And Platerus, in his Obs. Lib. 3. writes, he saw one in a Woman that equall'd a Goofes Neck, both in length and thickness; and Plempius relates of one Helena, who exercised this part with many Women, and had corrupted several Virgins therewith; and Diemerbroeck fays, he once faw in a Woman at Montferet, that was a Beadles Wife, who had a Clitoris the length and thickness of a moderate Penis: And tho' the same Author writes, that the Clitoris in Women does very well answer the Penis in Man, both in its Situation and Substance, and only differs from it in length; yet reason will not allow this, in that its Glans is no ways perforated, nor has it any Passage into the Urethra, as has that of the Penis.

The Muscles affign'd this, do arise out of the Bones of the Coxendix, which passing over its Crura, are thereinto inserted, and are allowed by their Contractions to compress them; and by this their Compression, are said to give a Check to the Motion of the Blood, upon their diffending the Body of the Clitoris. Regnerus de Graaf allows it a second Pair of Muscles arising backwards from the Sphineter Ani, and are fastned thereto, that they may rather be allowed to contract the Orifice of the Vagina,

than procure any Erection of the Clitoris.

Diemerbroeck writes, in Fol. 152, Anat. Lib. 1. that he faw Histories a Man at Anjau in France, of 28 years of Age, with a large Beard, cloathed in Womens Habit, who, for many years travelled up and down to shew his Privities for Money; in whole upper part of the Pudendum, a Clitoris strutted out the length of a middle Finger, and the thickness of a moderate Penis, with a Glans, Prapuce, and Franum joyn'd to it, as is usual in Man; fave that it was wholly imperforated, under the Urinary Paf-Jage; and the Vagina Uteri shew its self as in other Women, and in either Lip of her Matrix, was a Testicle contained.

And in the Year 1668, he writes, he saw an English Hers maphrodite of twenty two Years of Age, who, among many other Shows, came to Utrecht, whose Prolocutor or Informer, pro-

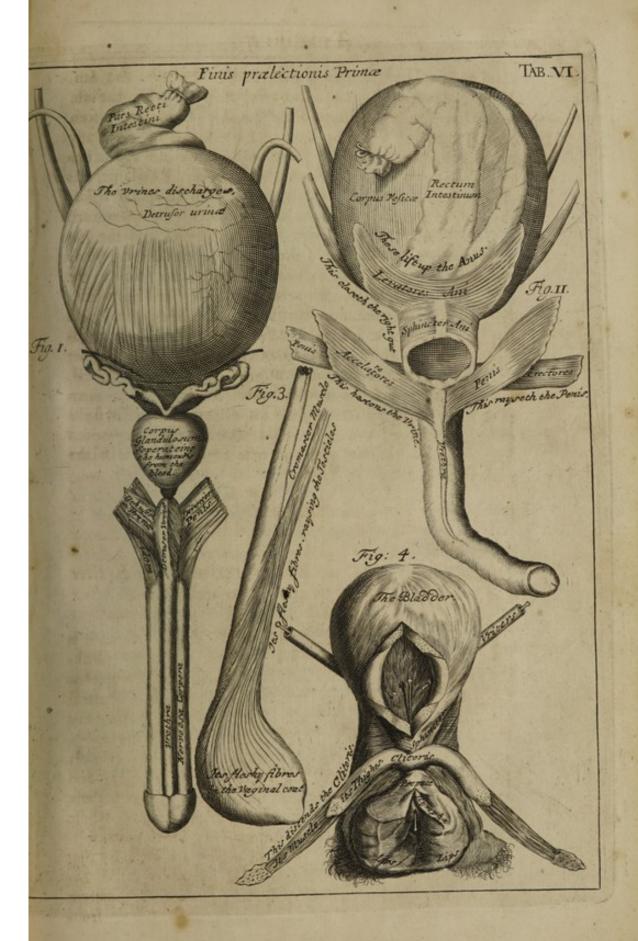
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claimed that he was born a Girl, and in the 5th. and 6th. Years of his Age, his Genitals began to change, and in the inth. year thereof, the Penis shew its self, and was afterwards seen to fwell near half the Length of the Little Finger, without any apparent Perforation in the Glans, altho' it was not much uns like it in Shew: This Penis upon her letcherous Thoughts, was feen to extend a Fingers length, and in each Lip of her Womb, was lodged a Testicle, as in the Scrotum; and a little underneath it, in its due Place, was seen the Urinary Passage, and the Vagina Uteri: Her Interpreter told them, that she had her Menstrues monthly, as other Women usually have; and that in the Height of her Letchery, she usually cast her Seed outwards; but whether this came from her Penis, or her Matrix, he could not, nor was not able to fay: Whence it is sufficiently apparent, that these sorts of Hermaphrodites are not parts of either Sex, but rather to be accounted Women formed with Genitals of an uncommon Conformation, when we shall see in them their Testicles hanging out of the Lips of the Abdomen, and the Clitoris so enlarged and encreased, as to run into those various lengths and thicknesses we have here shewn them to be de-Icribed by Authors.

This you have at Tab. VI. Fig. IV.

Director Penis, or Collateralis, or the Tards Erecter or Collateral Promoter.

THE Penis hath its Name à Pendendo, and sometimes it is called Mentula; it ost-times bearding a Man, or plucking by the Chin, from his more serious business, to venereous Embraces: And Collateralis by Spigelius, from its Collateral order of Fibres. Now of what Esteem and Veneration this Instrument was amongst the Ægyptians, Riolan in his Authropolog. Lib. 11th. Chap. 3. has shewn. Its planted in the lower Belly, as the fittest place, for exercising its faculties; and as to its largness, or smalness, its usually seen greater in those who make more frequent use of it, than in those whose care is otherwise employ'd: Amongst its other parts, it is allow'd two pair of Muscles; one of which are these, by Spigelius commonly call'd Collaterales, and by others call'd Directores, or Erestores Penis, they taking their Originations



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from the Appendix of the Coxendix under the beginning of their Nervous Bodies, in whose thick Membrane their Fibres do feem to terminate and disappear.

And whereas these Muscles are allowed to be Erectors by Observat. most Anatomists, yet whoever really considers their Situation, must reasonably conclude, that they rather depress than raise the Penis; for if here, as in all other Muscles, their Bellies are feen to swell, and their Terminations come closer, or nearer to each others, while they are in Action, (which if granted) then it must necessarily follow, that the Penis cannot be distended, when these Muscles are contracted, or set to work; nothing being more wide, than Extention is from Contraction: Nor indeed, can these Muscles any wife raise the Penis, considering their Situation; for whereas their Origination is firmly affixt to the Bones of the Coxendix, as I formerly faid, and cannot thence be moved, as being altogether immoveable, so it is necessary, that one of the Extremities should be attracted to that part, to which the Penis is annex'd; and therefore plain reason shews, that the Penis must rather herein be deprest, than erected, even from their Originations, which are generally allowed to arise in the lower part under the Penis.

But that we may describe the true Use of these Muscles, according to de Graaf, we with him must grant, that the Penis hath all forts of Vessels allowed it, some of which are sent to its extream parts, arising from the Pudendum, running over the thick Membrane of the nervous Bodies, others marching and entring their inward spongy Substance: The Nerves running over the thick Membrane of its nervous Bodies, are two Nerves ariting from the Os Sacrum, and as many Nerves and Arteries coming from the Hypogastricks, which every way sends ing forth their Capillary Branches, are seen to terminate and run into the Glans, before they obscure themselves. Having thus toucht upon the Vessels allowed the Penis, it will be neceffary to shew what Vessels do go along with these Muscles, in assisting them to cause an Erection thereof; and here most certainly Nerves must be of the one part, sending thither their Animal Spirits, and Arteries also, which afford it Blood sufficient for causing a Distention in the spongy part of the Penis, and without which, no Distention appears; and this is made good, by pouring or injecting Water with a Syringe into thole Arteries of the Deceas'd which lead to these nervous

Bodies,

Bodies, whereby you may eafily see the Penis become distended: Again, as de Graaf ingenuously observes, whenever you tye the Penis of a Dog in the time of Coition, you will scarce find upon opening of it, any thing else but fluid Blood come out from thence, which when discharged, his Penis shrivels immediately up: But as to our present Subject, if it may be enquired, how the Penis is erected in the Action of these Muscles, as it naturally and reasonably seems it should, if they do rather retract or draw the Penis downwards, as we have already faid, rather than raife it; this may ferve for an Answer, that this does not immediately happen from the Muscles, or any Advantage arising thence, but rather mediately, as the Muscles of the Penis in straitning these nervous Bodies near their Originations, do hereby propel, and drive forwards the Blood towards the forepart of the Penis, and by making here a Distention of their Bodies, they encrease its Erection, as we may plainly see in the parts of the Intestines which we distend, either with Wind or Water; where, if one end be comprest, the other readily becomes erected and distended; out of all which, we with de Graaf, may offer at three things, which may advance the Erection of the Penis; first, by prescribing fuch things as can augment the Animal Spirits; secondly, by adviling that which can allow an Encreale to the Quantity of Blood; and laftly, by strengthning the Muscles, by whose Constriction the Blood is allowed to be detained in these the nervous Bodies.

Histories.

Obf. 10. Borell: Med. You read of a dead Body being opened, whereupon examining the lower parts, the Scrotum was found a small Distance from the Anus, and as it were joyned to it; in these were two Testicles found; above his Cod appeared a certain fleshy Substance, covered over with a Cuticula and Cutis, which gave some shew of a Penis cut through its length in the middle, without any appearance of an Urethra; its Root was hard, solid, and almost cartilaginous, and in this its Roots, the Ejaculatory Vessels were lodged; a little above this, a Fragment of a Penis thew its felf the length of the lower Belly; in the midst of this semicircular Fissure, there appeared a fleshy and spongy Substance, the bigness of an Egg hanging outwards, first arising red, and then made livid, markt with round red Eminences; the Ureters did not terminate in the Blade der, because he had none, but in the Fissure, and the Urine discharged its self by its Orifices, and dropt out continually;

Above this Excrescence was planted the Navel, fram'd with four forts of Vessels, Gc. that which in his case was most material, he had no Bladder nor Penis, &c.

Diemerbroeck tells us, Fol. 154. Lib. 1. Anar. of one whose Histories. Penis was Originally lodg'd in the Belly, (as the Testes have sometimes been found in the Inguen, and hence some ignorant Midwives, (the Penis being lodg'd in a Cleft) have declar'd a Female to be Born, and was fo Baptized; who afterward arriving to riper Age, and the obscur'd Penis swelling in Letchery, made its way out of its narrow passage, whereby we may plainly see that these Men were not Women from the first, altho' judged so by filly ignorant Midwives.

In Obs. Schol. Med. Obs. 1. Felix Platerus tells us of a Priest who pift out about 2000 Stones in the space of two Years; it being very wonderful, that Nature should be more careful in raising a Querry of stones in some Bodies, to tear down or over turn the Natural Fabrick, than were ever defign'd others for raising it.

This you have at Tab. VI, Fig. I, II.

Acceleratores Urina, or the Urines Stimulators.

REfides the former, the Virile Member hath these two al- This hastened lowed it, which take their Names from their use made of them; they arising from the Sphineter Ani, and being joyn'd together by their Insides, are seen to run out with an Oblique Ducture, under the outward part of its Channel, and are faid to terminate in the thick Membrane of the Nervous Bodies.

The use of these Muscles, according to some Anatomists, as well as that of the former, is contrary to Sence and Reason; for these are rather seen to narrow, than dilate the Urethra, and therefore can by no means properly be call'd hastners, but rather delayers of the Urines Exit; for they sometimes have been seen to run over the middle of the Urethra, and strongly ty'd to one another with the extremities of their Fibres, whilst the other marching Obliquely over the Urethra, is feen to fend its fides to it Nervous Bodies, Embracing or Contracting it as it were, whence must consequently follow,

in these as in all other Muscles, that as they swell in their Contractions, they cannot at the same time dilate the Urethra, while they themselves are compressed.

The following Observation was sent me by my Worthy Friend Dr. Connor, viz.

SIR,

I looking over the Muscles of the Penis, it made me consider how they are sometimes strangely shrunk and withered; of which I have at present a samous Example in an Officer, who is now my Patient; a strong man about 45 Years of Age, and a Man much used to Women; his Yard, which he assur'd me formerly was sull Eight Inches long, is now so Contracted, that it hardly stretches Three Inches and an half, and is grown very little in all its Dimensions, and makes but a very contemptible Figure, by its being drawn into the Os Pubis; the reason of which I suppose, may arise from his makeing too much use of it, by which the spungy Cells of the Corpora Netvosa become dry'd up, and closed, so that the Blood cannot make its passage into them, nor distend them, as it does in the Natural State of Erection.

This you have at Tab. VI, and Tab. XIV. Fig. I, II.

Lecture

Lecture II.

To which these following MUSCLES do properly belong:

Frontalis, Corrugator, Occipitalis, Orbicularis claufor, Elevator Palpabra, Elevator Dilatator Constrictor Zygomaticus, Elevator Labii Superioris, Depressor S Elevator Labii Inferioris, Depre Tor Sphineter Labiorum, Buccinator, Quadratus, Elevator Depressor Abductor Adductor

Temporalis, Digastricus, Masseter, Pterygoidens Externue, Pterygoideus Internus, Styloceratobyoideus, Coracobyoideus, Milobyoideus, Geniobyoideus, Sternohyoideus, Stylogloffus, Ceratoglo Jus, Geneiogloffus, Mylogloffus, Hypfilogloffus, Lingualis,

Mastoideus,

Frontalis, or the Frontal Muscle.

AVING cleared the Abdominal Muscles, which of ne the Forebead ceffity required our first use of the Kinife, we now upwards. arrive at those which in Dignity deserve our Inspe-Etion, beginning with this Frontal Muscle, which takes its Name from its Situation, it arising from the Elated Part of the Front, near the Temporal Muscle, thin, broad and fleshy, as also where the Carnous Membrane closely adheres to the Cranium; which made Riolan give it the Name of Membrana Carnosa Musculosa, and in its march downwards, is Inserted into that Skin which covereth the Eyes, as also into the Eye-brows.

Annotat.

Hiftory.

In raising this Muscle from the Cranium, you'll meet with Nerves sent from it: This being Elevated, it not only raiseth the Skin of the Fore-head with it, but opens the Eyes also, and being made with right Fibres here, is a fair Caution to all Young Chyrurgeons how they make Incisions in this Part.

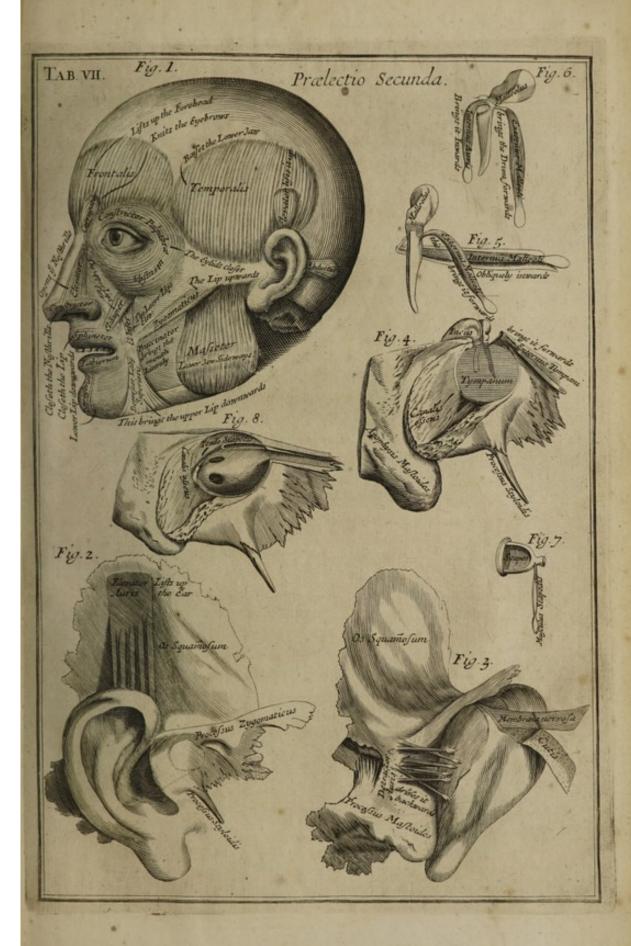
Bartholine writes, that in a Nasute Person, he observed the Appendix hereof to be Extended even to the Cartilages of

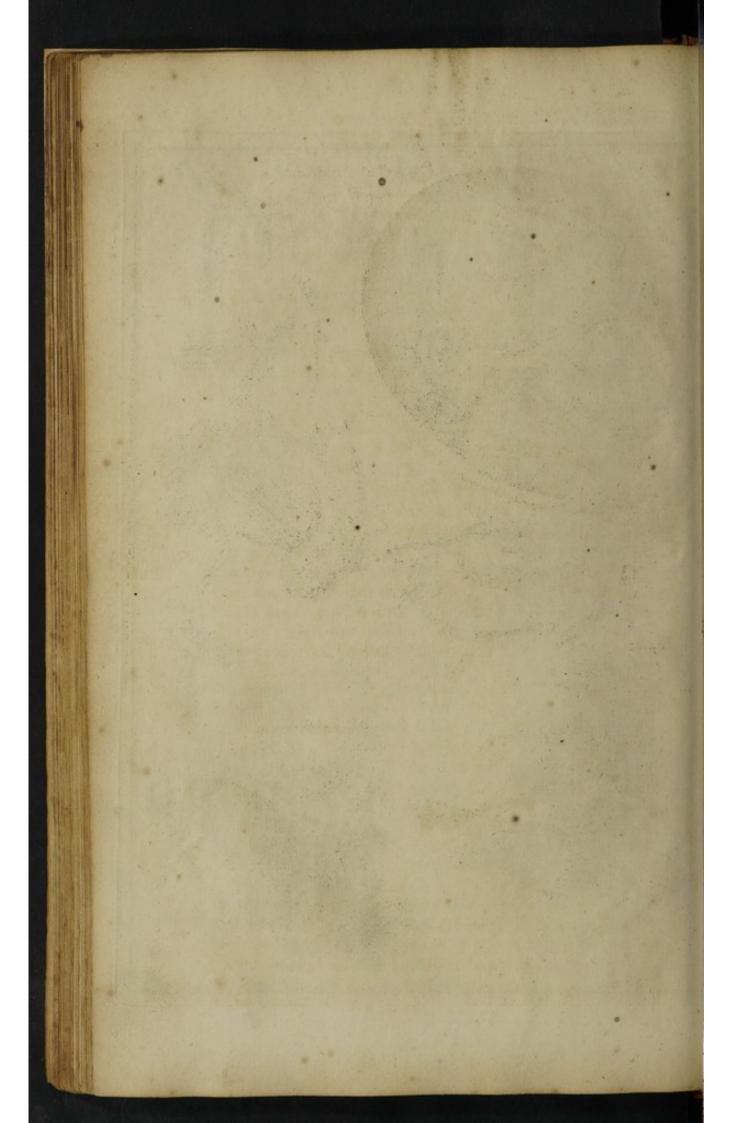
the Nofe.

I begin this Second Lecture with an Observation of a Patient of mine formerly in St. Thomas's Hospital, who was an Old Woman of seventy three Years of Age, who by a fall Fractur'd her Skull, near the lest side of the Frontal Bone; Mr. Hollier, and Mr. James Molins, who were both my Brother Surgeons with me in the said Hospitals, being then call'd to view her with the Physitians also, who were Dr. Dawkins and Dr. Briggs; upon searching her Wound, we found a Fracture thro' both Tables; whereupon, the Wound being Dilated, we Extracted from her a piece of Scull the bignels of a Three pence, &c. And because at that time I had the honour of Monsieur De Blegny's acquaintance, the French Kings Surgeon, and Surgeon of his Hospitals, who favour'd me with several Visits at the Hospital, during his stay here in Town, which hapned while this Woman was my Patient, with feveral other desperate Cases then under my Cure in the said Hospital, which he also saw; and making some Remarks, more particularly on her Case, with another of a Cancerous Ulcer, which had been of several Years standing, reaching from the Calf of the left Leg to the Heel, did engage me, when ever I appear'd abroad in Print, that I would favour him with the Ob. fervations he then made and had writ on both their Cases: The first whereof, I here present as I had it from him, and the other shall be put in its proper Place.

Observations Chyrurgicalles pour estre incerees dans le Journal de Medicine.

SI L'on en croit pluspart des Authours, Il faut toujours faire un prognostic tres suneste dans Les plaijes de Teste, qui sont avec Fracture du Crane; Cependant, il est certain, qu'on a veu bien des sois ces sortes des plaijes, Venis à Cicatrice quoy que Lu Dure & la Pie Mere, & Mesme la propre Substance du Cervous cussent este confiderablement





siderablement Offencies; C'est de quoy J'ay donne divers Exemples Memorables dans nos Journax de Medicine, Tom. prim. pag. 17. 6 527. & Tom. 3me pag. 43. Cela fait Voir, que dans les simples Fractures du Crane, quoy que d'aillures considerables, on peut attendre beaucoup de la Nature, Lors que son action est sont enue par L'Industrie d'un Artiste Experimenté; C'est de quoy L'Hospital de Londres Vient de me four ver une preuve qui me paroift Digne du Remarque; Car, ayant esté Convic par Mr. Browne Chirurgien Ordinaire du Roy et de cet Hospital de my rendre le 15 de Mars dernier 1685, j', eus le plaisir dy voir une Femme de soixante et treize ans qui par une cheute arrivée environ sex semains auparuvant, s'estoit fait une plaije contuse au Front, partie superieure & aucunement senestre, avec deux Fractures si considerables au Coronal, que Mr. Browne avoit avec L'Elevatoiretire une portion des deux Tables de cet Os, de la grandeur d'une piece de Deux Sols, ce qui avoit heureusement prevenu Les accidens qu' on pouvoit crainde de la part du sang espanche sur la dure Mere que cette Femme n'avoit rendu aucune Muliere sanguinolente, Ny parle nez, ny Oreilles, et qu'elle n'avoit Souffert ny vovissement, ny Fiebure, ny Convulsion, la plaije estant d' aillures disposeé à une parfait Cicatrization. Which in English runs thus:

Chyrurgical Observations to be incerted into the Journal of Physick.

If we may believe most Authors, we must generally make a fatal Prognostick of Wounds in the Head, that are attended with any Fracture in the Skull; in the mean time its certain, that those sorts of Wounds have many times come to cicatrize, tho' the Dura, and Pia Mater; yea, the very Substance of the Brain were considerably affected, several remarkable Examples whereof, I have set forth in our Journals of Physick, Vol. 1. page 17. and 526. Vol. 3. page 43. which shew, that in simple Fractures of the Skull (altho' considerable in themselves) one may expect a great Help from Nature her self, when its Action is backt with the Industrious Hand of a Skilful Artist.

The Hospital of St. Thomas Southwark, hath afforded me an Instance thereof, which to me seems worthy of Observation; for on the 15th. of March 1685 having been invited thither by Mr. Browne Chyrurgeon in Ordinary to the King, and to that Hospital, to go along with him to the said Hospital; I had the good Fortune to see an Old Woman of 73 years of Age, who by a fall she had received some weeks before, with it also re-

I ceived

ceived a contused Wound in the upper part of the Forehead, and somewhat towards the left side, with two Fractures of the Frontal Bone, both of them so considerable, that Mr. Browne by the help of his Elevatory had taken out a piece of the two Tas bles belonging to that Bone, much of the bigness of a Three-pence; which Operation had so fortunately prevented the Accidents that might have enfued from the extravaled Blood upon the Dura Mater, that the Woman had not voided any Blood, either by her Nose, or Ears, or suffered any Convulsions or Vomitting, or Fever; the Wound then being fairly enclinable to a Cicatrice; (thus much of Monsieur Blegny's Remark of her Case) who within a small time afterwards, was sent from the Hospital perfectly cured.

This you have at Tab. VII. Fig. I.

Corrugator.

This draws the bairy Scalp backwards.

HIS Muscle takes its Name from its Use, or rather from Con & Rugo, which fignifies to wrinkle; or, Frontem Corrugare, to knit the Brows. This Muscle and its Partner, as Vola cherus Coiter writes, doth arile near the greater Canthus, or Orbite of the Eye, and feems to end about the middle of the Eyebrows; and tho' they are not plainly apparent in all men, yet in some they fairly represent themselves, and are generally allowed to bring the Skin backwards; by which Action, they also smooth the Front.

This you have at Tab. VII. Fig. I.

Occipitalis.

This helps the former

HERE are two other Muscles found in the Occiput, but they are not commonly to be shewn in all people; they are short, broad, and thin, arising sleshy from the transverse Line of the Occiput, (from whence they do take their Names) and then becoming Tendinous, are seen to intermix themselves with the Pericrane; they arising with right Fibres marching upwards, are sometimes seen to border upon the Muscles of the Observat. Ears: And hence it is, that they who have these Musices very large, can at their pleasure bring the Skin of their Heads backwards, as Diemerbroeck well observes. These Muscles are not

to be shewn in any of my Figures, much less mentioned, but in my last before this; when they operate, they are al-

lowed to pull the hairy Scalp backwards.

I shall here add an Observation of a Watermans Case, who History. was my Patient in the Hospital also, that was there cured of a contused Wound, and a large Fracture on the right fide of his Head: His Name was Charles Cock, and lived at Rotherith, he being on Board the Coronation under Sir Ralph Dalival, in the Engagement with the French, who there received a very large Fracture on his right. Bregma on the 3 oth. of June, it was occasioned by a Splint from a Ship; upon the receiving of which, he both became dumb, senseles, and speechless for some time : The fourth day after this Milchief, he began to come to himfelf, and was fent to the next Port-Town, which was Dover, and was there placed under the Hands of the then Chyrurgeon, appointed to take Care of the Sick and Wounded for that place. who within a few days applyed the Trepan to him, but with little effect; afterwards he was sent up to St. Thomas Hospital, where he became my Patient, where viewing his Case, with the rest of my Brethren, we judg'd it very dangerous, if not mortal: However, I being advited by Cornelius Celsus, that In casu deplorato præstat Remedium anceps quam nullum, I used my best Care to discharge the foul Bones, and remove those Fungus's which dayly did arise from his Wound, and laying open almost all that side of his Head, I made enquiry into its Tables; and finding by my Applications that a very large piece of the Bone began to grow loofe, through which the aforefaid Chyrurgeon had entred his Trepan; I at length discharged it, and after that two other pieces (which made up the part of the Bone through which the Trepan passed, as may plainly appear by the bore there made by the Instrument in it) without any Flux of blood, or any Injury to the Patient; the which being removed, the Systole and Diastole were as plainly seen to move as any thing whatfoever; and by applying over it a Syndon dipt in my Balfom, and now and then using Catagmatick Powders to remove his Fungus's, there came on a new Callous from the edges of the Bones, and after much trouble, the Patient arrived at a very good Cure. This Cure was also performed by me in St. Thomas Hospital, when Dr. Briggs, and Dr. Dawkins were Physitians there, the first of which is alive, and can justifie the Truth of it; during the time he was under my hands, he had neither Fever, nor Convulsions, nor did Vo-

mit.

mit, or Bleed at Nose or Ears, but dayly went up and down; nor was he ever curious about his Diet, or strict in observing any regular Method as to his Living; he was afterwards twice Prest into his Majesty's Service; but I going along with him to the Lords of the Admiralty, had him foon discharged, after they had seen the Pieces of the Bones taken from his Skull. And the Patient is very well and hearty at the Writing hereof, and now exerciseth a Watermans Trade.

Orbicularis Clausor, or the Orbicular Closer.

This shuts HIS Muscle hath its Name from its Orbicular Set of Fibres, which do Circularly Enclose the Eye-lids: Vefalius and Bartholine allow this a fingle Muscle, planted between the Membrana Carnosa, and the Pericrane, near the Roots of the Nofe, it taking its Origination from the inner Angle; and is carried under the lower Lid, with Orbicular Fibres to the outward Angle, and afterwards Enwrapping the upper Eye-lid, maketh its Infertion into the greater Angle where it began.

Observat.

This Muscle at the first view, seems indeed but one Orbicular Muscle, but upon a more strickt enquiry, it will discover it felf to be two Semicircular Mufcles, of which the upper and larger being implanted into the upper Eye-lid, takes its Origin from the inner Angle of the Eye, near the Nofe, and passing thence the length of the upper Eye-lid, is Inferted into the outward Angle of the Eye; and being brought downwards, smooths the upper Lid, and covers a great part of the Eye; the other ariseth with a sharp Origin from the side of the Nose, somewhat under the former, and passing cross the lower Lid, is Implanted with a broad Infertion into the upper Eye-lid, where it adjoyns it self to the lower Lid, so that the Muscle of the upper Eye-lid pulls it down, and that of the lower Lid lifts it up, which plainly discovers to us, that this must necessarily be two distinct Muscles, and that each of them have different Originations and Infertions allow'd them.

This is Shewn at Tab. VII, Fig. I.

Elevator Palpabra, or the Eye-lids Elevater.

HIS is allow'd to arise sharp and fleshy from the up- This opens per Orbite of the Eye, near the Elevator, where the Eye-lid. Optick Nerve hath its Transmission, it having a thin and fleshy Origination, and is Expanded with a broad and thin Tendon into the Margine of the Palpabrae, and by raising the same up, does open the Eye with it.

This is not to be shewn but with the other. Muscles of the Eye, after it is taken out of the Skull. This with the former is shewn at Tab. VII, Fig. I.

Elevator Nasi Alarum, or the Raiser of the Pineons of the Nostrils.

THE Nostrils are a curious Apartment framed out of a bony This dilates and grifly Substance, covered over with Skin, to keep the Nostrills. the inward Passages open, as so many convenient and useful Tubes or Pipes for letting in of the Air, being allowed the proper Instruments of Breathing, as well as Organs of Smelling; whose inward Parts being encircled with a fine thin Membrane, interwoven out of nervous Fibrils, gives it that ready embracing, and embodying with aiery Particles, which occafions the various Appulses upon these its Fibres, which makes them the proper Instruments of smelling; and if we consider the Structure of the Nofe as to its Frame, we may find it a fine piece of Workmanship, made out of several parts, as Skin, Bones, Cartilages, Glands, Membranes and Muscles, all curiously melted into one another in good Proportion, and des cent Figure: We begin with these Pair, which are seen to arise from the Top of the Bone of the Nofe, near the Lachrymal Cavity, with a sharp and fleshy beginning, and falling down towards its sides, in a Triangular Figure, not much irresembling a Greek A, it marcheth downwards the length of the Bone, and is inserted broad and fleshy into the Nasi Ale.

This is not to be found in all Persons, its shewn at Tab. VII. Fig. 1.

Dilatator Nasi Ala, or the Nostrils Dilater.

This dilates the Noffrils.

THESE Muscles are very small and thin, and very scarce discernable, save only in Nasute people, where they appear sleshy at the Root of the Ala, and so climbing transversely upwards, are seen inserted into the upper parts of the Ala, and by raising them, do at the same time open the Nostrils, as Vestingius observes.

These are so small, and placed so inward, that they are not to be shewn by any of my Figures.

Constrictor Nase Alarum, or the Nostrils Closer,

This closeth the Nofirils. THIS is much like the former for bigness, it lodging its self inwards, near the Membrane which covers the Bone of the Nose: It ariseth sleshy at the Root of the Nares, and is transversly carried and inserted to the Roots of the Nasi Alæ, and upper parts of the upper Lip, and being very small, is rarely found out, save only in nasute persons, whose general Frame of Fibres, are usually seen thicker, larger, and more apparent than in others.

This is shewn in its place at Tab. VII. Fig. I.

Zygomaticus, or Distortor Oris.

This brings the Lip upwards.

THE Lips, as they are made of delicate fost and spongy Flesh, neatly covered over with a fine Skin, painted with an admirable Vermilion Blush, and as they are stuff up with Membranes, and diverse Glands, so have they allowed them both Veins and Arteries, as well as nervous Fibrils and Muscles, to give them Sense and Motion, by which they serve us like proper Organs in performing Variety of Motion: This Muscle which carries the Name of Zygoma, by Riolan hath its Denomination, upon its arising round and sleshy from the Jugal

Jugal process, and marching obliquely downwards and forwards through the Cheeks, is inferted into the fide of the upper Lip near Primus Nasi, bringing it upwards in its Operation.

This you have at Tab. VII. in its place.

Elevator Labii Superioris, or the upper Lips Elevator.

THIS Muscle ariseth fleshy from the Os Zygoma, immediately above the former, and obliquely descending under the Lip upwards and the Skin of the upper Lip, is implanted into the Lips, where outwards. they are joyned together, bringing them upwards and outwards.

This is shewn at Tab. VII. Fig. I.

Depressor Labii Inferioris, or the lower Lips Depresser.

HIS ariseth fleshy, from the lowermost and outermost This brings part of the lower Jaw, whence obliquely marching, it the lower Lip downwards is broadly inserted into the middle of the Lips, and in its and outwards Operation, is faid to bring it downwards and outwards:

This you have at Tab. VII. Fig. I. under the lower Lip.

Depressor Labii Superioris, or the upper Lips Depresser.

THIS ariseth fleshy from the fore part and outermost part This brings of the upper Jaw above the Gums, and in its ascent, is the upper Lip inserted into the Roots of the Nasi Ale, and upper parts of the upper Lip, forcing the upper Lip and Ale downwards; and by bringing them closer together in their Operations, doth advance our smelling of things grateful, or ingrateful; and by reason of this Contrariety of Motion, this Muscle by some Anatomists is taken for two Pair of Muscles.

This is described at Tab. VII. Fig. I.

K2

Elevator

Elevator Labii inferioris, or the Raifer of the Lower Lip.

This brings the lower Lip upwards and outwards. THESE Pair of Muscles are seen to lodge within the lower Lip, being by some Anatomists called Par Mentale, they arrising sleshy from the lower part of the nether Jaw near the Gums, and falling directly downwards in their Insertions, to the lower part of the outward part of the Skin, do in their Operations raise the lower Lip upwards.

This you have at Tab. VII. Fig. I. in its place.

Orbicularis, or Sphineter Labiorum, or Orbicular, or Sphineter of the Lips.

This purfeth up the Lips.

THIS Orbicular Muscle is planted in the middle of the five Pair of proper Muscles belonging to the Lips, and being common to both Lips, and consisting of a soft spongy Flesh, is encircled with many Orbicular Fibres running about it, by which it wraps in the Margine of the Mouth, and closeth the Lips in Form of a SphinEter.

Annotat.

This Orbicular Muscle is an Universal Antagonist to all the rest of the Muscles, keeping them in right Order, and allowing them an equal Ballance to perform their Tonick Motions:

The prime Use of the Muscles of the Lips may be thus described, as Dr. Collins worthily observes: The Zygomaticus borrowing its Origin from the outward part of the Os Jugale, and the Buccinator from the fore part of the acute Process of the nether Jaw, and the Elevator of the upper Lip from the 4th. Bone of the upper Mandible, do descend obliquely, and concenter about, or in the Angle of the Lips; so that this Triade of auxillary Muscles, contracting themselves by their carnous Fibres, from their Insertions towards their Origins, do endeavour to draw the Angle of the Lips laterally, and somewhat upwards towards the Region of the Face under the Ear, and thereby would perform or make-a wry Mouth, were not some Muscles of the Lips controuled by the Antagonist Muscles, seated in the opposite side of the Face, which do countermand those of the other side in their lateral opposite Contractions,

and do mutually reduce themselves to a Tonick Motion, and bring the upper and lower Lip (which is somewhat drawn downwards by the Depressors of the lower Lip) to a kind of a strait decent Posture, else the upper Lip would be too much elevated, were not the Muscles of the Lips somewhat depressed, by the Muscles arising out of the lower edge of the Chin, and inserted in the Angle of the Lips. And lastly, the Orbicular Muscle would by its annular Fibres purse up the Lips, by bringing the Angles nearer each other, and hereby disfigure the Mouth, was it not bound to its good Behaviour, as being laterally and equally diffended on each fide, by the opposite Muscles inserted in the Angles of the Lips, reducing as well themselves, as their Sphineter, the Orbicular Muscle, to a Tonick Motion, which gives the Mouth the Advantage of clofing the Lips in a pleasant Decency, rendring the Mouth and Face full of Air and Beauty.

This you have at its proper place at Tab. VII. Fig. I.

Buccinator, or Constrictor, or the Trumpeting Muscle.

T is called Buccinator from its use, in forcing the Breath This brings outwards; and Constrictor, from its bringing the Cheeks inwards the Cheek and the Mouth to in Mastication: Its a Muscle assigned both to the Lips and o- the side. ther parts, and doth borrow its Origin from the Gums belong. ing to the upper Mandible, and does terminate in the lower Mandible; and being thin and membranous, as well as broad and fleshy (intermix'd with a various Set of Fibres, so firmly annext to the inner Coat of the Mouth, that they are scarce thence diviseable, as Diemerbroeck writes): Thro' this Muscle passeth the Ductus Salivalis Superior (which is easily found out in a Sheeps-head) and in all our Readings at the Hall, they are usually put together by naming it Buccinator cum Ductu Salivali.

The Use of this Muscle, is, that by bringing the Cheeks in Observat. wards in Mastication, it forceth the solid Nutriment upon the Teeth, for its better Comminution; and when a Proportion of Air is enclosed in the Mouth (whereupon the Cheeks are blown up, and afterwards contracted by the stronger and gentler Mo-

tion of the Muscles) that the confined Breath may be expelled with greater or less Force, into any kind of Instrument of Musick whatsoever.

This is shewn at Tab. VII. Fig. I.

Quadratus, or Platisma Muodes.

This draws the Cheeks downwards

HIS has its first Name from its Figure, it being Quadrangular; and Galen gives it the other from its Muscular Expansion; it is generally allowed one of the common Muscles: It is a Membranous Enclosure closely adhering to the Skin, and arising from the Spines of the Vertebres of the Neck, Scapula, Clavicle and Sternon, running upwards with oblique Fibres, and is implanted at the Chin, Lips, and Roots of the Nose, which parts it brings obliquely downwards; and being so closely joyned to the Skin, it seems to afford it Assistance in opening the Mouth; sometimes this Muscle hath been seen to reach the Root of the Ear. In raising this Muscle, be careful of leaving its Elongation, that makes Adductor Auris ad Anteriora, which you will rarely miss: These Muscles are perfect Antagonists to the Temporal Muscles, which bring up the lower Mandible, and clofeth the Lips; this also is allowed to affift the Digastricus, in joynt Contractions in depressing the lower Mandible, and opening the Mouth, by separating the lower from the upper Lip, and the nether from the upper Mandible.

Annotat.

This you have at Tab. VIII. Fig. I. laid bare.

Elevator Auricula, or the Ears Elevater.

This lifts up I T's by the pleasing Sense of Hearing, that we make our selves Masters both of Converse and Conversation; and by affecting our Ears with Vocal Sounds, we arrive at the inward Conceptions and Passions of the Mind: Now, whereas the Allwise Maker hath planted the Ears on each side of the Eyes, that we may more readily become Masters of Sounds, conveighed by the Orbicular Motion of the Air naturally mounting upwards; so hath this sine Auricular Structure allowed it diverse Processes and Cavities, finely carv'd cut one within another: Its seen also surnished with Veins, Nerves,

and

and Arteries, and as the Inward Ear is the principal Organ of hearing, and hath several parts given it, as the Auditory Pasfage, the Tympanum, and the small Bones to brace it in with, so hath it allow'd it Muscles fitted and design'd for various uses. This Muscle of the Ear shews its Use from its Name. it arising from the external Termination of the Frontal Muscle, it being framed of divers fleshy Fibres, covering the Temporal Muscle; and being thin, and membranous, is carried over it, and growing narrower, is Inferted into the upper part of the Ear, bringing it upwards and forwards.

Lycosthenes tells us of a Boy, born on the 4th. of December History. 1556. without Ears, who in lieu thereof, had two small Cavities, which were so close shut together, that he could not hear any thing by them, and that he lived in good Health till the Month of August following; and of another who was born without Ears, Eyes and Nostrils, with a Month only

given to his Face.

This is shewn at Tab. VII. Fig. II. and at Tab. IX. Fig. VI.

Detractor Auris, or the Ears Detracter.

THIS Muscle ariseth fleshy, broad, and sometimes Figure This brings brous, from the back part of the Head, near the Mam-the Est backwards and millary Process, and growing narrow in its Progress, is Inser. downwards. ted into the Cartilage which environs the Ear: Be careful in raising the Cutis, least you take up this Muscle with it, and to loole him.

This Muscle by some is allowed a part of Quadratus Buccas Detrabens, and by Du Verney is call'd Triceps Auris, from its

three fold Origination allow'd it.

Columbus Anat. Lib. 15. Writes, he hath observ'd Ears in some Men like those of Bruites; and Thomasus Thom. Cap. 19. writes of a Woman, who brought forth a Child with Ears, so large, and so great, that they cover'd its little Body, much like a plume of feathers.

This you have at Tab. VII. Fig. III. and at Tab. XI. Fig. IV.

Adductor Auris, or the Ears Adducter.

This brings the Ear forseards.

HIS is a common Muscle, being a part which Spigelius calls Quadratus Buccas Detrabens, and is also allow'd a part of Platysma Myodes, as Galen calls it, (both which are but one and the same Muscle;) from its Insertion you'll find a fleshy and fibrous Elongation Implanted into the root of

This you have at Tab. VII, Fig. I.

Abductor Auris, or the Ears Abducter.

This brings THIS is planted at the Occiput, and arifeth above the Mammillary Processes, from a Knot of Muscles belonging to the Occiput, with a narrow Origination, and being carryed Transversly downwards, is Inserted with a double, and sometimes with a treble Tendon into the back part of the Ear; in Oxen, Horses, and the like four footed Creatures, these Muscles are seen much larger than in Man, and many times are seen more numerous, and a more evident use is made of them.

History.

Baubin. de Corp. Human. Fabric. Lib. 3. Cap. 22. Writes, that the Muscles moving the Ears, are seldom found in Men, yet he knew two who could move their Ears at pleasure.

G. Wolphius writes of one having a Fool, who could make an hundred fort of wry Faces, and could both move his Ears, and his Eye-brows any way he pleased.

This you have at Tab. VII, Fig. I.

Temporalis, or Crotaphitis.

the Nether Faw upwards.

This brings MAN hath allow'd him a short Nether-Jan to give his Face an Oval Figure, and provident Nature, lest the Muscles might be any wife injur'd with too much Weight of the lower Mandible, hath cunningly contrived, and drill'd many Cavities thro' it, which she has fill'd with Marrow: On each fide towards the termination of this Bone we find a Process

Process mounting upwards, and ending in a Cone, to which the Tendon of this Temporal Muscle is firmly annext. The strong and various Motions of the Nether Jaw is truly perform'd by the different Contractions of its Mufcles; among which, this, we now are describing, doth gain a preference from the reft, whole Courle of Fibres being various, are as strangely put together to enlarge their strength. This pair invested with the Pericrane, do borrow their Originations from the Bones of the Front, Temples, and Sinciput, from whence they arife with a thin fleshy beginning in a Semicircular Figure, and growing more fleshy in their Descent, and afterwards thinner again towards the Os Jugale, it is raised into a Circular Form, both to secure, and give place to the lower part of the Temporal Muscle, which creeping under it, doth Infert it self with a short and strong Tendon into the sharp Process of the Lower Jaw; and in its Contraction, by drawing it upwards, does at the same time close the Teeth of the Upper, with those of the Nether Jaw; which is seen sometimes Acted with that vigour and force, that the Mouth cannot be Involuntary opened, unless by the Interpolition of some screw'd Instrument, as is usually seen in those Persons violently troubled with the Fpilepfy, where we many times are forced to use a Speculum Oris to force open the Jaw, in order to make way for letting in of some proper Liquor into the Mouth, uleful in thele Cales.

This Mulcle is accounted the strongest Mulcle belonging to the Nether Jaw, and its apparently found dangerous to make Transverse Incisions here, as shall be made good by Historical Observations, especially in the lower part thereof, by reason of the variety, as well as multiplicity of Fibres allow'd it, which being Transversly wounded, occasions frequent

Convultions.

Columbus Lib. 8. Cap. 3. Writes, That he has oft observ'd History. that consent between the Eye, and the Temporal Mulcle, that the Temporal Muscle being at any time hurt, the Eye becomes that rer with its Prejudice; and this proceeds from some small Branches of the 2d. pair of Nerves, which are inserted into it.

Observ. 8. Fabrit. Hildan. Cent. 2. you read that Hippocrates Observat. writes, that the Temporal Muscle cannot be wounded without danger of Life; for as he says, if the left Temple be wounded, the right Operates by the Distention of its Norves; (to ule Hippocrates own Words) If the right, the Nerves are di-

ftended

stended in the lest; for the opposite Muscle of the sound part, whilst it is in Action, draws the Mandible to it in its Office, and the injur'd or wounded Muscle being quiet, and drawn with the other Mandible towards the found part, cannot but produce great Pain, if not Danger of Life: Besides, several Veins and Arteries do país through the Temporal Muscle, which by a Transverse Incision being at any time made, may occafion large and dangerous fluxes of Blood: As he himself writes, he saw in a Girl of sourteen Years of Age, where you have the story thereof at large, as a Caution to all Young Admonit. Surgeons, he Adviseth, that they never open the Temples or Temporal Muscles cross ways, for they will certainly find direful Symptoms follow their Knife, in that as all Muscles are made up, and intermixt of various Fibres, which Fibres do Unite and terminate in the end of the Muscles, before they run into Tendons; as Galen hath it, Lib. 12. de Ufu. Part. Cap. 3. So if they be cut o'rethwart, great Pains usually succeed thereon, by reason these Parts are endu'd with no fmall Sense, they having a Nervous Origination, whence oft times Convulsions are leen to happen; but if necessity require the opening of this Muscle, do it according to the planting of its Fibres, so that they may not be cut or divided, whereby you'll be freed from all fear of Convulsions and other ill Symptoms.

History.

I cannot pass by a very remarkable Case, which hapned in our Hospital of a Patient of mine, in a Soldier with four

Fractures in his Skull, Gc.

One James Crawford a Scothman, and a Soldier in the Lord Dugglas's Regiment, in June 85. had four Fractures in his Skull, one just above the Temporal Muscle, the second and largest between the Sagittal and Landoidal Sutures, a third under the second towards the right Side, the fourth upon the Sagittal Suture, with all the Bone of the right Bregma, foul and Carious, both outwards and inwards, all which were occasion'd by blows given him from his Captain; he was my Patient in St. Thomas's Hospital for about six Months, and at some times in a prospect of Recovery: At his sirst coming thirber, he had a large Tumor in the upper part of his Head, which I took for a Steatoma; and having laid it open, out of it came a Substance much resembling Brain, which being ablated, I saw the Tumor for some small time abated; afterwards new Fungus's arose in the same place, and closely tracing

it to the bottom, I found a Fracture there, and having laid the Cranium bare, I remov'd several Frustles or Splints of Bones from it; after which I apparently saw a very large Perforation of the Skull. Dr. Dawkins, and Dr. Briggs, who were then our Physitians of the said Hospital, with divers other of the College, and feveral of our most Eminent Surgeons of this Town, had been frequent Visiters of his Case; soon after we saw another Fungus arising out of another Perforation, just above the Temporal Muscle, which grew to a great Magnitude; this by our dreffings began to divide, and at times wasted, and turn'd out in several pieces; upon traeing of this also, we found a second Perforation, as I said before; about this we saw several streams of Blood frequently Issuing out about it, which we stopt with our Restringents: A third Fungus was seen after this to arise in the left fide of his Head, which was not opened till after his death. The great Remark in this Case, was, That we saw a Substance much resembling that of the Brain, both in Colour, Substance, and make, and had in it the Motion of the Brain, which is described by Authors, viz. both Contraction on and Dilatation, answering the Systole and Diastole of the Heart; hence both the Physitians, as well as Chyrurgeons were surprised how the Membranes of the Brain, could be wounded without the usual Symptoms, as Hipp. mentions Aph. 50. SeEt. 6. and 188. SeEt. 2. for from his first coming to the Hospital, he neither had Convulsion, Feaver, Vomiting, Delirium, or Stupor, till the time of his Death; and while he was there, lived a very irregular Life to all manner of Method; he only had a Hiccough two days before he dyed: The dead Body being opened by me, before several Physitians and Chyrurgeons, I began with the Head, and cutting into the third Swelling, I found another Perforation, as I many times foretold and expected; and having taken off the upper part of the Cranium, and narrowly examining the Dura Mater, we found this to be his Case: The Cranium had four apparent large Perforations; at three of which issued out these three Tumours filled up with a Substance much resembling the Cortical part of the Brain, which made us suppose it really to be so; and perhaps, by what I am now going to discover, may reasonably be allowed an Excrescence arising from the Brain its felf, much deprest by the repeated Blows on his right fide, it throwing forth on the contrary fide many strange strange and unufual Productions; for upon scraping this Substance of the Dura Mater, with the blunt side of the Knife, we observed several Foraminila or small Personations made thro' it, from whence this Matter might iffue, and be fupplyed from the Brain; belides, in one part of the Dura Mater, we observed a kind of Pedunculus, much resembling a Stem, or Stalk in the infide of the Dura Mater, which might well enough be allowed to give Growth to these Excrescencies; one of which was supposed to be as large as a Turkeys Egg, and the other to equal the bignels of a Pullets Egg, and may (if you please to allow it) properly be called two præternatural Cerebella, or Appendages of the Brain its felfa The Cranium within fide between these Fractures, was seen very carious; from all which, it may very well be worth our Observation, what Monsieur de Blegny writes in Zodiac. Medico. Gal. Ann. 1. pag. 78. 182. Ann. 2. pag. 154. Fallop. de Vuln. Capit. in Gener. cap 10. Forest. lib. 9. Obs. 36. & Obs. Chir. 2. lib. 6. in Schol. and feveral others who have writ of wounds of the Brain, that had no Symptoms followed them; it is most likely their Cases were no otherwise, than what I have here now recited, and may suggest to us, how to treat these Cases according to Art for the future; and probably, if this Matter after Trepanning, had been discharged, the Patient might have recovered, and these Perforations of the Dura Mater clofed up again. But this was not this poor Fellows Case only, for besides these, he had a very large Tumour on his left fide upon his baffard Ribs, covering that fide three or four Hands in length, and about two in breadth; which Tumour was also occasioned by Blows given him on his side, which gave him great Pain upon Coughing, and did no small Injury to his Head, that made his Cure more difficult. Upon opening his lower Belly, we found nothing unufual; but upon carefully examining his Trunk, (which we, next to his Brain) had a mind accurately to inspect, we found, that from the Tumour some præternatural Matter had discharged it self into its Cavity; which Matter was fo corrofive and virulent, that it eat through the Pleura, and so stinking was it, that it annoyed the By-standers; one of his Ribs of that side was eroded by it, so as that upon touching it, it crumbled into small pieces: It further made its passage into the lest Lobe of the Lungs, and this its fretting may be granted a sufficient Cause of his so frequent Coughing; at the bottom of the Lobe,

Lobe, there was also a Vomica, filled up with some Matter, and had been broke not long before his Death, which difcharging its self upon the Diaphragm, might be a sufficient Occasion of his Singultus, which he had some days before he died: He was naturally of a strong Constitution, and not above 25 Years of Age; he might probably have endured the Trepan, for the Relief of his first Case, which we once thought fit to have performed; but it bordring upon the Temporal Muscle, and penetrating both the Coronal and Sagittal Sutures, we thought it very hazardous, and so omitted it; but as to the Tumour on his fide, it was so large, and accompanied with such a Train of fatal Symptoms, that I question whether any Artist could have done more, than was prescribed in his Case; all which, altho' Dr. Dawkins is dead, vet Dr. Briggs, His Majesties Physitian, and who was one of the Phylitians of the said Hospital, when this Man was there under my Hands, will justifie what I have writ, is nothing but truth, and deserves to be made publick for the Advantage of all young Chyrurgeons, and others who have not had the Happinels of an Holpital Practice.

In Relation to the Temporal Muscle, and to the Skull, the Worthy Dr. Connor has given me this following Observation, viz.

"The Temporal Muscle, puts me in Mind of an extraors "dinary Operation of Surgery, which I formerly law per-"formed in an Hospital at Rome; upon a Man that had the "Os Syncipitis, or the Bone of the Crown of the Head, which " is very large, and loofely joyned to the Ambient Bones, "by reason of a Caries (occasioned, I suppose, by a Venere-"al Disease) in the Sutures of the Skull: A Chyrurgeon "raised up the Teguments, and Pericrane of that side of the "Head, and took away with his Instruments, the whole Bone "of the Crown, and left all the Brain naked, only with the "Teguments on it, in that fide: I was mightily surprized, to " fee the Patient undergo all this, with so little Concern; "he having had no Symptoms, or any Inconveniency succeed-"ed, lave only, that he could not lye upon this fide, for " Fear of pressing too hard upon the soft Skin and Brain, against "the Pillow; this made me reason with my self, and think, "that no Wounds in the Head can be mortal, unless there " follow too much Effusion of Blood, or too great a Preffure

- "fure upon the Brain; and that consequently it was no Won-"der, why this Man should live, having had neither of these
- two ill Symptoms after the Operation; it gave me likewife
- "room to believe, that most other Wounds are only mortal.
- "by reason of the too great Loss of Blood, or of a violent

"Pain which raises too great a Fever.

This you have shewn you at Tab. VII. Fig. I. and at Tab. VIII. Fig. I, you have the Same laid bare.

Digastricus, Biventer, or Graphoides.

This brings the Mandible downwards, and opens the

THE first and second Names it takes from its double Belly, and the third, it arising from the Fore-part of the Mastoidal, or Teat like Process near the Mammisormis. It is fuch a Muscle, that scarce its Fellow is to be found in Humane Body; it takes its Origination from the Fore part of the Mastoidal Process near the Mammiformis; first growing fleshy, then running into a Tendinous Body about its middle, does afterwards become fleshy again; so that it appears like a double Muscle put together by the Mediation of a small round Tendinous Substance; and then growing sleshy, does inwardly terminate in the fore and middle part of the Chin, being an Antagonist to the Temporal Muscles, which in their Contractions do close the Mouth and Teeth, by bringing the Neiber Jan up. wards; and this è Contrà, giving them a contrary Motion, does open the Mouth and Teeth, by bringing them downwards.

This you have at Tab. VIII. Fig. I. and at Tab. IX. Fig. I, II.

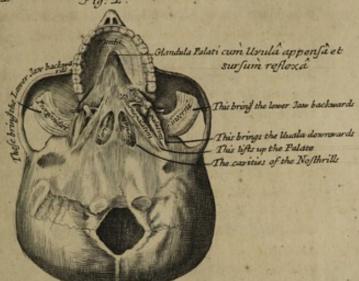
Masseter, or Mansorius.

This brings TT hath its first Name, from its Use made of it in Masticathe Neiber Jam fideways. I tion, and Lateralis from its Situation: It is a Muscle that arifeth with a double Origination, strong, short and thick, it being partly fleshy, and partly nervous, carried from the lower and inner Region of the Os Jugale, and from the upper Mandible, and is largely and strongly tyed to the Nether Jaw; and from its Variety of Fibres which are allowed it, it not only pulls it forwards, backwards, and laterally, but also works it about.

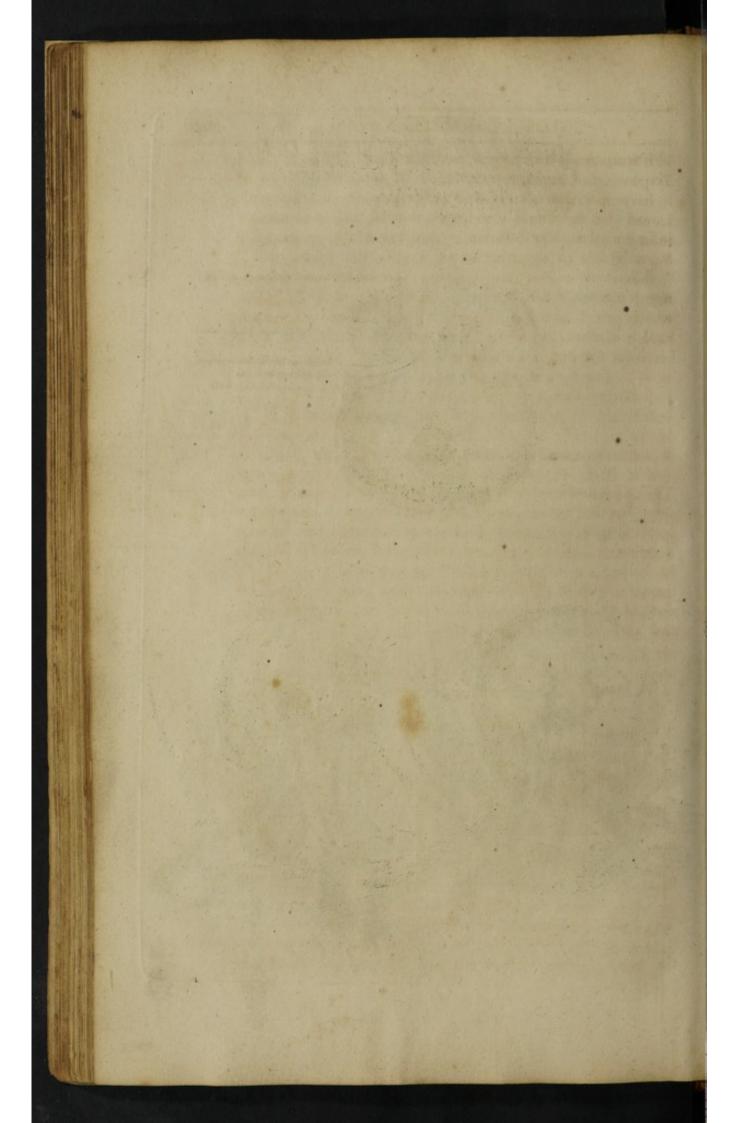
Tab. VIII. Musculi Uvulce vocati à D.D.

Croune primum in lucemeruti

et publice oftensi.







If you throw this Mufcle from its Original, or Infertion, Observat.

Temporalis will appear to view.

Its proper Use is employed in Mastication, it moving the Lower Jaw eitherwise, and is seen to affift the Temporal Muscle, in fending the Saliva forwards, which it performs by the upper Salival Ductus passing over it.

Oetheus writes, he faw a young Girl about 12 Years of History. Age, whose Nether Jaw, a Chyrurgeon finding putrified, wholly exfoliated it; over which Place, a Flesh grew to so hard a nervous Substance, that she made use of it to chew her meat for her Livelihood with it.

This you have at Tab. VII. Fig. I. and at Tab. VIII. Fig. I.

Pterygoideus Externus, or Alare Externum.

THIS has its Name from its Situation, it arising from This brings the Os Sphenoides, or Wedge like Bone, as also from the fam forwards outward part of the Processus Aliformis, or Wing like Process; it being strong, nervous and fleshy, and marching large in its descent, is inserted by a strong and broad Tendon into the inner part of the Nether Jaw laterally, just under the Tendon of the Temporal Muscle, and brings the same forwards, and as it were beyond the upper.

This you have at Tab. VIII. Fig. I, II.

Pterygoideus Internus.

THIS takes its Name from its Origination and Situation, This brings it arising thick and short from the inner Cavity of the Processus Aliformis, or Wing like Process, partly nervous, and partly fleshy, and is inserted by a strong and broad Tendon into the infide of the Nether Jaw, quite contrary to that of Manforius, promoting the Action of the Temporal Muscle, in bringing the Nether Jaw inwards and backwards.

These Muscles do never appear well, untill those of the Observat.

Tongue, Larynx and Gulet, be compleated in Dissection.

The whole Performance of Mastication, is managed by Annotat. the joynt Concurrence of these Muscles, and the successive Moti-

Motion of others, as Dr. Collins, and others do observe, in which the Maffeters, and these Pterygoidal Muscles chiefly are concerned with the Buccinators and the Tongue; the moving of the Digastricks more properly relating to others, which by depressing the Nether Jaw, do open the Mouth for letting in of the Nutriment; whilft the Temporal Muscles by lifting up the Nether Mandible, are seen to close the Teeth with the Meat. Again, the Digastrick Muscles and the Quadrati, depressing the Nether Jaw do open the Teeth, whilft the Temporal Muscles clofing them, as naturally do by their contrary successive Motion, stamp and lessen the Meat, whilst it is between the Teeth, and the Ptergoidal Muscles and Masseters, do break it into small pieces; the Internal Pterygoidals drawing the Nether Jaw outwards, and the External pulling it inwards, and the Mafseters by reason of their Variety of Fibres, decussaring each others in divers Angles, do affift each other in their Contractions, and helping the former, are allowed to bring the Nether Jaw both inwards and outwards, for the better lesning of our Nourishment in Mastication; the Buccinators and Tongue assist.

ing them in keeping the Meat in its proper place.

Again, The Ule of the Muscles of the Lower Jaw, appears in the various Contractions of their Terminations, towards their Origins: The Temporal Muscle moving from the acute Process of the Lower Mandible, towards the Os Frontis, Syncipitis, Sphenoides, and the Os Temporalis, and the Maffeter, contracting its felf towards the Os Jugale, and the first Bone of the upper Jaw, do lift up the lower Jaw, and the Digastrick Muscle, arising from the Forepart of the Mammiform Process, descends obliquely, and creeps under the lower. Jaw with an intermedial Tendon perforating the Musculus Styloideus; and the annular Ligaments, as a Rope passing through a double Pulley, which by a great Artifice of Nature (the Minister of the Allwife Grand Architect) doth pull down the lower Jaw, by the Affistance of the carnous Fibres, of the two Venters; one arifing out of the Forepart of the Processus Mastoideus, and the other Belly of the Digastricus is inserted outwardly into the middle of the lower Jaw; and the Muscle Quadratus Genee taking its Origin from the Spines of the Neck, and inferred all along the outfide of the lower Mandible, doth pull the lower Mandible downwards: Whereupon these Antagonist Muscles to the Temporalis, and Maffeter, the Digostricus and Quadratus do open the mouth for the Reception of Aliments, which is Stampt

stampt between the Teeth, tanquam Pistillis quibusdam alimentum contundentibus, conterentibusq; by breaking the Aliment into small Pieces or Particles, by the often repeated quick motions of the Temporal, Mansorial, and Pterygoideal Muscles joyntly contracting themselves: But if these last Muscles, the Pterygoidei Externi & Interni, do act fingly, their manner is different; the first arising out of Aliform Process, and are inserted into the infide of the lower Jaw, at its edge, opposite to the Infertion of the Masseter, and draws the lower Jaw backwards, when it acts fingly; and the Pterygoider Externi & Interni, taking their Origin from the external part of the Pterygoidal Process, and Os Sphanoides, lodged in a concave part of the Temples, opposite to the Os Jugale, and taking its Progress backwards to the Infertion of the Neck of the Processus Conditoides of the lower Mandible: These Aliform Muscles, if they act joyntly, they elevate the lower Jaw, and affift the Temporal Muscle and the Masseter in the raising the lower Jaw, in the Massication of Aliment, which is their Prime and common Action: The other Contraction of the lower Jaw inward and outward, is not of any great Use of eating, which is accomplished by the frequent Elevation and Depression of the lower Jaw, and other opposite Motions of the lower Mandible; inward and outward involuntary convulfive motions, commonly called gnashing of the Teeth, are produced in malignant Feavers, and near the Approach of Death, as Dr. Collins very well observes.

This you have at Tab. VIII. Fig. I, II.

Styloceratobyoideus.

BEfore we discourse of the Tongue, we shall offer at some- This brings what of the Os Hyoides, which is given to it, as a Prop upwards and backwards for its more firm Structure, and for its more ready motion; where we may observe, when the Tongue is moved, this Bone is also moved with it, and this is performed by the Benefit of its Muscles; amongst which, this is reckoned one, which hath this name given it upon these three Accounts; it first ariling fleshy and sharp, from the Root of the Processus Styloides, or Beak-like Process; and being small and round, and alterwards growing larger, is implanted into the Cerea, or Horn of the Os Hyoides under the Chin, or that Bone plans

ted at the Root of the Tongue, much resembling a Greek U, and therefore by some, called Upsilodes, and by others (tho improperly) Landoides, from a Greek A, and is infallibly sound near the Digastricus, where it is divided, to make way for the Entrance of the Tendon of Digastricus belonging to the Nether Jaw, thro which it obliquely runs; its Insertion being at the lower part of the Horn, or rather towards the Basis of the Os Hyoides, it bringing it obliquely upwards.

This you have at Tab. IX. Fig. I, II. and at Tab. X. Fig. I.

Coracobyoideus.

This brings the Os Hyoides obliquely downwards,

THIS Muscle being very thin and long, hath its Name given it (as Diemerbroeck, and most Anatomists write) from its arising at the upper side of the Scapula, near the Coracoidal or Beak like Process; at the Root of which, it marching obliquely under the seventh Muscle of the Head, and there becomes a round and small Tendon, and appearing again slessly, is implanted into the Horns of the Os Hyoides, bringing it obliquely downwards.

Annotat,

If you leave this Muscle in its Origination at the Levator, you will find his Beginning perfect; it hath allowed it a double Venter, as has its former Companion, that the Jugulars may not be comprest by it.

This you have at Tab. IX. Fig. I, II. and at Tab. X. Fig. I.

Mylobyoideus.

This brings the Os Hyoides directly upwards. THIS hath its Name from the place it has between the lower Jaw, and the Os Hyoides, and arifing laterally fleshy from the said Nether Jaw, under the Molares or Grinders, marcheth with a double Set of fleshy Fibres into the Basis of the Os Hyoides externally, and is to be thrown upwards in Dissection: Riolan gives this at the sullest, but it is not decyphered in my Book of Muscles.

Geneiobyordeus.

TT's called thus from its arifing under the Chin, and inserted This brings into the Basis of the Os Hyoides; and by some Anatomists and forwards, its called Rectus Attollers; it being a short, thick and fleshy Muscle, arising from the inner parts of the Nether Jaw or Chin, and marching downwards, is inferted into a proper Cavity at the Basis of the Os Hyoides internally, bringing it upwards and forwards, and doth affift the Geneiogloffi in thrusting forth of the Tongue.

This you have at Tab. IX. Fig. I, II, III. and at Tab. X. Fig. I.

Sternobyoideus.

TT is so called, it arising from the upper and inner part of This brings it downwards the Sternon, broad and fleshy, as most Anatomists allow, & backwards. under the Skin of the Neck, and carrying all along the same breadth and thickness, on the Apera Arteria, and the Thyroidal Cartilage of the Larynx, it inferts its self into the Basis of the Os Hyoides, bringing it directly downwards, and somewhat backwards.

This you have at Tab. IX. Fig. I, II. and at Tab. X. Fig. I.

Styloglo Jus.

THE Tongue hath its name a Lingendo, or licking; and altho' it is but small in Bulk, yet it is great in use, in the Tougue that it affords us many advantageous uses as to our Speech, upwards and our Eating, Drinking and Tasting; and tho' there is scarce any Member in the Body so much employed, and so continual in use as the Tongue, yet we see there's none more loose, or more moist than it; and as a very convenient Assistant, in sending both our Meat and Drink into the Stomach: All which variety of Motions are seen to be acted by the Benefit of its Muscles; and this being one of its Muscles, has its name from its Origination, it ariling sharp, small and fleshy, trom

Life.

from the Styloidal, or Pencil like Process, and growing broader and more fleshy, is inserted into the middle of the Tongue, and draws the Tongue upwards and inwards: Its best found by discovering the Processus Styloides with your Fingers, and then your Eye will direct you to it at the side of the Tongue; in many it is very slender, but in Beasts, it's double, sleshy and thick.

If either of them move, they bring the Tongue directly to the right or left fide; but both moving, they bring it to the Fauces.

History. P. Borellus, Obs. 17. Cent. 2. tells us of one troubled with a difficulty of Speech, occasioned by a Tumour arising in the Basis of the Nether Jaw; which being examined, there was found a Hardness, which hard Swelling being opened, there was taken thence two Stones, one of which was as big as a Walnut, and the other bigger, which being extracted, the Patient soon recovered, and the Wound was healed up, only with Barley Water, and Mel Rosarum.

This you have at Tab. IX. Fig. XI. and at Tab. X. Fig. II.

Ceratoglossus.

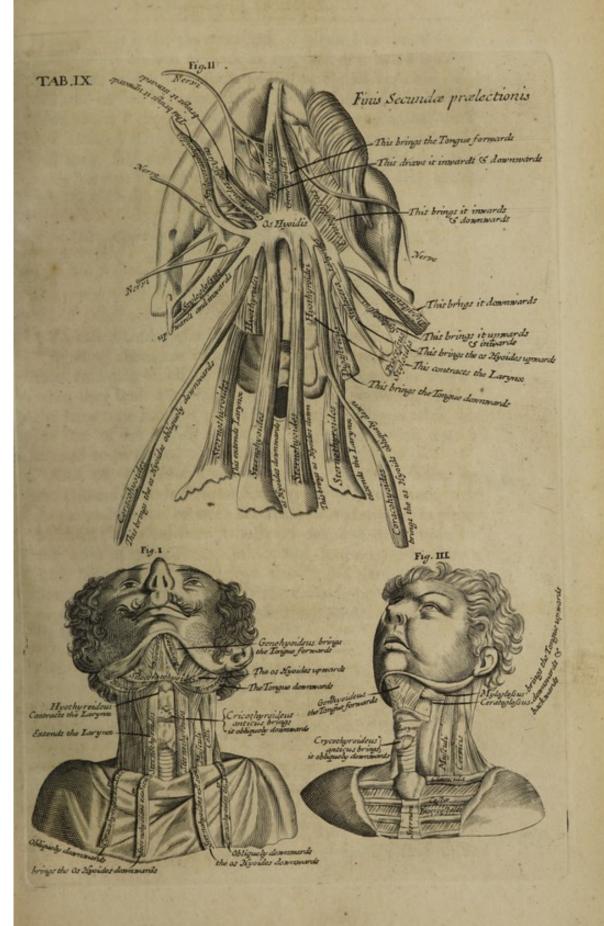
This brings the Tongue downwards & inwards.

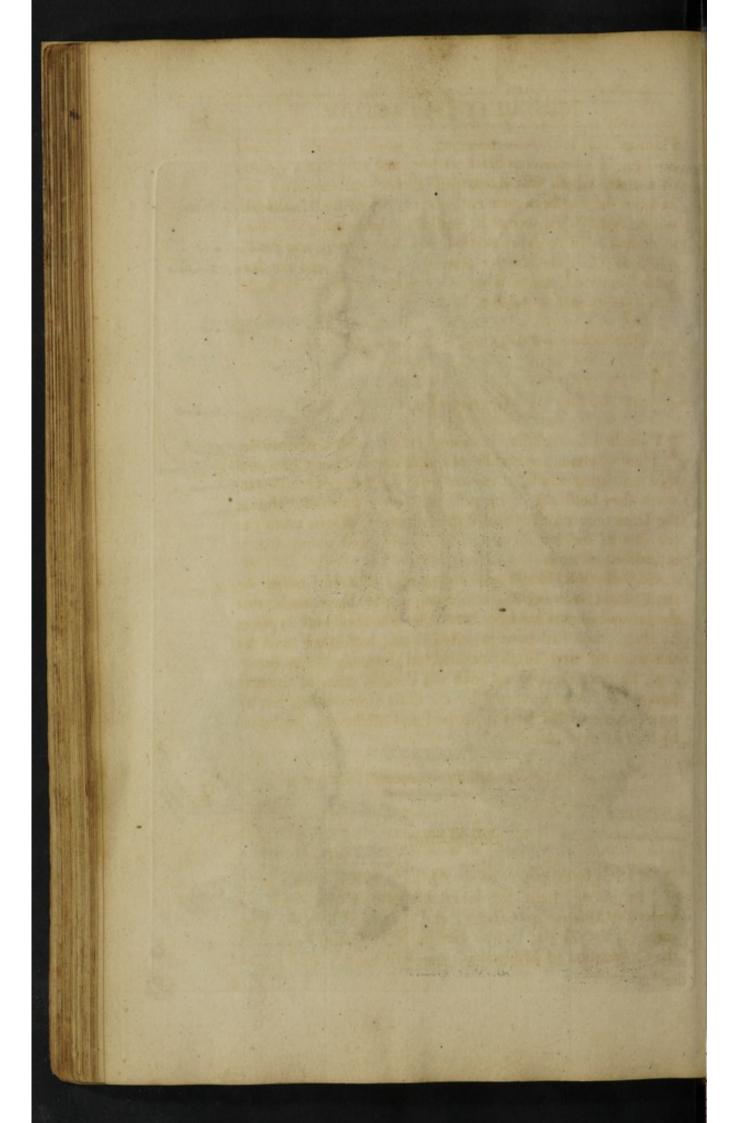
History.

THIS is called Ceratoglossus, it arising sleshy from the Horns or Bones of the Os Hyoides, and is implanted obliquely at the sides of the Tongue, near its Root; if this Pair do both act, they bring the Tongue inwards and downwards; if one only works, it brings it to one of its sides only.

In the lower part of the Mouth under the Tonge, there has been sometimes seen to grow another Tongue, as it were tyed to it; it not much differing from it, as to it natural Colour, which is also sometimes seen to encrease in magnitude, so as to over reach the Teeth of the Nether Mandible, with a kind of a Clest, dividing the right from the lest side thereof, carrying in it the likeness of a little Frog; or as some write, making him that is therewith troubled, to croak in his Speech like a Frog.

Such a Patient had I once in Buckinghamshire, in the Son of one Mr. Hall a Minister, who had a very large Ranula, which I cured him of, by dividing it from the Teeth with a red hot cutting Instrument; and tho' most Authors write, that the Humour





Humour that is therein contained, is much like the white of an Egg, yet his was as black as Ink, and near half a quarter of a Pint, which was discharged thence, all appeared so; and tho' he had been once or twice cut before by Mountebanks, without any Relief, in that it Iwelled Iuddenly up again; yet I fo eradicated it on every part by my Cutting Cautery, and the Vitriol Stone, that there is no Remains left of it, and the Boy holds very well, and is now at Cambridge, and speaks better than ever he did in his life.

This you have at Tab. IX. Fig. II, III. and at Tab. X. Fig. II.

Geneioglossus.

T's called Geneioglossus, it arising stelly, with a narrow Be- . This brings ginning about the middle of the lower Jaw, or Chin; and the Torque forwards. then enlarging itsself, is inserted into the Root of the Tongue; when they both act, they pull the Tongue forwards, and at the same time thrust it out of the Mouth: Veslingius takes this for one of the Muscles of the Os Hyoides, and writes that it is fixed to its Bais.

Obs. 28. Fab. Hild. Cent. 1. we read of a Girl falling on History. the Ground with her Tongue hanging out of her Mouth, that the part which was between her Teeth, was almost cut in pieces by them, and had been wholly bit out, had it not been for the want of two Teeth, which had formerly been drawn out; he once thought to joyn the divided parts of it with Suture, but was prevented by the Girls Impatience, but afterwards cured her by the Method and Medicines, prescribed

by him in that place.

This you have at Tab. IX. Fig. II. and at Tab. X. Fig. II.

Myloglo [us.

THIS is so called, it being a Muscle arising with a broad This brings Beginning, from the innermost part of the Nether Jaw the Tongue upwards. under the Molares, or Grinders, and is inferted into the Ligament of the Tongue, which ties its Basis to the Fauces: At Annotat. the Origination of Mylohyoideus, you will exactly find it; and

it is best shewn when the Mandible is divided: When one of these move, the Tongue is turned upwards; if both move, they lift up the Tip towards the Palate or Roof of the mouth.

History.

Riverius in Obf. 381. tells us of one troubled with the Pox, who being cured with Mercury, the Apothecary keeping him longer in his Flux, than the Dr. ordered, the extream Violence of the Flux had so swelled his Tongue, that it hung the breadth of four Fingers out of his Mouth; for the Remedy of which, the Dr. would not advise any thing, tho' the Patient continued in this miserable Condition, for the Space of four Months; and the Tongue being altered by the Air, was grown three Fingers thick; another Physician being fent for, after bleeding him, and other things there prescribed for him, his Tongue grew softer, and the Tumour discust, and the Tongue brought to its former Habit.

This you have at Tab. IX. Fig. III. and at Tab. X. Fig. II.

Hypfiloglossus, or Basinglossus.

This draws it inwards & downwards.

THE first Name it hath, on its arising fleshy from the Basis of the Os Hyoides, and by some also called Hypsiloides from its Figure it bears with a Greek U, and Bafiogloffus, it arising from its Basis, and ending in the middle of the Tongue; this being generally allowed to bring the Tongrie inwards, and at the same time said also to draw it backwards.

This you have at Tab. IX. Fig. II. and at Tab. X. Fig. II.

THE STAN DET TO LOS Lingualis. dar to west use the

the Tongue both in Con-Dilatation.

This moves TT has its Name, it arising large and fleshy from the Basis of the Os Hyoides, and runs forward to the Tip of the Tonque, Ariation and and at this day it is disputable whether it be a Muscle or not: But Spigelius gives it this use, that its Transverse Fibres do thicken, and as it were, constringe it; and that by its oblique Fibres it is dilated, and that its right Fibres were formed for bringing it towards the Palate.

There is no Description of this Muscle.

The Stylopharyng eus, and the Styloglossus, participating one and the same Origin in the Processus Styloides, have different Contractions in reference to their various Terminations; the first being inferted into the infide of the Glandulous Coat of the Fances, do lift them up, and expands the Mouth of the Gulet; but the Stylogloffus implanted into the Root of the Tongue, lifts it up towards the Palate; and the third Styloideus being inferted into the Horns of the Os Hyoides, elevates it, and the Root of the Tongue faltned to it; the Actions of the Swallowing Muscles with their Origins and Insertions, being thus premifed, Deglutitions and their main Uses is thus celebrated: The Styloglossus lifting up the Tip and Blade of the Tonque towards the Arch of the Palate, therewith throweth the Mafficated Meat (embodyed with Salival Liquor) upon the Epiglottis, prefling it down, and thrusting it so close, that no part of the Meat or Drink can enter into the Aspera Arteria; and the Styloideus lifting up the Root of the Tongue, puts the Aliment beyond the Epiglottis, near the Entrance of the Oefophagus, and at the same instant the Pterygopharyngeus, or as others Sphenopharyngeus, arifing out of the Aliform Processes of the Os Sphenoides, from whence it gets its last Name, and is inserted into the back part of the Glandulous Coat covering the Fauces, which this Muscle embraces with Semicircular Fibres, and bringing the arched Fauces to a plain, and by straightning the Passage of the Throat by their nearer approaches to each other, whereupon the compressed Aliment is pushed into the Orifice of the Gulet, and forthwith the Musculi Oesophagei, arising out of the sides of the Bucklar Cartilage, do encircle the Oefophagus instar Kapina, whence they are called Vaginales, befet in the outfide with oblong Fibres, contracting the Oefophagus longways, and more inwardly with Annular Fibres, streightning the Gulet in depth, circularly, and throw the Aliment into the left Orifice of the Ventricle, wherein by diverse Ferments, infinuating themselves into the Compage of the Aliment, and enlarging its Pores, doth colliquate and diffolve it, extracting an albefcent Lis quor, which we commonly call Chile, as Dr. Collins learnedly observes.

Mastoideus.

This contracts the Nest.

THE System of Spinal Vertebres may properly be termed a Chain made up of two extream parts, each part being formed of many Links curiously put together, by the interpofition of strong Ligaments, whole Union is scarcely divisable; their Sinews being well fitted to the Heads of the Occiput, whereunto they are so firmly affixed in their proper Cavities, that they cannot readily start out by the moving of the Head, which are brought forward in flexure on the first Vertebre of the Neck, by these pair of Muscles; and being long thick Muscles, arising partly out of the Top of the Sternon, and partly out of the Clavicle, and obliquely ascending by the Neck, are inferted into the Processus Mammiformes, which being contracted, do draw the Head forwards, pulling the Chin to-These in aged People wards the upper part of the Sternon, are very conspicuous, and plainly apparent.

Observat.

Petrus Forest. tells us of a Struma in the Neck, growing to the largeness of an Egg, which being cut by a Sword, and stricktly examined by his Father, and by another Nobleman, it was seen filled with living Lice; the Man having this Struma in his Neck for a long time, no Chyrurgeon would undertake to cure him, he being poor and wounded, and requiring the present Help of a Chyrurgeon, one upon Charity, and by chance, coming to cure his Wound, with it also cured his Evil Swelling. This is the Muscle usually cut in curing of Wry. Necks.

This you have at Tab. VIII. Fig. III.

Lect. III.

Lecture III.

Having these following MUSCLES belonging to it, viz.

Hyothyroides, Sternothyroides, Crycothyroides, Crycoarytenoides Lateralis, Thyroarytenoides, Crycoaritænoides Posticus, Arytanoides, Stylopharyngaus, Sphanopharyngæus, Cephalopharyng aus, Oe ophagaus, Sphænopalatinus, Pterygopalatinus, Obliquus Major cum Trochleâ, Obliquus Minor, Elevator Deprellor Oculi. Abductor Adductor

Laxator Externus, Tenfor Internus Tympani, Longus, Scalenus. Serratus Major ? Serratus Minor Anticus, Subclavius. Intercostales Externi, Intercostales Interni, Triangularis, Diaphragma, Cor. Detrufor Urine, Sphincter Vefice, Sphincter Ani, Levatores Ani.

Hyothyroides.

HE Larynx is the Head of the Wind pipe, and an In- This construment made for Modulating of the Voice, it being max, and an admirable Piece of Art, framed by the Alwife wards. Architect for that Use, and a Compage framed out of several distinct parts, as Membranes, Cartilages, Veffels and Muscles: This among the relt, taking its Name from its Origin, it arising fleshy from the whole sides of the Os Hyoides at its Balis, and marching along with right Fibres, is inferted into the lowermost and lateral part of the Buckler Cartilage; and by raising it, does dilate its Cleft: Upon your raising this Must le clear from its Origination and Infertion, you will with eafe find out all the other Muscles belonging to the Larynx; and

Annotat.

as an Observation hereof, when we would raise, or form a sharp Voice, we are usually seen to bring our Larynx upwards.

Observat.

This Muscle being contracted by attolling the Larynx, is said to force the Nutriment towards the Entrance of the Gulet, in its Order to Deglutition, which in its Journey is facilitated by the Epiglottis, closing the Head of the Wind pipe, for hindring the falling of the Nutriment into its Cavity, in its Passage over it.

As an Observation on this part, it has been many times taken Notice of, this part being wounded, that those who have lost their Speech thereupon, have also lost their Tasting; and it is reported of William Prince of Aurange, upon his receiving a Wound in his Neck, he lost his Taste; and of another, being wounded in the French Wars, died Dumb; and this may reasonably follow hence, in that there is seen a pair of Nerves arising from the third Conjugation, inserted into the Larynx, by one Branch, of which the Tongue is made the Master of Speech, by the other we obtain our Sense of Tasting; and therefore when any one of them be divided, that part must necessarily lose its proper Energy, as Bodinus well observes in Theatr. Natur. lib. 4. pag. 46:

Amatus Lusitanus, Cent. 2. Curat. tells us of a Woman troubled with the Evil in her Neck, who putting her self under the Hands of a Quack, who having applyed many Medicines in vain, he drest her afterwards with Sublimate, in hopes of eradicating it, by which one of the recurrent Nerves of her Breast (which makes the Voice) was eaten away; upon which she not only became hoarse, but lost her Voice, wholly thereby.

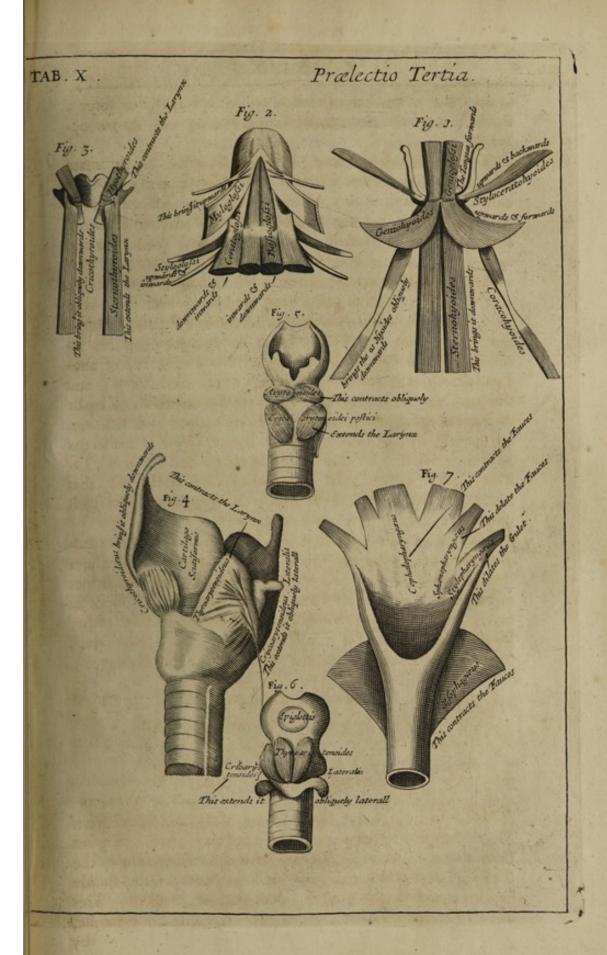
This you have at Tab. IX. Fig. I, II, and at Tab. X. Fig. III.

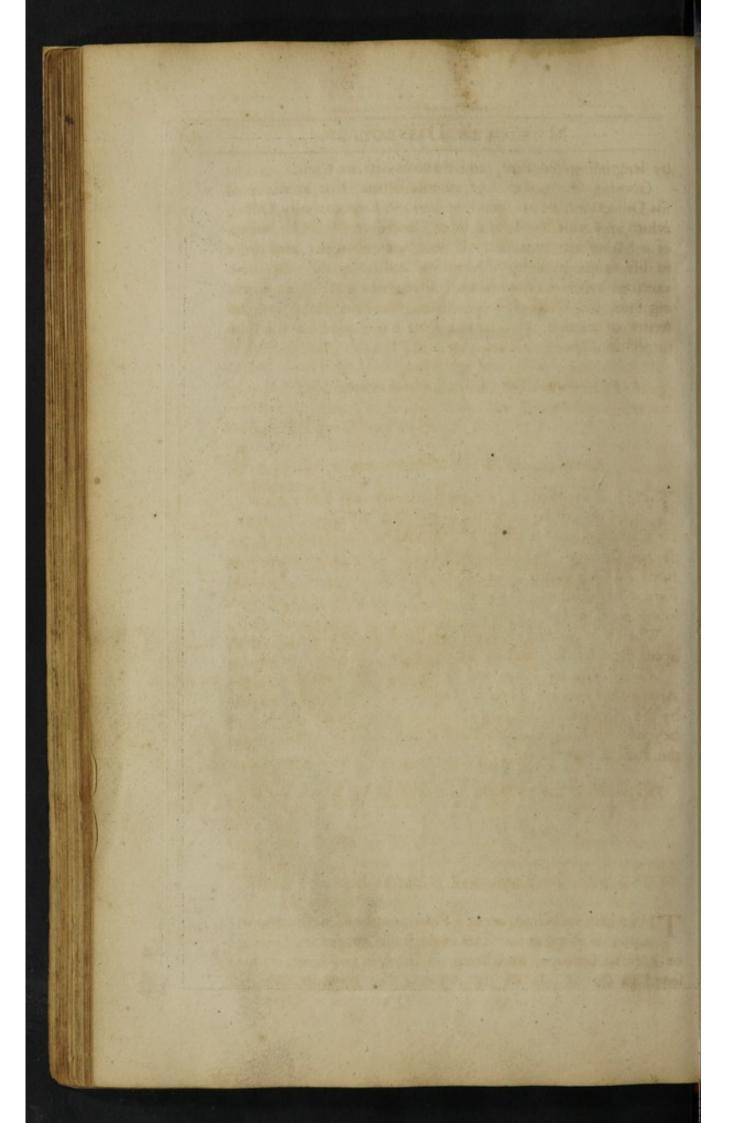
Sternothyroides.

This extends the Larynx, and brings it downwards-

THIS hath its Name, by its arising fleshy and broad from the upper and inner part of the Sternon; and keeping his Dimensions, is seen to creep up with strait Fibres along the Wind-pipe, and is inserted into the lower part of the Buckler Cartilage; and having prest it, does narrow its Clest: This and its Partner working together, do draw down the Larynx,

VC





by lengthning the Pipe, and do close up its Cleft.

Columbus, lib. 1. cap. 13. Anatom. Writes, that in many of his Diffections, he has found the humane Larynx wholly Offeal, which in Youth was cartilaginous; and Cotter, lib. Opf. writes of a Malefactor twice hang'd, and yet recovered, and came to life again, as if by a Miracle; and being the third time executed by the Command of Justice, till dead; upon opening him, his Wind-pipe was found wholly Offeal; and he writes of another, who had both his Larynx and his Wind pipe turned into spongy Bones.

Hiftory.

This you have at Tab. IX. Fig. I, II. and at Tab. X. Fig. III.

Crycothyroides.

THIS is so called, it being a short, thin and fleshy Muscle, This brings the Carillage obliquely lar Cartilage, and ending at the fides of the Scutiformis, or downwards Buckler Cartilage; and by some it is called Crycothyroideus Anticus, from its Origination, and is thought to bring the Cartilage somewhat obliquely downwards, it arising in the fore and lower parts of the Larynx.

When it is contracted, it extends the Annular Cartilage, and opens the Cleft for making a more grave, and deep voice.

Albucasis cap. 94. Chir. tells us of one, who having a spiked Arrow shot into the Throat, which was not to be cut out, nor by the Applications of proper Instruments drawn thence, yet beyond the Expectation of many, nay, and of himself also, the Patient recovered.

Its Ufe.

Hiftory.

This you have at Tab. IX. Fig. I. and at Tab. XI. Fig. III, IV. and at Tab. XIII. Fig. II.

Crycoarytenoides Lateralis.

THIS hath its Name (being a short, small and fleshy Muscle) This extends upon its rifing at the fides of the lower part of the Cricoidal it obliquely or Annular Cartilage; and being in its oblique Ascent, is inferted to the outlide of the Arytanois, or Ewer-like Cartilage laterally,

Hiftory.

laterally, not far off from the former, it opening the Larynx,

by the oblique Deduction of its Cartilages.

Job. Baubine de Obs. Prop. Writes, that he opened a Boy, whose Larynx was wholly cut thro, and almost all his Gulet, who lived seven days without Meat, and whatever he took, went through his Wound, thro' which also he breathed; and upon opening his left Kidney, the Emulgent Vein was seen divided into three parts, the first entring the Kidneys, and the other the Arteries of the same side, and his Vena Azygos was with its Branches fent to the fecond Rib.

As a further Observation of this Muscle, we may take Notice, that by how much the second pair of Flexors do bring the Cartilage to a Closure, the other pair of Extensors do

bring it outwards, and open it.

This you have at Tab. X. Fig. IV. and Fig. VI.

Thyroaritænoides.

This Con. THIS hath its name from Thyros, or Scrutiformis, and Arytænois Guttalis, it being a fleshy and broad Mulcle, and the largest of all the proper Muscles of the Larynx, and is transversly planted into the Cavity thereof, and being carried upwards lengthways, is implanted at the Fore parts of the Ewer: like Cartilage, which makes the Glottis, which by constringing, it shuts the Larynx.

Observat.

This Mulcle is best found out, by dividing the Buckler like Cartilage, from the Annular, and Ewer-like Cartilages, and fubjacent Muscles, the Coats of them being carefully pre-

ferved, after which this will plainly shew its felt.

That the Cartilages of the Wind-pipe in all, or in most Bodies should turn Osleal, is beyond my Belief, but that fometimes it so falls out, has been perfectly shewn; and I remember I have seen in some old men, both their Larynxes and their Muscles so attenuated, as if they were even dryed up, and made excarneal, so as that some of their Diet is seen easily to fall into the Wind-pipe.

Hiftory.

Cl. Ofvald. Gabelchover de Obf. Juis, writes, of an old Man of above threescore Years of Age, who had the Misfortune, not to swallow any Drink, but a great part of it would tall into his Wind pipe; he could fwallow his Meat well enough

with.

without any Offence to him, especially that which was not friable, which by degrees confumed and wasted.

This you have at Tab. X. Fig. IV, V.

Crycoarytenoides Posticus.

This fo named, upon its arising from the back part of the This extends Cricois, or Annular Cartilage, and being implanted into the lower part of the Aritanois, or Ewer-like Cartilage: By Cafferius, it is called Par Cucullare, it bordering upon the back part of the Larynx, it being much of a Quadrangular Figure, it aris fing fleshy from the back part of the Cricois, and marching obliquely upwards, filling its Cavity with its Fibres, is im= planted in the lower part of the Ewerslike Cartilage, and by dis viding the Cartilages, does open the Larynx.

This is said to extend the Ewer-like Cartilage, and by bring. ing it backwards to the outward parts, does open the Epiglott, which is eafily shewn, upon turning the Muscle back with your Knife, where you will plainly see the Ewer-like Cartilage

readily open upon it.

I knew one Mr. Goodman, a Schoolmaster in Norfolk, about Observati forty years of Age, who could eat his Meat very heartily without any Disturbance, but when he had occasion to drink, was forced to bend himself forwards, and let his Liquor down very flowly and sparingly, least any of it should fall into his Wind-pipe, as have sometimes hapned to him beyond all his Care, and have given him no small Trouble or Danger of Suffocation; I saw the same Case also in the Earl of Arglass.

This you have at Tab. X. Fig. V.

Arytenoides.

TT hath its Name, it being a very small and fleshy Mus- This obliques cle, arising with oblique selhy Fibres from the Arytanois, it contracts or Ewer-like Cartilage, and joyning its self to the Annular Cartilage, inserts its self into it, they seeming to joyn themselves together.

This obliquely moves the Ewer-like Cartilage to either fide, and by constringing its Basis, does thut the Glottis.

Its Action is very observable, viz. when we for some time forceably stop our Breath, we intercept the Motion of the Muscles of the Trunk, whose Use is employed in Expiration.

Observat.

Ule.

Mercellus Donatus, Higt. Mirab. lib. 3. cap. 7. writes of a Noble-woman, who taking some Pills, one of them by chance fell into her Wind-pipe, which remaining there for near three hours, gave her great Pain, and Danger of Suffocation, and which was not to be drawn out with the greatest Skill whatever, until at length, by growing moist, it was coughed up by piece meal, and so discharged her from her great Anguish of Mind, and Torment of Body, nay from Death its felf, which she hourly expected.

An Annotation upon the MUSCLE Arytansides, given me by the Worthy Dr. Connor.

"The Action of this Muscle solves that famous Question, "whether Respiration be a voluntary or involuntary Moti-"on, or whether partly one, and the other; 'tis plain, we "can stop our Breath when we please, and it is very evident, "that the Motion of Respiration goes on spontaneously when "we are afleep; from whence all our Anatomists conclude, "that Respiration is both a voluntary, and an involuntary "Action: Dr. Willis went a step further, and explains how "this Motion is involuntary, because saith he, the Intercostal " Muscles receive their Nerves from the Cerebellum, which Nerves "he supposeth all to serve for involuntary Motions; which "in my Opinion must be a Mistake, for there are several "Nerves, that come from the Cerebellum, even Branches of " the fifth Pair, (which with the eight Pair, make the Intercoftal "Nerves that cause Respiration) which serve for voluntary " Actions, as are the Branches of the 5th. 6th. and 8th. pair " which voluntarily do move the Eje, the Tongue, the Larynx, Phas "rmx, the Muscles of the Neck, and those of the Lower " Mandible; from whence it is evident, that Respiration is " not involuntary, as our Moderns would have it, because it " is performed by Nerves, which come from the Cerebell: "Since it would follow from thence, that all the Muscular " parts that receive Nerves from the Cerebellum, should be in a "constant involuntary Action, as the Heart, and the Intercostal " Mul.

Muscles are: But I would rather, as I have in my Account of Muscular Motion, derive the Involuntariness of the Motion " of the Intercostal Muscles, from their want of true Antagonists: "Now the Reason why these Muscles can voluntarily stop, " is not because they are of themselves, subject to any in-"voluntary Motion, for the self-same Muscle can never be " subject to voluntary, and involuntary Action at the same "time; but because the Muscle Arytanoides, which shuts the "Passage of the Air into the Lungs, can be at our free Will " contracted, and can close the Larynx, that the Air, tho "pressed by the Muscles of the Breast, which are always in " this involuntary Motion, cannot get into the Lungs, from "whence Respiration voluntarily ceases for a time, so that "I may in some respect call the Muscle Arytanvides contracted, " and the ambient Air intercepted the Antagonists of the Mus-"cles of Respiration; as I may in a manner call the Blood "that dilates the Heart, the Antagonist of the Heart it self, "the Hearts own Muscular Motion being self-contraction.

This you have at Tab. X. Fig. I.

Stylopbaryngæus.

themselves from the Or Feath, all you arrayout the Cavett

and basic that officer ancient their winds of

MAture hath made the Gulet, as a concave Body, and a Repository for entertaining our Nutriment, the only pros the Guler, per Conveyance for the carrying and dispatching of our Aliment from the Mouth, into the Stomach; as the Head of the Wind-pipe is called the Larynx, so the Head of this is named the Pharynx; its feen to march along at the backfide of the Wind-pipe, for its more easy discharge of its Nutriment thro' it, which it performs by the Benefit of the Muscles allowed it, of which this is accounted one of the third Pair, and hath this name allowed it, upon its arifing with a sharp and fleshy Beginning from the inward part of the Styloidal, or Beak-like Proces; and with its thin Body obliquely descending, it expands its felf at the Termination of the former. This Pair acting, as Veslingius and other Anatomists write, do bring the Fauces upwards, and dilate them, and are said also to enlarge the Cavity of the Gulet; others on the contrary affirming, that this is a Constrictor. Wierus R 2

History. Wierus writes of one, who took a whole Egg, and got it into his Gulet, but it sticking so close to the upper part thereof that it could not be got out, and denying all Passage, and pressing too hard upon the Wind-pipe, the Man became presently suffocated and dyed.

This you have at Tab. X. Fig. VII. and at Tab. XIII. Fig. I.

Sphænopharingæus.

This dilates

THIS is one of the second Pair, and from its arising near the Appendix of the Sphenoides, or Wedge-like Bone, both thin and nervous, it has this Name given it; and falling down by the inner Cavity of the Pterygoides, it is inserted by a small Tendon into the skinny part of the Palate, from whence the Gargareon seems to arise, and is allowed to dilate the Fauces.

Annotat.

Neither this or its Partner is to be shewn without much Difficulty, and to find them, after you have raised the Larynx, and the Oesophagus, leave the Fauces entire, then divide the Fauces themselves from the Os Palati, till you arrive at the Cavity, then carry your Knise close inwards to the Os Coneisorme; and when it is thus divided, you will meet with both their Ori-

Hiftory.

ginations, which you may raile with great eafe. It's a Maxim allowed among the Ancients, if any one swallows a Pin or Needle, or any other such like sharp pointed thing; if in thele Cases they should prescribe either Vomits, or Diureticks, they know not but hereby (whilft they by endeavouring to remove them from their place) they may drive them to as to fix them into some other part more sensible than that, where they were first lodged in, and hereby create great Danger; such Cures therefore are not to be undertaken by them. where neither Art or Hopes can give them any Encouragement thereto, unless Providence its felf works some strange Interpolition of lupplying them with Help, or Nature, (as sometimes is feen has thrown them out by convenient Passages without any Injuries to the parts, as has been feen by opening of an Abscess) or by Stool, or by Urine; where it is wonderful to see how these sharp pointed Instruments, as Needles, and the like, should pass through the Stomach and Guts, the MelaMesaraic Vessels, the Porta, the Liver, the Vena Cava, the Emulgent Veins, the Kidneys, the Ureters, and the Bladder, and all this in a small Space of time, as if the Needle its self, or the like, sought out its own way for its Discharge out of the Body, through all these Stages and Circuits thus planted in Humane Body, through which it must pass.

This you have at Tab. X. Fig. VII. and at Tab. XIII. Fig. I.

Cephalopharyng aus.

THIS Muscle arising from the Cranium, and the first Vere This Contracts the tebre of the Neck, where they are joyned, gives it the Fauret. first part of its Name, and in its Descent, it being Inserted into the sides of the Os Hyoides, and Buckler Cartilage, and the beginning of the Oesophagus, or Pharynx, gives it the other part thereof, whence he seems to borrow his Coat, and by listing it up, doth at the same time constringe the Fauces in deglutition.

Tho. à Vega Cap 3. Lib. 6. Loc. affect. writes, That by a Observat. Resolution of these Muscles, some have of a sudden grown

fick, and dy'd.

Benedictus Bonacurtius a Medico - Chirurgeon, writes, He Cured Historyi one in Prison, who with a Knife had so Cut his Throat, and made so large a Wound therein, that both his Victuals, and his Medicines which he took, came all thro' it, and yet the Man received a perfect Cure in few days.

This is to be shewn at Tab. X. Fig. II. and at Tab XIII. Fig. I.

Oesophagæus, or Sphincter Gulæ.

IT has its first Name from its Situation Oefophagus, or This Constracts, and Sphineter from Equiple, Stringo, to girt close: This is a faces. Helhy and broad Muscle, encircling the Gulet, it taking its Origination from each side of the Buckler Cartilage, and afterwards gives a soft slessly covering to it; 'tis allow'd to contract its Cavity, and at the same time to send the Aliznent forwards in its passage into the Stomack.

We read a very unusual Case in Fol. 42. Fabric. Hildari. Observate

100.1

Cent. 1 .

Cent. I. of a Souldier who being wounded with a Bullet, which past into his Trunk; three or four Months after his Cure, a tragment of a Rib, pritty thick, and 3 fingers in length, was thrown out by his Wind-pipe, and yet did well, and had

no Symptoms followed, as Peter Pigray Recites it.

Obs. 32. Tab. Hildan. Cent. I. we read of one who having swallow'd a Sharp-bone into her Throat, who being many times provoked to vomit for three days successively, yet could neither get the Bone up or down: He being call'd for the sourth day, found her Neck both inwards and outwards much swell'd and instam'd, so that she could scarce breath; besides, she was seiz'd with vehement Pain, Feaver, Delirium, and Convulsions; and when neither by Vomitting, or Instruments, 'twas to be removed, an Abscess did arise in her Throat, which by his Medicines there made use of, both inward and outward, he eased her Pain, and brought the Abscess to Suppuration; which breaking, a good quantity of Matter came out of her Mouth, and with it she discharged the Bone, and in a short time after recovered.

This you have at Tab. X. Fig. VII. and at Tab. XIII. Fig. I.

aletter durant, inche baye of el ludden alowa

Sphenopalatinus.

This attols the Palate, & brings it backwardsMAN hath configned to his upper Palace, a curious Portal, finely wrought within, for the more advantagious tuning of his Voice, and helping his Tongue in the articulating of Letters, as also for the more ready indulging his Palate, in eaten savoury Meats, and drinking pleasant Liquors, and as it hath allowed it variety of parts, so hath it these two pair of Muscles granted to it, which the late Learned Dr. Crown named Spanopalatinus, and Pterygopalatinus: This having its name upon its arising from the Os Sphanoides, or Wedge-like Bone, and inserting its self with a broad Tendon into the sides of the Glandula Palati, where it becoming a round selfhy Belly, and afterwards lessening its self near its Insertion, carries on the same Body to the back part of the Gargareon.

Observat.

From the Situation and Action of these Muscles, with the Pterygopalatini may some Account be given, how the Uvala being relaxt, is so easily reduced, by thrusting the Thumb bent towards the Palate, or these Muscles.

Valescus, cap. 5. lib. 3. Philon. writes, That he was called to a Person troubled with an Apostem in his Uvala, and upon feeing his Case, he promised to deal with him according to Art; another Elder in his absence came to him, and cut off all his Uvala with his Sciffers; which being done, the man being of a plethoric Constitution, such a quantity of Blood and Humour discharged its self into his Brest, that it made fuch an Obstruction and Pressure on his Brest and Lungs, that he could scarce breath; and after this could scarce spit, or cleanse his Brest, but the third day he died suffocated.

Hiftory:

This you have at Tab. VIII. Fig. II.

Pterygopalatinus.

THIS Muscle by some is called Sphenopterygopalatinus, it arising This brings like the former from the Os Sphanoides, or Wedge-like Bone, the Vosts downwards. and inserting its self into the inner Cavity of the Os Pterygoides, or the said Bone, (both which Names are given to the same Bone) where its Tendon feems to terminate, it first running over a part of the forementioned Bone, and then is feen to insert its self at the Fore-part of the Palate, whence it naturally hath the other Name allowed it.

Altho' in the last Description, we read of one dying suffor Annotat: cated, by having his Vvala cut in Pieces; yet I can tell the Reader, we live in an age, where very few parts of the Body has been more ill treated, than this of the Palate, especially in venereal Cases, where I have many times seen it eat away with the 'Uvala in the French Pox; and tho I have known many troubled with this Disease, who have been so hoarse. that you can scarce tell what they say, and so rotten, and eaten up with stinking Ulcers, that they are the Subjects more of Shame than of Pity; yet many of these, by the help of a filver Palate, fitted to the Ulcer that has been eat thro', and kept up by a piece of a Sponge let into its back part thro' two Holes, it has been feen there kept so tite, that it has altered their Voice to a strange degree, and they have spoke so well, as if they had not loft any of their Palate.

This you have at Tab. VIII. Fig II.

Obliquus Major cum Trochlea, or Musculo Trochleari, Or the Eyes Greater Oblique Muscle with its Pulley.

This brings the Eye inwards. THE Eye, that Globular or Spherical Body, planted in a concave Valley in the Front, for securing us in our Actings and Conduct, as well as bringing us into the Knowledge both of Men and Matters, is a System made of many parts, having a dependance on each other, either of which are feen to pay their various Tribute to this Noble Member, for the better securing of our Sight: I shall not enlarge any more upon this part, but only shew the Muscles allowed it, beginning with this, where we may fee it has three Names ala lowed it by Authors, it being called Obliquus, from its Position, Trochlearis, from its cartilaginous Pulley through which it passeth, and Longissimus, from its length, being considered with the other Muscles of the Eye. Now, since this Muscle being both longer, and feated above the other, hath the fame Origination with the third right Muscle, it getting its thin Body into a Cartilagenous Pulley; which being made sharp and fleshy, does obliquely march thro' it, to the upper part of the Eye, and ends near the Tendon of the Obliquus Minor; and being affifted with this Pulley, does turn the Eye obliquely inwards, towards its inner Corner or Canthus.

This Muscle by some is called Amatorius, the Lovers, or Ogleing Muscle, from the rowling Use, Lovers make of it with their Mistresses; several Fibres are allowed to pass from the Periostium, to the fore-mentined Trochlea, which according to the Opinion of some Anatomists, were made on purpose for forming of this Trochlea, tho' the Use of them seems rather designed for a more steady fixing of the Trochlea, than any

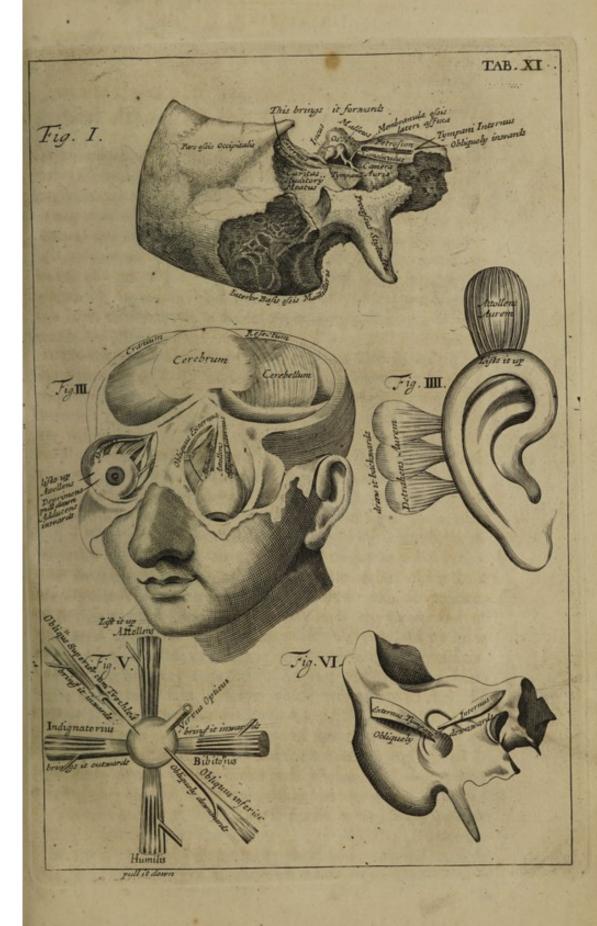
Muscular Motion.

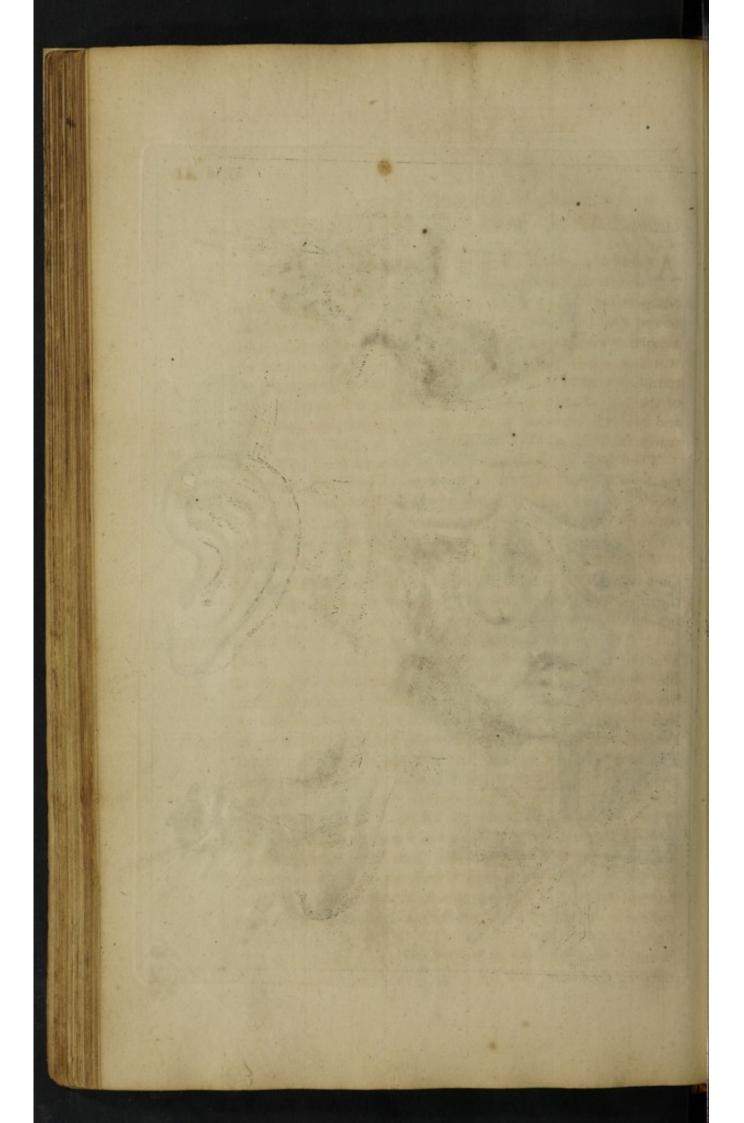
History.

Ulfe.

P. Borellas, Obs. 63. Cent. 2. writes, That he saw in two Men, Eyes of various Colours, one of which was blewish, and the other black, and that D. Formius a Farrier of Montpelier affirmed to him, he saw a Boy, in the Iris of whose Eye, these French Words were fairly to be read, Love soit Dien; in Latine, Laudatus sit Deus; Anglice, God be Praised.

This you have at Tab. IX. Fig. III. V.





Obliquus Minor, or the Eyes leffer Oblique Muscle.

A Sthe former was the longest, so this appears as the shortest This brings of the Muscles of the Eye; it ariseth from the lowermost liquely down-Margent, or from a Chink in the lower part of the Orbite wards of the Fye, it being in its Origination, fleshy, small, and not altogether round, and being carryed obliquely all along upwards, towards the outward Canthus of the Eyelid, is feen to terminate with a short, but nervous Tendon, near the Verge of the Iris, or not far from the Tendon of the Abducent Muscle, and in its Contraction, pulls the Eye obliquely downwards, towards the lefter Angle.

Thele two oblique Muscles are of great Use in enlarging the light of the Eye, for by the various movings of these Muscles, as carrying it upwards and downwards, inwards and outwards, the Eye becomes more expanded, and the Objects

are made more plain and visible to us.

P. Borellus, Obl. 91. Cent. 3. tells us of a Fish, whose History. Guts being hung in a Glass Vessel in the sun, in the Dog days, they have been resolved into Oyl; a few Drops of which being instill'd into the Eye, has recovered the fight when near lost: The same is reported of the Lamprey by Gafferello, who kept this as a very great Secret, and with which he cured a No. ble woman, a Relation of a great Commander, who let a very great Value on it; and there are some, who do believe, that this was the same Fish, that Tobias, by the Command of the Angel, cured his Father with; for that was said to be a Fish, long, like that of a Serpent, and voracious: Now a Lamprey is like in every respect to a Serpent, and is so voracious, that it has been faid of some which were kept in standing Waters, that they have devoured Men.

Forestus tells us, that the Liver of this Fish being put into a Glass, and that let into another more wide, and placed in the fun, it will yield a Liquor purely white and clear, much resembling an Oyl, with which only anounting the Eye-lids of those that are blind, it will miraculously restore them to their fight; and tells you further, in Lib. 11. Obf. 35. he cured a Woman, who was near perfectly blind, and recovered her fight only by thus using of it, and hath many times experimental-

ly been approved of by others in the same Cases, with the like fuccels.

This you have at Tab. XI. Fig. III. & V.

Elevator Oculi, or the Eyes Elevater.

up the Eye.

THIS Muscle hath its Name from its Use, in raising the Eje upwards; it arileth from the upper Orbite of the Fye, fharp and fleshy, not far from that part, where the Optick Nerve appears, and becoming a fleshy Belly, is inserted into the horney Coat of the Eye, where it is clear, and near the Iris, by a thin and Membranous Tendon, and being contracted. does elevate, or raile the Eye.

By some this is called Superbus, allowed as the Master of

Disdain, and which it shews upon its turning upwards.

Hiftories.

Lustranus, Curat. 32. Cent. 7. acquaints us of a Boy, who received a large Wound in his Head, loft the fight of both his Eyes; and tho he was pertectly recovered of his Wound,

yet he never recovered his light.

Lycosthenes tells us in the year 308, that there was born a Monfter in the time of Constantine the Great, with a double Mouth, with a double Row of Teeth, with a Beard, and four Eyes, and two short Ears; and Lusitanus, Cur. 57. Cent 2. writes of a hairy Monster, having four Eyes, two Nostrils, and four Ears.

This you have at Tab. XI. Fig. III. & V.

Depressor Oculi, or the Eyes Depresser.

the Eye down-

This brings THIS being less than the former, hath much the same Origination, it arising from the lower part of the same Orbite, and carries in it the same Insertion towards the opposite

part of the Bulb of the Eye.

This is an Antagonist to the former, carrying no great Dispolition of Vigour in it, there being required less Force to depress, than to raise, and by some it is called Humilis, as being the Index of Humility,

This you have at Tab. IX. Fig. III. & V.

Adductor Oculi, or the Bringer of the Eye inward.

THIS hath its Name from its Use, it bringing the Pupil This draws the Eye inof the Eje towards the Nofe, it ariseth from the Or- wards bite of the Eye, near the beginning of the Elevator, drawing the Eye inwards towards the Nofe, and is inferted to that part of the Cornea which is nearest the Nose; this by some is called Bibitorius, it directing the Eye towards the Glass, and bring-

ing it towards the inward Angle.

That the Eye may perform its visive Action aright, there ought to be kept up a perfect Sympathy amongst its Muscles, fo that in their Operations, they may fulfain it in a due Position; now, when any Muscle is seen to work more or less than its Companions, this does more than ordinary draw the rest to it, by which it distorts and disturbs the Sight, and upon this diffortion, it usually occasions that which we commonly call Strabifmus, or Squinting, which may arise from an ill habit of the Muscles, especially of this particular Muscle.

Dr. Willis in Lib. de Aim. Brutor. cap. 15. de Vi. Writes of 2 Young Man troubled with the Palfy, who when his other Muscles of his left Eye were Relaxt, this Adductor was strongly Contracted, by which his Eye became so distorted, that every Object appeared double, nor could he diftinguish

any thing well with it.

This you have at Tab. IX. Fig. III. & V.

Abductor Oculi, or Bringer of the Eye outwards.

THIS by some is called Indignatorius, or the Scornful Muscle, and Abductor from its Use, it bringing the Eye out- outwards. wards from the Nose; it ariseth from the outward Angle of the Eye, and hath the same Insertion with the former; when thele four work together, they are allow'd to bring the Eye inwards, and do form a Tonick motion.

Lusitanus, Cent. 7. Curat. 63. writes of a Girl, who to all appearance was well in Health, yet out of the inner part of the Eye, which we call the greater Angle, the head of a Worm appeared, much troubling Her, and it being more

Annotat.

Hiftory,

closely

closely lookt into by some inquisitive People, they sound it, and drew it out; 'twas the length of half a Hand, and of a whitish colour; during the time of its lodgement there, it gave her no great Pain, nor did she receive much prejudice by it.

This you have at Tab. XI. Fig. III. & V.

Laxator Externus, or Externus Tympani Auris, or the Outward Relaxer of the Drumb of the Ear.

This brings the Drum forwards.

THE Tympanum or Drumb, is the Instrument of Hearing, or as Constantinus calls it, the Door of the Mind, it being formed and prepared for the reception and impression of Sounds, or assuming to its self, the first Sensible species thereof; its allowed a fine membrane, form'd out of many Nervous Fibrils; in the upper Sinus of the Auditory passage, is planted this Muscle, which takes its Origination in a fine Expansion, form'd of many Nervous Fibrillaes, which running gradually less and less, are seen carried to this Membrane, with a slender Tendon to the Malleus; and this membrane being drawn upwards and outwards, by its contraction, its made more tense in its upper part, to referve the Sound more entire, and send it to the Ears inward Recesses.

Annotat.

This, tho' it be one of the smallest Muscles in the whole Body, yet 'tis to be shewn entire, but not without difficulty; great care is to be used in opening of the Os Petrosum, about that thin Part near the Temples, whether it be done with a small Chissel, or fileing, that so the pieces of the Bones being taken out by degrees, this Muscle may not receive any prejudice: The like Care is to be observed in shewing the tollowing Muscle.

Hiftory.

Fabr. Hildan. Obs. 39. Cent. 1. writes, Of a Girl troubled with an Impostume in her lest Ear, where at first she had no Feaver, but after the 14th. day of her Disease, in which time the Abscess began to come to a Head, and the Matter ready to be Discharged, but it still being kept in, by reason of the thickness of the Skin, it afterwards discharged its self downwards: He being called, found the Abscess broke of its self before he saw it, and yet she became perplext with Feaver, Fainting, Vomiting, and abhotring her Diet; with Watchings, and

Pain of her Back and Kidneys, and she not bringing any of the Matter upwards, she soon after Dy'd:

This you have at Tab. VII. Fig. IV. and at Tab. XI. Fig. I, VI.

Laxator Internus, or Internus Tympani Auris, or the Inward Relaxer of the Drum of the Ear.

THIS is planted in a bony Channel, and takes it Origination where the Petross Process joyns it self with the it obliquely Os Cuneiforme, or Wedge-like Bone, and branching its felf into two small and very thin Tendons, one of which is implanted into the upper part of the Malleus, and the other into its Neck, where being inferted into it, is faid to draw it inwards and forwards, with the Membrane of the Dura Mater annext to it, whereupon the Membrane becomes stifned by the Contraction of these two Muscles, as by two Antagonists, the one drawing it upwards and outwards, the other drawing it inwards and forwards, which ballancing each other, do so brace up the Membrane, as to make it tense, for the apter receiving the Appulses of Sounds.

Joan. Franc. tells of a Cobler, who being much troubled with a continual Pain in his Head, and Noise in his Ears, by the advice of a Gentlewoman, mixed some Nigella Seed with warm Water, and dipping Cotton into it, and applying it to his Ear, it not only gave him Ease, but perfectly cured him

thereof.

This you have at Tab. VII. Fig. I. and at Tab. XI. Fig. I. VI.

Longus Colli.

THE Neck is allowed to be purposely framed as a Security for the Windspipe, in order to Respiration; and this Muscle trasts the thereto belonging, ariseth with a sharp and fleshy Beginning, from the Fore-part of the Body, and from the 5th. and 6th. upper Vertebres of the Thorax, and being enlarged in its middle, is seen to run upwards under the Oesophagus or Gulet, and is joyned to all the fides of the Vertebres, ascending until he reacheth the first of them, where he meets with Scalenus, and then

Hiftery.

History.

then they both infert themselves with a sharp nervous Tendon, into the Transverse Process of the first Vertebre of the Neck.

Ulfe.

By the Benefit of this Muscle, and its Partner, the Neck is brought directly forwards; one only working, it is turned

fideways.

Going once to Windsor, near Colbroke, I found one of the Guard lying upon the Ground as dead; he a little before was thrown from his Horse, and pitching upon his Neck, dislocated it, and was supposed to be dead; I coming to him, and finding a Pulsation, clapt his Head between my Knees, and with my Hands I readily reduced it, and restored him to Life; and instead of giving Thanks for the Mercy received, he fell a curling, and wondred where he had been.

This you have at Tab. VIII. Fig. III.

Scalenus, or Triangularis.

This Con-

T's called Scalenus, from the Greek Word Exahinos, or a Figure with three fides, this Muscle being made much of such a kind of Figure; it arifeth fleshy from the first and uppermost Rib of the Thorax, broad and fleshy; and then narrowing its self in its upper Course, it bestows Transverse Fibres upon all the Transverse Processes of the Neck, and is inserted as the former, and does affift it in its Motions; this Muscle hath a particular Cavity allowed it, thro' which the Arteries do descend to the Arm, and the Veins thence ascending do pass.

Hiftory.

I had some years since a Patient, who was an Old Lady living in Norfolk, that for many years had a Cancerous Wen in her Neck, much resembling a Bullocks Kidney both in length and thickness, which she for a long time bound up in a Linnen Cloath, and after that, with a black Piece of Silk so artificially, that it could scarce be discovered; at last it broke out into extreme large Fungus's, and what with the ill smell it carried with it, and the continual Eruptions of Blood attending, she was so emaciated, that in a few days she dy'd.

This you have at Tab. VIII. Fig. III.

Serratus Major Anticus, or the Greater Saw-like Mufcle planted forwards.

Mature hath made the Scapula much like a Buckler, to guard This brings the fides and back part of the Trunk, it being fram'd much the Scapula forwards and of a Triangular Figure, thin and broad, hollowed inwards, downwards. and convext outwards; nor has Nature here only given it, as a Security to the back part of the Trunk, but for the Inarticulation of the Shoulder allo, and the Inlertion of diverss Muscles allowed it, by which it becomes fasten'd both to the Ribs, and to the Occiput, as also to some of the Spines of the Vera tebres of the Neck.

This has its Name from its Figure and Make, as also from its Situation, it being planted in the fide of the Thorax, with a fingular, broad and fleshy Substance, passing from the inner Basis of the Scapula, to the 6th. or 7th. Ribs, according as Riolan describes it, it arising from the two upper Ribs, even to the Clavicle, and the five inequal Extremities in the five True Ribs, and is implanted in two or three of the Baftard Ribs before they become Cartilagenous. Spigelius and Veslingius supposeth its Origination è contra, and some of its distinct Teeth, or Sawlike Indentions, being intermixt with the Obliquus Descendens of the lower Belly, do affift the faid Muscle in its Motions.

This is generally allow'd to dilate the Trunk, and to bring the Scapula forwards and downwards, when its Muscles are relaxt, and may also be said to fasten the Scapula to the Brest.

Wounds hapning in the hinder part of the Trunk or Brest, are reckoned dangerous, by Reason of the Nerves and Tendons there planted, as also by Reason of the Blood Vessels there inserted; and few or none here hapning are without danger, by Reason of the continual Motion of the Lungs, and of Blood falling upon the Diaphragm corrupting it.

Some years fince, I was fent for to the Right Honoura- History. ble the Earl of Bridgwaters at Eastridge, to Cure one of his Gentlemen who was Wounded in the Brest; a Neighbouring Physician being therewith concern'd, and not finding the Patient any better by his Application, ordered me to be fent for to him; when I came, I took out a very long Tent which he had put into the Orifice, which gave the Patient a

Its Ufe

Annotat:

great deal of Pain and disquiet, and instead of his Tent, I put in a hollow Pipe made of sheet Lead, whereby a great deal of Sanies and Pus discharged its self, after which the Patient began to be at ease, and by keeping his Body soluble with Glisters, and dressing it with proper Digestives, and afterwards with Mundificatives, and after that with Sarcotick and Epulotick Medicines, the Gentleman recover'd, and lived many Years afterwards, tho' at my first coming, the wind came so strongly from his Wound, that it almost blew out the Candle that was put near to it.

This you have at Tab. XII. as also at Tab. I. in its proper Place, & also at Tab. XVIII.

Serratus Minor Anticus, or the Lesser Saw like Muscle Planted Forwards.

This brings the Scapula upwards.

THIS hath its Name of Minor, given it from its difference with the former, and is so Substrated to the Pectoral Muscle, that without you take great care in raising it, you will consequently borrow from it; it ariseth slessly from the upper Ribs, excepting the first of them, and arising as it were Digitatim, and being inserted slessly at the Corocoidal Process of the Scapula, bringing it forward to the Iborax: This and its Partner, are said to promote the dilating of the Trunk in large Inspirations: When the Scapula is properly raised by these Muscles, which when deprest, it cannot perform the same, without difficulty.

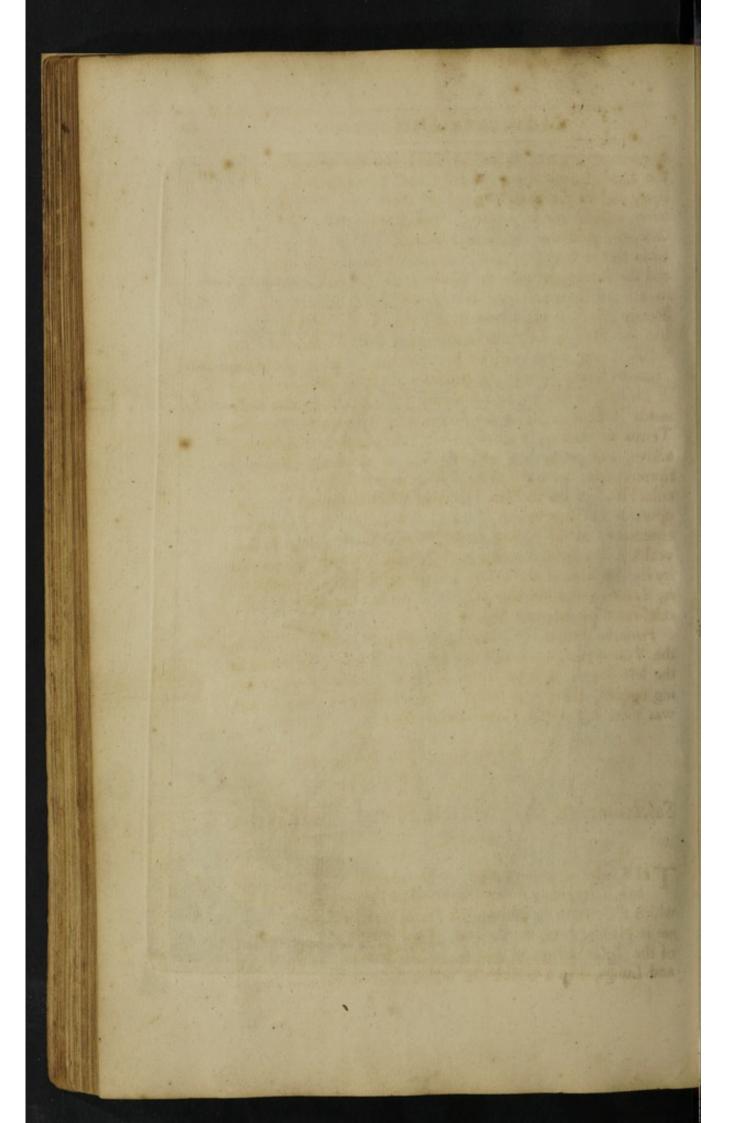
Observat.

When ever any one is wounded in the Trunk, and no blood has entred its Cavity, you are to heal it with all speed; if Blood, or Matter, be once lodged in the Cavity thereof, you are to keep it open, to discharge the same.

Annotations on the Muscles of the Scapula.

The Muscles of the Scapula, in their various Contractions, do produce different Motions, downwards, backwards, and principally upwards, to give Way to the motion of the Ribs in difficult Inspiration: But I humbly conceive, that the prime Use of the Scapular Muscles, is to fasten it to several neigh-





neighbouring parts, as to the Head, by the Interpolition of the Cucullaris, espousing the Chine, and by tying it to the Oce ciput, and to the back part of the Neck, by the lowest Vertebres, and to the back, by the upper Spines belonging to the Cucullaris; and the Base of the Scapula, is fixed by the Rhomboides to the back, by the four upper Spines of the Vertebres: and the lower Angle of the Scapula is fastned to the Neck, by its 2d. 3d. 4th. and 5th. Transverse Processes; and the whole Scapular Base is tyed laterally by the Serratus Anticus Major, and the Processus Coracoides to the upper Ribs; whereupon the Scapula being firmly fastned forwards and backwards to the Trunk by many Muscles, it becomes a proper Fulcimen to the Os Humeri, to receive its variety of Motions, by reason Omne mobile fundatur in immovabile, upon the Account the Relative Terms of motion are celebrated; the Terminus d quo being active, and moveable, and the Terminus ad quem passive and immoveable, as to the Motion it receives; so that the Orbicular Head of the Os Humeri sporting its self in several Postures, upwards and downwards, backwards and forwards, which are entertained in the Socket of the Scapula, which being immoveable, strangely supports the different Motions, performed by the Muscles of the Arm; Qui funt tot Hypomoclia, as so many Leavers and admirable Machines of various opposite Motions, celebrated by Antagonist Muscles.

Ferrandus Senior, Lib. de Nephrit. Pag. 8. writes, That in History, the Year 1567, upon opening of a dead body, he found in the left Scapula, a large Tumor in its Inner Parts, which being opened, there was found a very hard Square Stone, which

was there bread from Coagulated Blood.

This you have at Tab. XII. laid bare.

Subclavius, or that Muscle planted under the Clavicle.

THE Clavicles are so called, as Diemerbroeck writes, because This brings the Clavicle like a Key they Lock the Scapula to the Sternon, and by downwards. which they feem to shut up the Trunk; and whereas the Sternon is planted between the ends of the Ribs, in the Fore-part of the Trunk, to guard and secure the Bowels, as the Heart and Lungs, like a Buckler to which the cartilagenous part of

the true Ribs are annexed; fo the Clavicles are made crooked, and formed both of Convex and Concave Rilings, for the better Originations and Infertions of Mufcles, &c. amongst which this is one, which ariseth fleshy from the lower part of the Clavicle, and descending obliquely between the first Rib of the Thorax, and being enlarged forwards both with oblique and transverse Fibres, is implanted at the upper part of the first Rib, near the Sternon; upon drawing or bringing of which upwards and outwards, it apparently dilates the Thorax or Trunk.

Observat.

Spigelius writes, That its Use is to depress the Clavicle when it mounts upwards with the Scapula; and since it is plainly seen, that the Clavicles do naturally arise with the Scapula, Provident Nature has here planted this Muscle, as a Brace, or a Stay, to keep them down, which is plain enough, as Spigelius observes; in that, when ever the Clavicle is fractured near the Sternon, the next part is visibly seen to ascend, and the part next the Scapula, together with the Arm apparently falls down; but if a Fracture happens near the Scapula, then neither parts are elevated, which wholly happens by the Interposition of this Muscle here planted, and the Strength allowed it to perform this Office.

Hiftory.

Mr. Wiseman tells you in Fol. 461 of his Book, of a Page, who falling down from behind the Coach, bruised his Face, and broke his Collar Bone; and being carryed to the next pretender to Chirurgery, who feeing his Face fwelled, and his Nole bloody, concluded it to be fractured, and filled up his Nostrils with Tents, Ge, and then finding his lower Jaws flanding unequally with the upper, supposed them dislocated, and that part of the Sternon under the Collar Bone was broke down; he being lent for to fee the Youth, neither found Fra-Eture nor Wound in the Nofe: The next day a Chirurgeon being called in to justifie this Pretenders Proceedings, but there nothing appearing either of Luxation or Fracture in the James; they examined the Sternon, and found it well, but found an oblique Fracture of the Collar Bone; which being reduced, and bound up by them, with a Resolution not to open it, till it should be united; things being thus managed, the Patient was advised to keep his Bed, and to follow the Directions of his Physician, which he did; about the tenth day, our Chirurgeon, contrary to former Order, undrest the fractured Clavicle, who upon binding of it too flack, faw the Bone flart-

ed, and from that time, it grew painful; then he dreft it four or five days afterwards, but the Pain encreasing, Mr. Wifemant was fent for again, who then faw one end of the Clavicle riding over the other, and pricking against the Skin; the Callus being confirmed, the straiter the Chirurgeon made the Bandage, the greater was the Patients pain; he not imagining the Cause, attributed it to the Fault of the Patient: Upon which, Mr. W. being again fent for, and finding the Pain did arise from the end of the fractured Bone pricking in the Skin, he caused half a Walnut Shell to be plaistred over it; and having thereby defended it from preflure, he made use of his Arm, and complained of no more pain, &c.

. This you have at Tab. XII.

Intercostales Externi, or the outward Intercostals.

THese Intercostal Muscles, with the Ribs, Sternon, and Diaphragm, These do dia late the The are all engaged in various Motions, and each contributing towards the main Motion of the Lungs: These Intercostals let in between the Ribs in oblique Positions, are formed into two Ranks, outwardly and inwardly, made out of numerous equidiffant Fibres strongly intersecting each other. These take their Names from their Situations, and do arise from the transverse Process of the back, where the Ribs are joyned, and proceeding fleshy, do adjoyn themselves from the lower Edge of the upper Rib externally, to the upper part of the lower Rib, being both thin and fleshy.

This double Series of Fibres, interfecting these Muscles, were thus wifely framed by Nature for the affifting of each other in convenient Motions, in that, two Ranks of Oblique Fibres would with Ease distort the Ribs in the moving of the Brest: Nature hath therefore prudently contrived, that all their Fibres decuffating each other, and being affixt to the Margent of the Ribs, should joyntly produce the same operation of moving

them upwards and outwards at the same time.

Columbus writes, that in a Woman diffected by him, he found more Ribs in her, than in a Man, whence some of his Brother Phylicians declared, this was the Woman that had got that Rib from Eve, which she had stolen from Adam: Tacobus Carpus Writes Hagog. Anat, that in a publick Anatomy,

he saw one of the true Ribs double, where it was joyned . to the Breaft Bone.

Valleriola Lib. 5. Obs. 8. writes of one wounded by a Pistol Shot, which past transversly thro' the Trunk, making its way thro' the Intercostal Muscles of either side, and yet was cured.

This you have at Tab. III. and at Tab. XIII.

Intercostales Interni, or the Inward Intercostals.

Trunk.

These con- THESE are seen to begin, where the Ribs begin to turn inwards, and then running from the lower to the upper parts of the Ribs, not only to the Cartilage, but under that to the Sternon, they working contrary to the former; for these in Expiration, do bring the Trunk inwards and downwards, and by contracting its felf, is hereby feen to lessen its Cavity.

Annotat.

Wounds of the Breast, if they penetrate the inward Parts. are generally allow'd Mortal; if not, they are not to be Cured without Care; and these many times have produc'd these following Accidents, as Pain, Cough, Feaver, Faintings, &c. which Accidents here hapning, must either arise from the largenels of the Wound, or from the Fault of the Patient, or the Chirurgeon; and therefore it will not be amis, to give the Reader some proper Symptoms of Wounds penetrating, and not penetrating the Cavity of the Trunk: If a Wound therefore enters the Concave part of the Trunk, Wind is seen to come out thence, and a Noise is heard within; nay, very oft so forceably has the Wind come forth out of the Wound, that it has blown a lighted Candle out, and this more usually upon the Patients coughing; if the Lungs be wounded, the Blood that comes out by the Wound, is seen froathy and clear; if the Heart be wounded, all the inward parts grow cold and chill; and when it appears to, there's little hopes left of cure; yet tho' many times thele Wounds have proved fatal, yet at other times they have been most certainly cured; and Fallop. pius has layd it down for a general Maxime in his Book, de Vulnerib. cap. 12. wounds of the Thorax do never bring death with them, where the inward Bowels are lafe, and untoucht; but many times, where they have been inartificially treated, they have turned into Fiftulaes; many of which he hath cured.

This you have at Tab. IX. Fig. III. and at Tab. XVIII.

Triangularis, or Pectoralis Internus.

"HIS is commonly called Triangularis, because it carries in it somewhat of a Triangular Figure, altho' not much firingeth the of it, and Pectoralis, it arising from the lower part of the Sternon, or Os Pectoris, from whence its upper part borrows its Origination, and its lower falling down to its Infertions at the bony Endings of the 4th. 5th. 6th. and 7th. and sometimes at the 8th. Ribs near their Cartilages; by the Adduction of which, they are said to constringe the Thorax, and bring it lomewhat forwards.

This is not to be shewn by Figure, as I said in my First.

Of the Use of the Thoracical Muscles.

The Antagonist Muscles of the Thorax or Trunk, being continually busied in opposite Actions, of dilating and lessning the Cavern of the Brest, do not admit of any Tonick Motion; but are restless in their alternate Contractions of Elevation, and Depression of the Ribs, which are so oppositely articulated with the Chine by mutual Infinuations, that eafily participate variety of Motions, as upwards and outwards in Inspirations, as also downward and inward in Exspiration; the last being performed by fewer Muscles, because the Ribs were somewhat streightned in the Expansion of the Thorax, do by their innate Disposition of recoyling, contribute very much to reduce themselves from their Tendency toward a Plain to their former Arches.

The Muscles of Inspiration claim the first Place of Treatment, as they precede those of Expiration in Order of Nature and Action, and are chiefly feated in the Anterior, or lateral Region of the Thorax, viz. Scalenus Primus, Secundus & Tertius, arising from the Transverse Processes of the Vertebres of the Neck, and the Subclevius, ariting out of the Clavicle, and Spine of the Scapula; this and the first and last Scalenus, inserting themselves into the first Rib, and the second into the second, and sometimes into the third Rib, and all these Muscles are Coadjutors in the Elevation of the three upper Ribs, and the Serratus An-

ferted by its fleshy Fibres into the bony part of the 2d. 3d. 4th. and 5th. Ribs, and the Serratus Major Anticus arising out of the whole Basis of the Scapula, is laterally inserted with so many fleshy Indentments into the right upper Ribs, so that the Serratus Minor Anticus, and Major, are as auxillaries in the listing up the eight upper Ribs, and expanding the Capacity of the

Breft in Inspiration.

The Intercostal Muscles lodged in the Interstices of the Ribs, do accompany their Arches both above and below from the Chine to their Terminations, affixed to the Cartilages of the Sternon: These Twins of Muscles are denominated Externals and Internals, each of which borrowing their Origine from the Margin of every superiour Rib, and are inserted into the upper edge of the lower. These semicircular Muscles do affix their tendinous and fleshy Fibres, (intersecting each other in obruse Angles) as auxillaries to every point of the Circumference, belonging to each Rib, and do make nearer Approaches to each other, by alternate Motions, immediately succeeding in a Moment, as if all the Muscles made but one entire motion; so these Conjugations of Ribs are drawn joyntly upwards and outwards, by eleven Machines of motion, as by a Teem of many Horses, assisting each other: These arched Muscles, are so many Hypomoclia, or Leavers of the Ribs, joyned in one Extremity to the Chine, as a Fulciment of their motion; and as they recede further and further from it, to the other Extremity, fastned by Cartilages to the Sternon, as to the opposite Fulciment, supporting the joynt Motion of the Intercostals; so that these, and the other precedent Muscles do dilate the Thorax, externally in breadth, and the Midriff in length, which in its lower Region borroweth its Origine partly fleshy, and partly tendinous on the right side of the Chine, from the 1st. 2d. & 3d. Vertebres of the Loyns, and on the left fide, from the two lower Vertebres of the back: And the Midriff in its upper Region ariseth thin and tendinous, but then soon grows fleshy at the lower Margin of the cartilagenous Terminations of the Ribs, and the lower Terminations, or Extremity of the Sternon, whence the fleshy Fibres (like lines drawn from the Circumference to the Centre,) pass into the middle Region, where the tendinous Filaments interfecting each other, become reticular.

This Circular Muscle, fastned to the Vertebres of the Back. and Loyns, as to a posterior Part, and to the Sternon, as to an anterior Fulciment of Motion, whose various Scene is acted by carnous Fibres, as so many Afters, beginning their Motion from the Cicumference, to the Tendinous middle of the Diaphragm, as to a Center, and the Circumferences to the Margine of the lower Ribs, and backwards to the Back and Loyns, as so many Ufeful Props of Motion, which is accomplish'd by various Fibres, Contracting themselves downwards, and by bringing the Arch of the Midriff to a Plain, do enlarge the Perimeter of the Thorax to receive the tender compage of the Lungs into its loft Embrace and Umbrage; the Antagonist Muscles to these of Inspiration, are those which do narrow the Thorax, in reference to Exspiration, and of these, the first is, Serratus posticus inferior, deciving its Origin from the Vertebres of the Back and Loyns, and is Inferted with four fleshy Indentments about the middle of the three Lower. and the termination of the last Rib: This Indented Muscle Contracting its felt from the middle of the Ribs, to the Vertebral Spines of the Back and Loyns, and the Sacrolumbalis arifing out of the Os Ileon and Sacrum, and Transverse Processes of the Vertebres of the Loyns, are inserted with thin Tendons into every Rib, and in Contracting its various Fibres towards the Chine, Os Sacrum, and Os Ileon, pulls down the Ribs to these props of Motion, Supporting it in the Serratus posticus Inferior; the Sacrolumbalis, and Triangularis, confifting of many Muscles lodged in the Inside of the Sternon, near the Care tilages of the 4th. 5th. 6th. 7th. and 8th. Ribs, which they pull downwards, and inwards, by many Fibres to the Infide of the Sternon, the Fulciment of Motion; by which the capacity of the Thorax is narrowed in Exspiration.

The Delineation of the Thoracic Muscles, and their actions being premised, Respiration may hence be celebrated, as it consists of Inspiration and Exspiration, to exalt the Blood with Nitrosulphureous, and Elastick Particles of Air, and of Exspiration, to discharge its essate Atomes, and the Fuligenous Reak of the Blood. Inspiration is thus accomplished, the Air being prest down by the weight of the superincumbent Atmosphere, is pushed into the pipes of the Nostrils, and from thence is protruded as Particles of Air crouding one another through the Remula of the Larynx, dilated by the Postici, and Latera'es Musculi Cricoarytenoides into the Bronchia, and numerous appendent

Vehicles which are highly expanded by the Elastick Particles of Air, endeavouring to break Prilon, and acquit their Confinement of the Orbicular Pipes, whereupon the Bosom of the Thorax is enlarged, by the Muscles encircling it. clavil, Scaleni, and Serrati Amici, seated in the anterior Region of the Thorax, and the Intercostals in each lateral part thereof, and the Serrati Postici Superiores in the posterior Region, which joyntly conspire as so many Hypomoclea lifting the Ribs upwards and outwards, to give Reception to the tumefyed Tubes of the Lungs, and on the other fide, the Antagonist Muscles, the Triangular Muscles lodged in the inside of the Sternon, and the Serrati Postici inferioris Sacrolumbaris behind, take their turns, as Actors in the various Scenes of Motion, by pulling the Ribs inwards and downwards, and tho' among the Machines of Motion, the Depressors are lesser in Number, than the Elevators, yet the former have this advantage moving downwards, as pressed by their Weight to reduce themselves by their innate Inclination to their proper Stations; fo that these Antagonist Muscles do on one Hand elevate the Ribs, and do preis the entrails of the lowest Apartment, by the motion of the Diaphragm, from an Arch to a Plain, to make way for the Entertainment of the Lungs inflated with air, inspiring the Blood with volatile spirituous, and Elastick Particles, whilst the Depressors on the other fide, by the recoyling of the Ribs, and the Weight of the Lungs, compressing the Bronchia, and apa pendent Vesicles, do expel the vapid Particles of air, loaden with Imoaky Steams of Blood.

Diaphragma, or the Midriff.

This divides the middle from the lower Belly.

dividing the Trunk of our Body into two Venters, it being made as Natures partition Wall, keeping the middle from the lower Belly, partly tendinous, and partly fleshy on the right, from two or three of the Vertebres of the Loyns, and round the termination of the Ribs, and Ensistemal Cartilage, and carrying its Tendon in its Centre: It was chiefly designed for the promoting of our free Breathing, it being affished by some of the Intercostal Muscles, it carrying in it a Circular Figure, and perfectly different in its Site, from the rest of the Muscles in Humane Body, its Capacity answering the transverse Bots

tom of the Trunk, its middle Substance being framed of carnous Fibres running thro' it, like so many Lines from a Circumference to a Centre; and when they enter the middle, they are entertained and embraced with another fort of tendinous Fibres interfecting them: Its Membrane is double, the upper part whereof expands the Pleura, here being planted as its Mediastinum, or partition Wall, whilst its lower part is carryed downwards towards the Peritoneum: It is drawn out into many Fleshes about the Lumbal Vertebres, and is strongly tyed to the Ribs by two tendinous parts, which descend in their March even to the Os Sacrum, thro' which the descending Trunk of the greater Artery, and the Vena Azygos does pass in its ascent, it is shortned about its middle towards its right side, and in its tendinous part to make a Passage for the Vena Cava, and in the left, in its fleshy part, it receives the Oefophagus, and the Stomatick Nerves.

In Inspiration it turns into a plain, and from a crooked or convex Laxity, it apparantly comes into a plain again; but in

Expiration, it is made tense, but is soon relaxed.

When this Orbicular Muscle moves its self, it contracts the Observat. upper and lower fibrous Diameters or Semicircles, fo that the cartilagenous Terminations of the Bastard Ribs are drawn downwards, and its Vifcera forced downwards with them at the same time; whereby the Brest becomes lengthned, and its Bosom enlarged to give a Reception to the distended Lungs in Inspiration: Whereas in Expiration it hath a Diastole, as freed from Motion by the Relaxation of its fleshy Fibres, (planted in its circumferential part) performed by the Abdominal Muscles as its Antagonists, which by pressing the fore-part and sides of the Abdomen inwards, do at the same time force the Viscera of the lower Belly upwards towards the Trunk, whereupon the Centre of the Diaphragm looseth its plain, as Dr. Collins very well observes.

Hollerius Com. ad Aph. 18. lib. 6. writes, that the Diaphragm Historye being wounded in its membranous part, is not to be cured, but in the fleshy part it may; and yet Benedictus remembers a Souldier, who was cured of such a Wound; and Hollerius writes in another place, that he had observed in a Fellow that was hanged, and afterwards diffected at Paris, that he faw a Wound covered with a Cicatrice in the fleshy part of the Diaphragm: Jacotius Com. ad Aph. 15. Lib. 1. Sect. 3. Coac. Hip. writes, that he cured a Young man wounded in the Back, about the mid-

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dle of the Vertebres of the Thorax, not far from the Spine, and the whole Trunk perforated, and the Weapon passing through his right Hypochondry; yet, tho' the Flux of Blood was large, and much Wind and Spirit came thro' the Wound with noise, and the Septum every way stabb'd, with some Signs of the Livers being wounded, he recovered of his Wounds.

This you have at Tab. XVIII.

Cor cum Arteriis & Venis, or the Heart with its Arteries and Veins.

The Heart is a Muscle of great Use, in serving the Body with Blood.

THE Heart being the most Noble, as well as useful Machine of Motion, found in the Theatre of Humane Body, altho' its a Muscle, may well enough be allowed the Sun of our Microcosm, from whence all the bright Rays of our Life and Warmth do take their Origins. Hence was it, that the Alwise Architect placed this vital Repository in the middle of the Trunk, for its more ready and equal Distribution of its vital Nectar to all the parts of our Body.

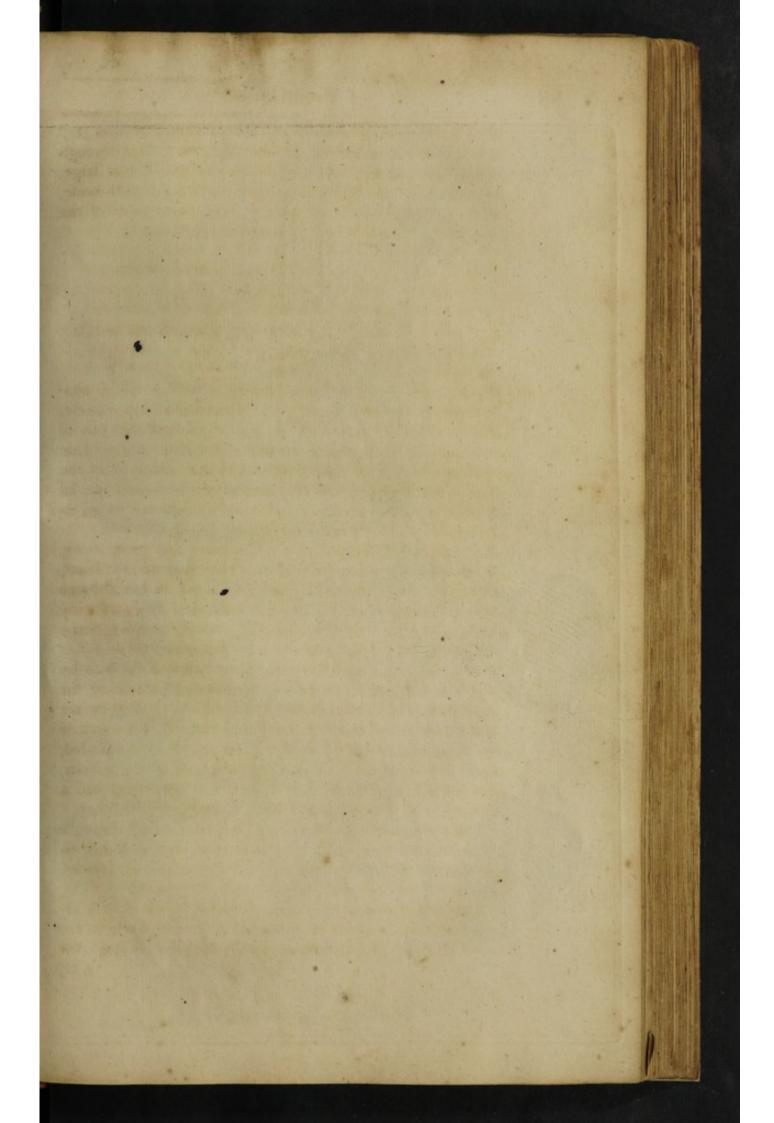
It's apparently seen tyed to the Vena Cava, and great Artery, and its Basis adjoyns its self to the back part of the Trunk, and is affixt to the Pericardium and Diaphragma; it has allowed it two Ventricles, viz. a right and a lest, both distinguisht by a carnous middle, outwardly gibbous, inwardly concave: Some Anatomists do call these, Muscles, they supposing the Fibrilla's thence arising, and extended even to the tricuspid Valves to be their Tendons, there planted on purpose for promoting the Contraction of the Valves of the Heart, which altho' they are framed with many small selfly Fibres curiously set together with wonderful Art, yet they are no where seen perviated, which hath occasioned no small Mistake among the Antients, who supposed, that by these its large Pores, the Blood had a passage out of the right, into the lest Ventricle of the Heart.

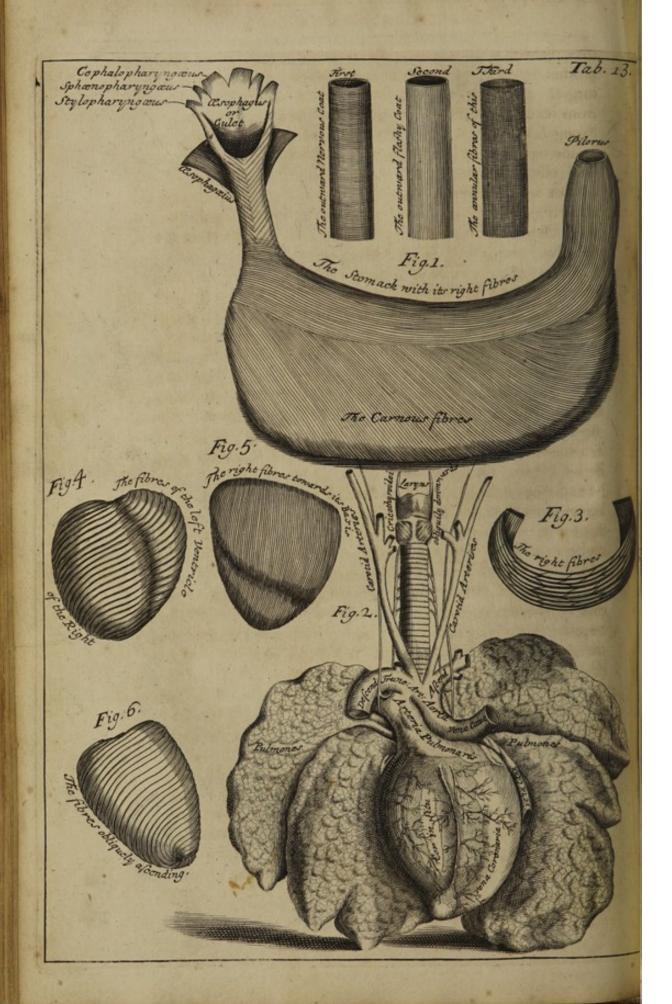
The Motion of the Heart is plainly discovered throughout the whole Body, in that, as it first makes the Blood, so also doth it propel the same by the Pulsation of its Arteries,

into all the parts of the Body for their Nutriment.

And for the better performance whereof, Nature hath allowed it various kinds of fleshy Fibres, some of which are Spiral sent into it, and others seen to march in oblique Andrew

gles,





gles, before they arrive at the Tendons, for the more ready promoting of their Contractions, making them strong and turgid, and in a well boyled Sheeps or Calves Heart freed from its Auricles and Vessels, we may with ease discover a strong Tendon, encircling the Margent, about the Entrance into the right and lest Ventricles; into which Tendon, as Dr. Lower well observed, are planted many oblique slessly Fibres.

Nor are its outward parts alone, but its inward Cavities also, seen furnished with carnous Fibres, carryed along in Flexures, they marching upwards thro' the outward surface of the

Ventricles, and so inserted into its Basis.

And its plainly evident to every clear Eye, that the Fibres encircling both the outward and inward Surface of the left Ventricle of the Heart, tho' they may feem to march Antagonistically to the others in their Progress, yet they are seen plainly to affift them in their Motions, and do conftringe and bring the opposite Tendons inwards; and by drawing them clofer to each other, they at the same time do lessen their Cavities, and squeeze forth the Blood out of the right Ventricle into the Pulmonary Artery: And when we come to confider the Heart in a more strickt Sense, we may truly allow, that it is made of fleshy Fibres, all which do bear a Communication, with a Membrane formed out of tendinous Fibres; which Membrane being planted at the Basis of the Heart, does keep the Auricles fixt to it, which may serve as one Reason for allowing this to be a Muscle. Again, both the Auricles are seen to contract and dilate themselves at the same time, as also do both the Ventricles in the same manner, save only with this Difference. that when the Auricles do contract themselves, the Ventricles become dilated; and when the Ventricles do contract themselves. the Auricles in the same manner are dilated; and this further makes for the Hearts being a Muscle, whose Auricles may well enough be supposed its Antagonists Muscles. In the Heart also we observe several Orders and Degrees of Fibres, as I have shewn in my 13 Tab. Fig. 3, 4, 5 & 6. the first of which are feen to march along in strait Lines, from the Basis of the Heart to its Extremity, and passing somewhat over the right Ventricle; another fort are thole which goe from the Balis, and having arrived at the middle of the Heart, make their return back again to the Basis from whence they came: A third are those, which marching from the Basis, do in a spiral manner reach to the end thereof; all and every of thele forts

forts of Fibres have allowed them their proper Uses and Offices, for we apparently find, that the streight Fibres do shorten the Heart, the Cucular ones do streighten it, and the spiral Fibres do wreath it, or twist it side-ways; from all which, we may reasonably conclude the Heart to be a Muscle, whose Action chiefly consists in streightning the Cavities, which are planted among its Fibres; and if still we would consider it more nicely, we may allow the Heart to be a Muscle having three Venters, each Auricle making one, and the body of the Heart a third, whilst we reckon the Membrane which terminate its Basis, and where both their Fibres concentre, to be

the common Tendon.

And fince, in the Appendix I have shewn from the late Dr. Lower the Circulation of the Blood, and by what Passages and Pipes it passeth thro' the Heart: We may next confider how the Blood Circulates in the Fatus, where we may Observe, that in the Right Ear, just opposite to the mouth of the Descendent Cava, there is a Cavity seen commonly call'd the Foramen Ovale, which makes its passage into the Vena Pulmonaria; which Cavity having a Valve allowed it for fuffering the Blood to enter the Vein, but hinders its coming back again. Now, the blood which comes from the Plas centa, by the Umbelical Vein into the Porta, is sent into the Cava by a channel, which goes from the Trunk of the Porta, to the Trunk of the Cava in the Liver; and this ascending the Vena (ava, is directly thrown thro' the Foramen Ovale, into the Vena Pulmonaria; whence it is carried into the left Ventricle, and thence is thrown into the Aorta, to be distributed thro' the whole Body: But the blood which comes to the Vena (ava Ascendens, is carried off by a branch of the Cava, from the Foramen Ovale, and brought into the Right Ventricle, and after that into the Arteria Pulmonaria, from whence immediately it is dispatcht by the DuEtus Botalli, into the Aorta or great Artery, to be mixt with the rest of the Blood; so that we plainly fee, that the blood which comes from the Vena Cava Descendens, does only pass thro' the Left Ventricle; and that the blood which comes from the Cava Ascendens, does only pass thro' the Right Ventricle.

To this I shall add an Experiment about the Foramen Ovale, which I receiv'd from Dr: Connor, where he tells us, as I formerly said, that the Blood does Circulate thro' the Heart in a different manner in the Fatus, from those that are born; for in us, as he

well

well observes, it passeth all along the Right Ventricle to the "Lungs; from the Lungs into the Left Ventricle of the Heart, and " from thence to the Aorta, which carries it all over the Body; but in the Fatus, it does not passethrough the Lungs, because there is no Respiration in the Womb, but part of it is seen to " pals from the right Ventricle, into the Canalis Arteriosus, into the " descending Aorta, whilst another part thereof passeth from the "Vena Cava, thro' a particular Door, called Foramen Ovale, into " the left Venericle, and from thence into the great Artery: But "after a Child is born, then beginning to breath, all the "Blood goes to the right Ventricle of the Heart, and from thence to the Lungs; and in a little time, both the Foramen Ovale, " and Canalis Arteriosus closeth up, tho' sometimes the Blood hath "been feen to circulate thro' them; as he himself found in "diffecting a Girl about four years of Age, in which was found " no Hymen, but the Foramen Ovale was then open, and instead " of being Oval, it rather appeared Semilunar; and he doubts "not but it may be found open in some persons of riper Age, "as he has proved in his Differtationes Medico-physicae; where he "gives an Account of a Humane Skelleton he saw at Paris, "in which the Vertebra of the Back, the Ribs, the Os Sacrum, and " the Os Ileon, were all one continued Bone, without any Joynts " or Ligaments.

And as it is well known, that the Heart has its Arteries from the Aorta, and sendeth Veins to the Cava, and that it takes its Nerves from the Plexus Cardiacus, and Par Vagum; so is the whole closed up in a membranous Bag, called the Perricardium; and having shewn elsewhere, by what Ways and Methods the Blood is seen to circulate through the Heart, we may hence conclude, that when the Auricles are full of Blood, the Ventricles of the Heart are empty; and because the Auristes, so soon as they are filled with Blood, do contract themselves, this Blood which they do press or push into the Ventricles of the Heart, being affished by the Spring of their Fibres, dilates them, and forces the Animal Spirits out of them into the Auricles, to compleat their Contraction; but so soon as the Animal Spirits are contracted, the Blood which advanceth on all sides,

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joyn'd with the Force of the Spring of their Fibres, restores them to their former State, and the Spirits passing in that Moment from the Auricles to the Heart, shuts it up, and causeth its Contraction; and hence is it, that the Auricles empty themselves, when the Ventricles of the Heart are filled, and that the Auricles fill themselves, when the Ventricles of the Heart are emptyed; and having thus explained the filling and the emptying of the Auricles and the Ventricles, we may properly next consider the quickness of this their Motion; and whereas its generally allowed, that each Ventricle will at least contain an Ounce of Blood in it, which may make us freely suppose, that the Heart throws into the Aorta an Ounce of Blood at every of its Contractions; and whereas the Heart is said to contract four thousand times in an Hour, either more or less, according to the different Temperament, Sex and Ages of the persons herewith concerned; hence it follows, that there do pals through the Heart every Hour 4000 Ounces, or 350 Pound of Blood. Now the whole Mass of Blood, by common Computation, being not above twenty five pound, we fee fuch a quantity of Blood, as equals the whole Mass, doth pass thro' the Heart fourteen times in an Hour, and is seen to keep its Turn about every fourth Minute; but this is not to be allowed fo from all parts, it not being reasonable to suppose, that the Blood which passeth into the Extremities, can make so speedy a Return, as that which goes only to the Kidneys or Liver; moreover, the quickness and quantity of Blood, together with the time of its circuling in different Blood Vessels, do very much alter its Stages, according to their Lengths and Orifices of Vessels, and according to the greater or lesser Compression of them, as being taken also into different parts. thro' which they pass; as also according to their more or less Windings and Turnings, and to their fewer or more Branches, into which they are divided: Having thus briefly discoursed in general of the Heart, confidering it as a Muscle, and of the Circulation of the Blood, and the Quickness of its Motion, before I treat in particular of the Arteries and Veins, I shall here insert one of Dr. Connor's Experiments, about the Motion of the Heart, which is as follows.

"Considering the Bulk of the Heart, with the Quantity and Continuation of its Motion, and comparing them with the Bulk and Motion of one Eye, I could never conceive, that the Motion of the Heart proceeds from the same Cause

" as that of the Eye; for the Heart has at least ten times the Bulk, "and in twenty four hours a million of times the quantity " of Motion, and yet the Eye hath twenty times more Nerves "than the Heart; nay, I could never trace any one Fibre of a "Nerve, beyond the Pericardium, or at farthest, the outward " fide of the Basis of the Heart, tho our Authors all agree, that "these Nerves do enter the Muscular Substance of the Heart, and or produce its constant Motion; for my part, I neither could my felf " discover (nor yet get any Body else to shew me) those Nerves " in the Heart, tho' I have endeavoured to find them out in " a Horse, in an Ass, in a Calf, in Dogs, and in the Humane "Body also: From whence I must necessarily conclude, that this constant, and involuntary Motion of the Heart, can never "proceed from the few Animal Spirits that pass thro' those " few Branches; for, granting at the best, (with all our Anatomifts) that those very few Branches of the Intercostal, and eighth " pair, do enter into the Heart, which they never can demon-"Arate, they would ftill be insufficient, to produce the in-"credible Quantity of Vital Motion, of which we are not " naturally sensible: To convince the World, that those Nerves "do not move the Heart, I have publickly tryed the last year, "the year before, and some other years, the following "Experiments, viz. I laid bare the Intercostal, and eighth pair "of Nerves of both fides, I made as strict Ligature about "them on one fide as I possibly could, to intercept any Spi-"rits flowing from the Brain, yet I could not observe, that "the Motion of the Heart was any ways hereby retarded; af-"terwards I tyed both Nerves on the other fide, leaving still "the first Ligature bound tite, yet I could not find the Heart "moved ever the less, tho' there could no Spirits arrive from "the Brain thro' these Nerves to it; afterwards, for fear "the Company should suspect that the Ligatures might loosen, and that the Subtilty of the Spirits might still make its way " under each of them, I divided both the Intercostal, and the eighth pair, first on one side, as near the Heart, and as near "the Brain, as I could possibly; so that I took out about eight "Inches in length of the Nerves, I mean all their whole "Length, from the Head to the Heart; after which, the Com-" pany then expected the Animal could not long continue a-"live, yet notwithstanding, there was not the least Appea-"rance of any Weakness or Fainting found about him, but "he walkt without any Convulsive Motion, Palpitation, or any "other

other Diforder: Afterwards, least it might still be suspected, that the Intercostal, and Eighth Pair on the other side, did " Supply the Heart with Spirits, for continuing its usual Motion, "I cut them off also as close as I possibly could, both near the "Head and the Heart; which being done, the Company then "did not in the least doubt but the Animal would infal-"libly dye, but were afterwards very much surprized to see "him walk about the room as little discompos'd as before, and "continued so for several days; which without all doubt had "hapned otherwise, if the motion of the Heart chiefly depen-"ded on the Spirits, that used to pass thro' the Nerves; for " all the Branches and Trunks of Nerves that all our Anatomists "affert, do carry Spirits to the Heart, were entirely cut to " pieces, so that there was absolutely no communication or cor-" respondence left between the Heart, and the Brain, or the Spi-" nal Marrow; which two last are the Magazines, out of which all

" parts of the Body are supply'd with Animal Spirits.

"Besides, the first motion of the Heart in the Fætus, can-" not depend on the Brain, because the Brain cannot send Spi-"rits to the Heart, before the Heart transmits blood to the " Brain: I need not mention how the Hearts of Eeles, Serec pents, and of other Animals, move for several days after they "have been taken out of the Body. From these Experiments, "I hope our Learned Physicians, and other Naturalists, will think " of some other cause for the motion of the Heart, besides the " Celebrated and received Doctrine of Animal Spirits; for my part, "I am of Opinion, that the motion of the Heart depends en-"tirely on the Blood rarified in the Lungs, by a mixture of " Elastick Air forced into the Lungs by Respiration; and that it " is this Air, together with the blood conveigh'd from the Lungs, " not only into the Ventricles of the Heart, but likewise by the "Coronary Artery, into its whole substance that causeth the Systole, "and Diastole, or the Dilatation and Contraction of the Heart; "which perhaps, when I may have more leifure, I will make more "evident in a particular Treatise of the motion of the Heart.

Casper Baubine writes, that he opened a Girl, where he found a lump of fat in one of the Ventricles of the Heart, and her Cacum, and her other Parts, were not posited in their Natural

State.

Vesalius says, Lib. 1. Cap. 5. de Human. Corp. Fabric. That he found about two pounds of blackish glandulos sless in the lest Ventricle of the Heart of a Man. And,

Neretus of Neretii Obs: 155. writes, He saw in the right Ventricle of the Heart of a Woman troubled with a Peripneus mony, a Root enated, fleshy, whitish, and flaccid, arising out of the Heart, and passing into the Vena Cava, reached even to the Head and Os Sacrum; and that fuch a like fleshy substance he saw arise out of the left Ventricles of four Persons

who dy'd Peripneumonics: And,

Columbus, lib. 14. Anatom, Says, upon tying a Dog down, fit for Diffection, upon opening his Trunk, to as you may take hold of the Heart, whilst one of your Companions having a thread ready to tye up its four Vessels, and the Ligatures being strictly made, and between which they being divided so as you may take out the Heart, which being done, loofe him from the place you bound him down to, and you shall hear him bark without his Heart, and shall see him walk without it.

And the same Columbus, lib. 15. Anatom. writes, That in Rome, he saw in a Cardinal he there opened, a very hard Tumor, equalling the bigness of an Egg in the Ventricle of

the Heart.

Benivenius, Cap. 63. de Abditis, Writes of two Brothers of a Noble Family, who living together, a little before Supper a Quarrel arose, and in the Engagement, the one ran the other into the Heart, whence followed a great Flux of Blood, which so emptyed the Vessels, that he began to change Colour, grew pale, feized with cold Sweats, his Arteries became deprest, and diverse Symptoms of Death surrounded him; he being sent for, prescribed convenient Cordials, and other nourishing Liquors, in order to the advancing his Spirits; the Patient in this Condition having worn out near half the night, and expecting every Minute his Change, being by all Perfons judged past Recovery; at length, after his suffering such a Conflict of Fears, he takes fresh Courage, and by Gods Blesfing on his Endeavours, he was cured beyond all Expectation, and restored to his former Health.

The Heart upon every Pulfation, is feen to throw forth a good quantity of Blood out of its Ventricles into the Arteries, Anteries. as I have already faid, whereby they become dilated; which Blood would without all question, be retarded in its Journey, (if not intercepted) did not the Heart and Arteries, by a joynt Consent, and constrictive Power of their Fibres, fully countermand a Resistance made in the expanded Arteries, especi-

ally

ally those in the Ascendent Trunk of the Great Artery, and the Carotid Arteries, where by its Weight, no small Opposition to the Impulse thereof, is lent in every Systole, first into the common Trunk, then into the Ascendent Trunk of the Great Artery: And because the Arteries become still narrower, its reasonable to suppose, that the Blood cannot be pusht out impetuously, without making them fwell; and when they are thus fwelled or blown up, they are seen to reduce themselves to their former State, by the spring of their Fibres, and hereby make a part of the Blood, which they have taken into the Veins of the Heart; and fince we plainly find, that the Heart throws forth the Blood into the Arteries by various Strokes, the Arteries must needs hereupon fwell, and fall off, as they fill or empty themfelves of the Blood thus forced into them; the true Motion of all which Arteries, we commonly call the Pulse, about which it is very observable, that the Dilatation of the Arteries do attend on the Contraction of the Heart, and that the Contraction on of the Arteries, do bear Correspondence with its Dilatation; from all which we may rationally allow, that the Ara teries have their Coats encircled with circular fleshy Fibres. fince that by their Contractions they push forward the Blood, first made in the left Ventricle of the Heart, and thence fent forwards throughout all its Stages and Circuits.

And tho' Rolfincius Lib. de Def. Anat. Cap. 1. will not allow the Arteries to have any fleshy Fibres, yet whoever examines the large Arteries after boyling, may plainly see them, and Reason it self convinceth the Truth hereof; for, were they not made firm by these Transverse, or rather Circular Fibres, as they are dilated in Pulsations, (so would they keep) were it not by the help of these and their Contractions, that a constrictive or compressive Power is made in the Arteries, by which they discharge themselves of their Load, and free themselves from

the Weight of the Blood.

The Cause of an Aneu-

And this I take to be the true Cause of an Aneurism, viz. when the outward Coat of an Artery is rent, and its circular Fibres divided, there's nothing can be said to hinder the Bloods reiterated Shakings, or prevent the Dilatation of its inward Coat, by reason of its Sostness; and it being not longer able to defend its self against the many repeated Pulsations made in it, it at length yields, and becomes so distended, that it ariseth into that beating Tumour we commonly call an Aneurism.

Coiter

Coiter in Lib. Obf. Anat. & Chir. writes, That he faw the great Artery of a Girl become perfectly Offeal, and the fame I likewife faw at my Brother Pointers at Oxford, a famous Chirurgeon of that City.

Solonander Cauf. Med. Sect. 5. Conf. 16. Writes of a Bishop that could not stand upright, but was forced to lean for some years on his Pulpit; he dying, and his Body being opened, the Great Artery was feen very hard, both above and below the Kidneys, and as brittle as Glass, and his Kell stook to his

Belly round about it, fave only at the Navel.

And tho' Wounds of the Arteries are not generally cured, yet fometimes they have been cured; and we may read of Gas len, lib. 5. cap. 7. Meth. Med. acquainting us of one coming to be let Blood in the Spring time, and he that was to bleed him, not being much used to the Lancet, or to letting of Blood, instead of the Vein, pricks an Artery; Galen seeing the Mistake, and the Accidents which attended it, prescribed a Medicine to stop the Flux of Blood, which was applyed to the Orifice, and over it a piece of wet Sponge, which he ordered to be kept on for four days; the fourth day the Arm being opened, the Wound appeared agglutinated; and by applying the same dressings the second time, and rowling it as formerly, and at the same distance of time, his arm was seen perfectly cured.

Nor are the Veins less destitute of Fibres than the Arteries, made so, both for exporting and importing the blood to e- also have Fivery part of the Body; nor is their Energy or Constrictive them. Power lesser than that of the Arteries; they also being guarded with Circular fleshy Fibres, as is plainly made good in the Trunk of the Vena Cava; about whose terminations, in large Animals, as Horses, Oxen, and the like, it is encircled with Annular fleshy fibres, to prevent its being easily rent, and for the better promoting of the Currency of the Blood, by lessening its circumference, by whose contractions of these strong circular fleshy fibres moving inwards, they are made capable of fending the Blood forwards, towards the right Ventricle

of the Heart.

The substance of the Veins indeed is much thinner than that of the Arteries, they being only made of two Coats, outward and inward; the outward fram'd out of many small Fibres running in various Angles; the inward form'd of Three forts, Right, Oblique, & Transverse, finely interwoven, & curiously put toge-

together: These sibres also are seen to add strength to the Veins, and are of great use in high Dilatations; when ever the blood upon any extraordinary Essusions, seems to force its self beyond its usual Course thro' these inward Parts, even to the very rending of their Circular slessy Fibres, by which they become useless, and not being longer capable of helping themselves, they seem disposed to Varices, and appear only as stretcht skins, sit only to contain, not capable of longer propelling the Blood, as formerly; and hence do occasion that rupture in them, which we commonly a Varix.

Columbus, lib. 15. Tells us, That with his own Hands he had Extracted several Stones, which he found in the Vena

Porta.

Schenkius, Obs. 8. fol. 399. Writes of one troubled about 11 Years with a continual pain in his Hip; who, after many Medicines prescribed and applied in vain, and the Man near stript of all hopes of Recovery; some time, by a morbific Matter gathering about his Knee of the same side, his former Pain encreased with greater violence and Feaver; but afterwards, advising with one Peter, who opened the external Malleolus or Ancle Vein, thence came out not only very hot blood with force and itching, but many small Stones much like Mustard-seed in Figure, and Magnitude, in that plentiful quantity, as would fill a Walnut; by which his many Years Pain, (as it were by one stroak) vanished and ceased, and was Living when he writ the Story, and was afterwards by his Princes savour taken into the Hospital as an Object of his Charity and Clemency.

Another of Dr. Connors Observations of the Coats of the Veins and Arteries.

The Veins and Arteries are not only Membranous, as was formerly supposed, but likewise Muscular; for they have both Orbicular and Longitudinal Fibres, which serve not only to strengthen them, but likewise by their Contraction, like the Vermicular Motion of the Guts, do drive the Blood forwards to hasten its Circulation thro' both Channels; and the Arteries have their Orbicular Fibres much larger and more spongy than those of the Veins, because the Arteries receiving their Blood immediately from the Heart, and this Blood being in great Motion, they need to have strong Coats, not only to resist the violent Dilatze

" latation of every Pulse, but have Spring enough likewise for "the forcing forwards of the expanding Mass of Blood: So that "I may in a manner call the Arteries, not only a Continuation , of a Channel from the Heart to all the parts of the Body, but , likewife in some respect a Continued Heart; because they have 112 Systele and Diastole, and Orbicular Fibres as has the Heart, plo that I cannot reckon the Arteries passive, in receiving the Waves of Blood poured out from the Heart, by a Contractiy on alternative to its Dilatation, but likewise active in push. , ing the Stream forwards, which makes me differ from those , Naturalists, whilst, tho' I allow the Heart to be the Primum Viwens, I cannot grant it to be the Ultimum Moriens; I mean, wthat tho' the Heart is the first part of the Body that moves, yet I cannot allow it the last in Motion; but I must affirm, that the last Motion in the Body, is that which is found in the Arteries, which is further confirmed by a particular Observarion I have fometimes made, and which I never yet met with in any Author; which is, that I find no Blood in the Arteries after death, but all the Mass of Blood is dispatcht from them into the Veins, from whence I draw these two Conclufions; first, in that while we are living, neither the Arteries nor Veins are half full, fince the Veins alone do contain the whole Mass of Blood after death, and are then scarcely full; n fecondly, that after the Heart has ceased to move, which is called Death, the Arteries still do continue their Motion, till , they have dispatcht all the Blood received into them, (even to the very last Motion of the Heart) into the most exintream Capillaries; and from thence pusheth it forwards into the ngaping Orifices of the smallest Veins, so that instead of allowsing the Heart to be Ultimum Moriens, the Capillary Arteries ought , rather to have that Priviledge granted them, as I humbly conceive.

Having thus shewn the Structure and Use of the Heart, and the Arteries and Veins, and how they are to be treated upon receiving Accidents, I next, for the informing of Young Students in Chirurgery, and others naturally delighted with these Studies, shall in brief speak somewhat of the Liver, Lungs,

Stomach, Guts, Bladder, and the like.

All the Vessels entring its small Lobes, do in their Connexis First, of the ons frame the Liver; and whereas each Lobe is shut up in a delicate Membrane, dividing its felf from the rest, yet it ceases eth not to intermix with them by small tendinous Fibres,

Cc

and

and this Membrane enfolding each Lobe, changeth into a part of the Capfula, including all the Vessels entring into each Lobe; and whereas all these Lobes are made of small Vascular Glands touching one another, each of these Glands is supposed to take a Branch of an Artery, and of the Vena Porta, carrying with it another Branch of the Ductus Choledocus, which is nothing more than a Continuation of the Vessel of the Gland; from each of these Glands comes a Branch to the Hepatick Vein, all which being united, do give it a good confiderable Bulk. And as the Vena Porta and the Arteries, do conveigh the Blood to the Glands of the small Lobes, the Branches of the Hepatick Vein are faid to carry it away again into the Vena Cava, whilft the Ductus Choledocus transmits the Bile into the Duodenum, which the Glands of the small Lobes have separated from the Blood. Thus much for the Ductus Hepaticus, and its Ramifications according to Beddevole, where also you may clearly see the tracing of the Ductus Cyflicus: In its upper part we find it convex, and concave underneath, it being divided into three or four Lobes, and in its under part, it embraceth the Stomach; so that when the Stomach is full of Meat, the Bladder of Gall being then prest, the Bile is seen to pass out by the Cyflick Channel, and runs in abundant into the Duodenum, to diffolve the Chyle, as it comes from the Stomach: From all which, we may therefore conclude, that the Use of the Liver is to separate the Bile from the Blood, to perfect the Chyle in the Intestines, by disfolving its Sulphures by Alcalies, and by diluting it with its Flegm, as he allo very well observes.

Schenkius, fol. 389. obs. 7. writes de Jecore, of a Body whom he dissected, was sound without a Liver and a Spleen; and that one Mr. Matthias Ortelius, dying on the 11th. of September, 1564. at Antwerp, and his Body being opened by the Physicians and Chirurgeons then present, and looking under the Diaphragma and Spurious Ribs for the Liver and Spleen, there were neither of them to be seen in the Body; which Case being ve-

ry remarkable and rare, made me infert it here.

And altho' it is a general received Opinion amongst Physicians, that Wounds of the Liver are Mortal; yet, not withstanding sometimes they have been seen Cured, especially where Nature is well backt with Art; many wonderful things have been seen done, even to a Miracle: As it once hapened in a Noble Man, who being Wounded in the Wars, and shot into the Liver with a Bullet, was given over by the

then present Physicians as past Cure, the substance of the Lister being therewith hurt; yet notwithstanding, by some of his Noble Friends, he received a Cure only upon prescribing him ordinary Medicines: So that it is better to observe Cornelius Celsus's method, than desist the undertaking, who advises to try a doubtful Remedy in these Cases, rather than leave a Cure unattempted. This Story, Quercitan relates in his Book de Vulnerib. Scoplet. Cap. 2. about the end of it.

And Fernelius affures us, that the ends of the Lobes of the Liver have been cut out without danger of Life; and that, tho' they are very difficult to be Cured, by reason of the great flux of Blood which usually attend them, this Part being plentifully made up, and stockt with Blood-vessels, yet both Reason and Experience shews that they are not incurable. An Example of which we have in Hildanus, Obs. 34. Cent. 2. where He tells us of one Helvetius, about 30 Years of Age, who was Wounded with a Sword in the Region of the Liver, which Wound being very large, the Blood so plentifully issued out, that it made the Patient faint; a Surgeon being advised with, having fearcht the Wound, and endeavouring to stop the flux of Blood, a piece of the Liver appeared at the Orifice of the Wound, which he Extracted with his Fauceps, and cut it off; and tho' some cruel Symptoms succeeded this, yet by God's Bleffing he recovered. About three Years after this, he being taken Ill with a Feaver, was received into an Hospital at Geneva for Cure: When Hildanus saw him one day with the rest ment tioned in his Observation, he cryed out aloud, Is it not a miferable thing, that he should then be jo seized with a Feaver, as not to be cured by two Phyficians, whereas about three years past, he had been so desperately wounded on his Side, that a piece of his Liver was cut to pieces with a Sword, and extracted, and yet by God's Bleffing restored to his Health by one Chirurgeon only?

Fabritius and his Brethren being amazed at the seeing his side, in which a Cicatrice had been induced, near a Spans. length from the Region of the Liver, and he dying a few days after the shewing hereof, his Body being opened, a part of the lower Lobe of the Liver had been cut away, and a fair Cicatrice seen made, as they themselves saw upon examining

As we have already shewn, that the Blood doth pass out of Lungs.

The Right Ventricle of the Heart, and enters the Pulmonary

Ce 2

Artery,

Artery, so this Artery is seen divided into many Branches, encircling the Body of the Lungs, and afterwards subdivided into many Ramifications, till at last their most minute Bodies are swallowed up into the substance of the Lungs. The small Vessels collected about the end of the Bronchie, are all wrapt up in one Membrane, which Membrane is nothing more than the continuation of the outward Coat which covers the Winde-pipe and the Bronchiæ; these Bronchiæ are every where faluted with Arteries and Veins, whose Extremities being expanded into the Coats of the Vesicles, do compose the Substance of the Lungs: Now, when we blow into the Wind-pipe, we plainly see the Lungs swell, and all the Vesicles are filled with Air, whence we may rationally conclude, that there is a Communication between the Bronchia and the Veficles; and fince we plainly see, that the Wind pipe shares with the outward Air by the Mouth and Nostrils, we may hence be fatisfied, that the whole Frame of either, was made for Conveyance of the external Air, into the Vesicles of the Lungs : and fince we find, that the Air enters the Lungs, as the Breaft is enlarged, and goes out as it is comprest; the true Understanding of the Make and Structure of the Thorax, will give us the best light, how the Lungs are enlarged by the Air's entering into them, and how they are lessened by its going out thence.

Gemma, lib. 1. Cosmos rotted off by Abscesses, and by Wounds,

and yet the persons have lived.

Petrus Forestus, Schol. ad Obs. 37. Lib. 2. writes of a wounded man, who was a Patient in the Hospital, who had there lain for above a Year and a half, in whom almost the whole Substance of the Lungs, by length of time was converted into Pus, and the Heart lay naked without any Lungs adjoyned to it.

And the Physicians do dayly report, That Wounds of the Lungs are incurable, yet Rulandus, Chir. lib. 3. cap. 25. tells us, That by Gods Blessing, being call'd to the Patient on the fifth or fixth day after the Wound received, he found part of the Lungs come out between the Ribs, which by the Concourse of the Spirits and Humours there made, so swelled up the part, that it could not be reduced again, so that the Nutriment being denyed it, the outward parts became mortified, and Worms bred inwards; the chief Chirurgeons of the place being confulted.

fulted, they left him for dead; he being afterwards fent for, made a Circular Incision into the Cutis about the Wound, the length of a Nayl of the little Finger, and with it, cut off the part of the Lung, which hanged out of the Wound, and by stopping the Flux of Blood, and his Application of convenient Medicines, cured his Patient.

The Oesophagus or Gulet, being framed like a hollow Pipe, or Neck, is implanted into a Bag, not much irrefembling a Bagspipe, and this is that which we commonly call the Stomach, it being allowed it several Membranes and Fibres, the outward and inward whereof, being formed of tendinous Fibres, and its middle of carnous Fibres; and when ever we examine its middle Coat, we usually find three degrees of Fibres in Beafts, and but two in men; the first being a Continuation of the longitudinal Fibres of the Gulet, and these extend themselves from the upper Orifice of the Stomach, as far as the Pylorus, and the other is no more, than the Continua= tion of the Circular Fibres of the Oefophagus, which are intersected by the longitudinal Fibres at right Angles, as Willis obferves; all these Fibres are made to produce a Peristaltick Motion in the Stomach, by which Motion, the Victuals which we take into our Stomachs by the upper Orifice, are sent out by the Pylorus.

Various are the Forms, Substances, and things found in the Stomach, some being seen to congeal therein, so far as to form Stones in it; and Cardanus, Cont. 9. Lib. 2. Tract 5. writes, That he dissected two, in whose Stomachs were found Stones, the largness of a Hens Egg, both which caused intollerable Pains in the Patients Stomachs while living; and Gesner, Par. 1. Cap. 12. Lib. Fossil. writes, That a Friend of his, an expert Anatomist found several hard and round Stones of a whitish Colour in the Stomach of a Man at Norimberg; and Gemma, Lib. 2. Art. Cicl. Pag. 76. writes, He has by him Stones taken out of the Stomach, Bladder of Gall, and Heart.

Borellus, Obf. 66 Cent. 1. Writes of a Beggar walking and begging about the Streets, who had an Ulcer for many years in his Stomach, which he closed up, by putting a Tent into it, after he had let out any Chyle from it, which is a thing of no small Remark, in that Ulcers of the membranous parts are scarce curable without great Difficulty, but that which was more strange, that this should be so long kept open, and yet at length be healed.

Of the

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Chr. à Vega, Com. ad Aph. 18. Lib. 6. Hip. tells of a Chirurgeon of Reputation, who cured a Wound in the Stemach, through which the chewed Meat past not long before with the Chyle.

Stupendous also is that Story of Ofueldus Crollius, p. 60. which he tells of a Country Fellow at Pragne, who swallowing a Knife into his Stomach, had it afterwards cut out, and cured

by a Chirurgeon.

Of the Gus.

The Guts are made up of three Coats, as is the Stomach and the Gulet, in every respect, and are allowed to be fix in Number, three small, and three great; the first called Duodenum, the second Jejumum, beginning where the first ended, and ends where the Excrements begin; the third Ilean, the fourth Cocum, being only the small end of a Gut, fastned to the rest; the fifth Colon, and the fixth the Rectum; and fince no parts of Humane Body comes under more Mischances, or are so often wounded, as the Guts, especially upon Duels, by Whore masters for their Mistresses, or by Gamesters upon their losing their Money, so are they to be managed according to Art, else the Patient goes off suddenly; for these parts are seen readily to run into Putrefaction, they being always filled and bedewed with Humours; and if the Air once gets into them, fo as to penetrate their Substances, they readily seem to swell, and the Blood thickens, being hereby pincht, which gave 'em both Life and Warmth, when ever it becomes exposed to the Air, is foon seen deprived of its Motion, whence it naturally gangrenates and mortifies the part, whilst other times an Inflammation alone, is sometimes seen the Fore-runner of the same, as well in these parts, as in others: Now, that the Intestines are seen frequently puft up with Wind, arising from an Inflammation, which the Wound does foon communicate to the Gut, and the Air obstructing the Pores, and the Reflux of the Venal Blood being hereby stagnated, hence must consequently follow a Strangulation; when ever therefore an Inflammation enters a Gut, which not being able to carry it off, by reason of the Air stopping the Passages, and locking up the Pores of the Intestines; this cannot be honestly supposed to receive any Cure, but by the Chirurgeons dilating the Wound, and enlarging the Orifice, for the readier discharge of what is inwardly contained. And whereas nothing is teen to help forwards the Cure of Wounds of these parts, more than good Diet, and that every one knows there

there is no greater Enemy hindring their Cure, than Motion, the Chirurgeon is hence therefore advised, as he observes the first, that he forgets not the second; for as Dyet does in a great Measure lessen the Action of the Guts, so Rest does bring the Lips of the Wound to an Enclosure; and this they do, either by Knitting the wounded parts to the Peritoneum, or some of the other inward parts: In these Cases, Clysters are also very proper, in that, as they do relax the Fibres, and carry off the Matter, and refresh the Parts; so likewise in form of a Bath, they both repress, and becalm the Motion of the Blood and Spirits.

Columbus tells us, Lib. 2. Cap. 6. Cosm. of a Woman who after having been troubled with direful Pains in her Stomach, had a Triangular Stone excreted by her Guts, the bigness of a Chesnut, which was supposed to have been lodged for a whole year in her Pylorus, as the Nature of the Antecedent Symptoms

demonstrated.

Albucasis, Lib. 2. Cap. 5. Meth. says, That he stitcht up a Wound, made into the Belly of a Man with a Pen-knife, which was the breadth of the Palm of a Hand, by which came forth the Guts, which hung out two Handfuls beyond it; yet these being reduced, the Wound in sisteen days was persect-

ly healed, and the Man lived many years after it.

Gemma. Lib. 1. Cap. 6. Cosm. writes, That he saw some pieces of the small Guts rotted off by Abscesses, and by Wounds, and yet the Persons lived; and Hollerius writes, Obs. 17. Lib. Prop. of one who with a sharp-pointed Sword, was run into his small Guts, as also wounded the great Guts, and the Excrements came out by the Wound; and tho' every one despaired of his Res

covery, yet he received a very good Cure.

Jacotius, Com. 2. ad Aph. 17. Writes, That tho' its afferted by all Authors, that the Intestinum Jejunum when ever wounded, is certainly incurable, by reason of the large Vessels allowed it, and the thin Coat it is seen to have, it being mostly framed of a nervous Substance, and also a near Neighbour to the Liver; yet sometimes, this has been seen to receive a Cure when wounded; And all the great Guts are so frequently known cur'd when wounded, that there needs no farther Examples of them in this Discourse.

This you have with the Stomach, Heart, Lungs, and the various Fibres of the Heart, at Tab. XIII. Fig. I, II, III, IV, V, & VI.

er lineary hindring their Care, then

would to an Inclolance and allies

Detrusor Urine, or the Urine's Discharger.

This dif-

A S Man hath Kidneys allowed him, as proper Colatures of chargeth the Strainers of his Blood, so hath he given him 2 Bladder, as an useful Repository or Receptacle to keep in his Urine, till it becomes so full, that it unloads its self of its Burthen; and for this Reason, Provident Nature hath placed the Bladder with its Bottom upwards, and its Neck downwards, and allowed it proper Muscles, both for promoting the Urines Excretion,

and others for preventing its involuntary Egreffion.

This by most Anatomists is allowed the first proper Membrane of the Bladder, whose fleshy Fibres embracing it on every fide, are feen comprest or contracted, in our making of Was ter; and therefore it is very fabulous what some Physicians do contend for, that befides this, and the following, many other Mulcles are allowed the Bladder; but we having no Authority to confirm this their Conceit, do admit of no other than this and the next: This being only as the middle Coat of the Bladder, formed out of carnous Fibres running lengthways, helping forwards the Urines Excretion, contrary to the others, which being Transverse, are as properly faid to hinder the involuntary Egression of the same.

This is a part variously attacks with Diseases, and sometimes feen desperately wounded; and tho many and large Wounds have been made into the Bladder, yet the Patients have been cur'd; several Examples of which, I shall here mention to confirm

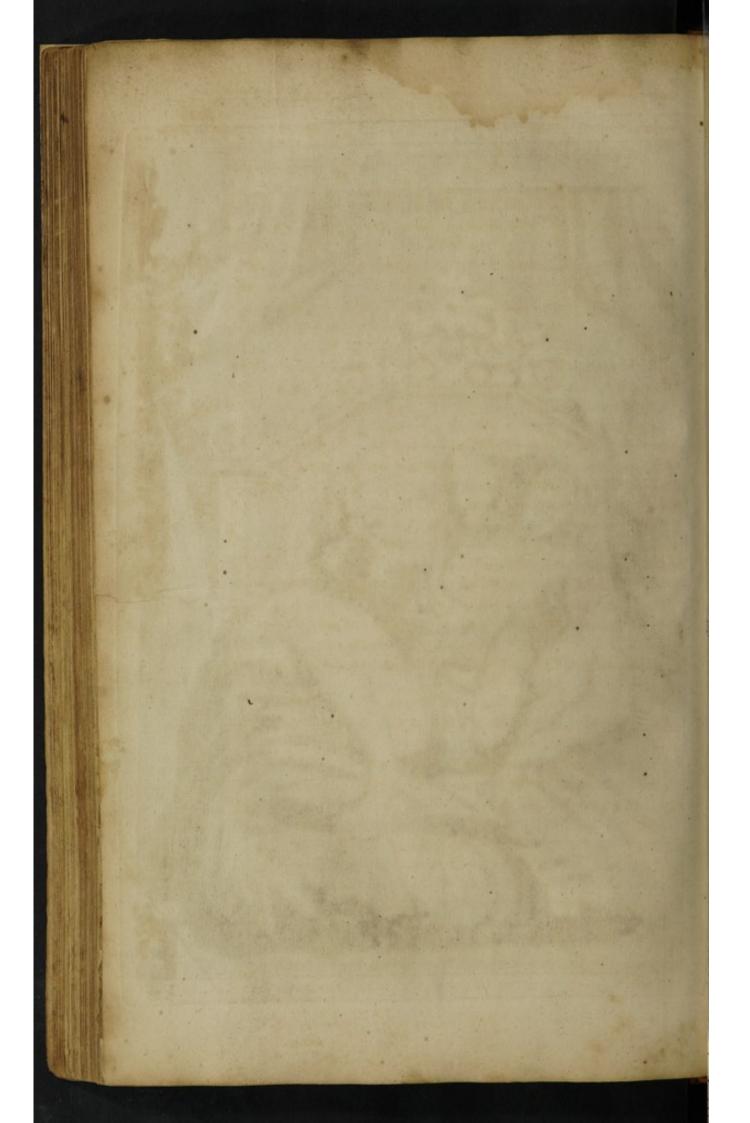
my Affertion.

That its Neck is always cut into, in those troubled with the Stone, every Lythotomist will allow, when ever he makes his Operation; and altho' its inward Coat is nervous, yet its outward being Muscular, (that is, being framed out of carnous Fibres) I lee nothing that may hinder any Wounds heal-

ing, which may happen in this part.

Wounds of the Bladder

P. Borellus, Obs. 4. Med. writes, of a Shepherd being desperately wounded, and falling on the Ground, his Adversary stabb'd him into the Body with a large Knife, and afterwards into his Perinaum, making a wound fo large therein, that half the body of the Bladder was cut through, his Urine continually passing thro it; and yet the Man being naturally of a healthful Con-



stitution, and by observing a regular Course of Diet, and applying Arceus's Liniment to his Wound, he was persectly Cured by one Godde an Eminent Chirurgeon, as the Story relates: So that Hippocrates's Aphorisms are not seen always to carry truth in them, which Galen makes good by an incredible Spectacle of a Young Man in Smyrna, who having received a wound in the Fore part of the Brain, was notwiths standing Cured. That also of Cabrolius, is worthy our Observation, which he writes of a Country Fellow, who having had a part of his Brain cut out with his Wound yet was notwithstanding cured thereof.

There are also many other Observations which do prove Wounds of the Bladder Curable, which I omit to prevent

And fince I have toucht upon Wounds, both of the Heart, Arteries, Veins, Lungs, Liver, Stomach, Guts, Bladder and the like, it will not be amiss to mention somewhat here which Fabritius Hildinus writes in Obs. 32. Cent. 1. about Laughter, where he shews that immoderate Laughter in large Wounds is very prejudicial to the Patients, and therefore to be cautioned against by Chirurgeons, which he thus farther explains with this following Annotation.

Laughter is the effect of the Heart, and in Extraordinary Laughter, not only the Heart, but the Pericardium also is much moved with it, and is both variously contracted and elevated out of one place to another, as the Wise Phylosopher and Physician Laurentius Joubertus and Experience

The same may be said upon every other Passion of violent Motion, (viz) Fear, Anger, Sorrow or the like, all which have power enough in them to alter the habit of the Patient, and russe and discompose him in his Temper, &c.

And because the Pericardium is tied to the Mediastmum, and Diaphragm, in a violent Laughter the Diaphragma is violently moved; and whereas the Diaphragm is also annext to the Lumbal Vertebres, and to the extremities of the bastard Ribs, and to the lower part of the Sternon, and Ensiformal Cartilage, as also in its lower part to the Peritoneum; and as the Pleura invests the upper Parts with Membranes, hence it is, that in violent or extraordinary Laughter, both the Pettoral Muscles, with those of the lower Belly, are seen both to be agitated and contracted at once; in this violent motion also, the Muscles, both

both of the Diaphragm, and the Pectoral Muscles moving the Arm, are both agitated and shaken; suft, the Muscle bringing the Arm to the Brest, and lifting the Arm up, then also the Nerves therein Inserted, and the Tendons thence produced, are every of them contracted and agitated; and hence is it that we usually find, when Men Laugh violently, or seem to be heartily Merry, (as we commonly phrase it) they are frequently seen to bring their Arms to their Brests.

And because the Muss les moving the Head and Neck, do partly arise from the Os P Boris, it is necessary, that the Head also should be moved in violent Laughter, by the agitation of the Diaphragm, and Pettoral Muscles; hence is it also, that those who are given to extraordinary Laughter, are sometimes seen to bow their Heads, sometimes backwards, and somes

times either to the right or left Aim.

And fince also there is a consent between these Parts, and the Muscles of the Belly and the Legs, it's oft seen in extraordinary Laughing, that these merry People do bow themselves inwards; in that, when the Abdominal Muscles are raised by a strong Elevation of the Diaphragm, the Muscles of the Legs, and the Veins, Arteries and Nerves, which are inserted into them, must consequently be raised with them: Hence it is plain, that extraordinary Laughter in all Wounds (especially in large Wounds) is very dangerous, for the Reasons before mentioned, and in Wounds of the Nerves in a more particular manner, in that it produces very sharp Pains in them, Convulsions in the Veins, and Hamorrhages in the Arteries.

Sphineter Vesica, or the Bladders Closer.

This closeth up the urinary Bladder. THE Neck of the Bladder being very fleshy, is furnished with many Transverse Fibres, or rather Orbicular fleshy Fibres, which do contract it, whereby the involuntary Discharge

of the Urine is prevented.

Borichius hath many curious Observations concerning these Fibres writing, that they do lessen the Urinary Passage, and that this Sphineter Muscle being framed of different fibres, is as an Antagonist to the Tonick Motion of the Oblique, Transverse, and Right Fibres belonging to the Body of the Bladder; whereby the sibres planted in the several Coats of the Bladder are drawn into Motion by Consent, according to the Action of the ner-

yous Fibres of the inward Coat, making their various Contractions, lesning its Cavity hereby, and forcing the Urine contained in it towards its Neck, whereby the Fibres of this Sphineter Muscle being relaxed, the Passage is made open, and free for the discharge of the Urine; this is allowed to be planted in the upper part of the Neck of the Bladder, not far from the Prostrates, or Corpus Glandulosum: And since I have altered my fixth Table, and added the whole Penis to it, with this Glandulous Body, we shall speak somewhat of the last, here in

this place.

The Prostrates, so formerly called by the Ancients, are nothing Of the Proelse but a spongy Body well stockt with variety of Glands, our Glandule. wherefore by Vefalius, and Regn. de Graaf it is called Corpus Glandus just. losum, its Magnitude for the most part not exceeding the bigness of a Wallnut, seen lesser in Aged People, and in those not given to Venery, but larger in those given thereto, both before and after Coition; for then the spongy part of this Body is feen to swell with a waterish Kind of Liquor, which makes it diftend in a great Measure: If we examine its inward part, we may plainly see, that there are many Hydatides, or Waterish Glands, discovering themselves in its spongy part, which being squeezed or comprest, do discharge themselves into those Ducts, which ends in the Urethra, as De Graaf very well observes. It has a double Substance, as being both Glandulous and Spongy, every where covered over with a strong Membrane, which has many fleshy Fibres, ariling from the Urinary Bladder, primarily for this end, that its Body (when occasion requires) may the readier be constringed, for the expelling those Humours separated from the Blood, which were contained in it.

Its Uses have not a little puzzled the Thoughts of the Learned, some supposing that the Semen coming from the Testes, to be better elaborated here, whilft others write, that in this part, a sharp Humour is separated from the Blood, for raifing a greater Delight and Titillation in the venereal Act; others again on the contrary do think, that this doth produce an Humour, fit for bedewing of the Urethra, by which itmay feem to prevent the Acrimony, either of the Seed or Urine, or its Drying; of this you may read more at large in Regnerus

de Graaf, to which I recommend you.

Dr. Cockburn's Observation about Claps.

I Lately receiv'd this following Observation from my Worsthy Friend Dr. Cockburn, about Claps, which by his di-

rections I here Infert.

"In his Book of Sea-Sickness, Pag. 164. He observes, That "the Nature of Gonorrhæas, and the Seat of that Disease are "quite different from what they are commonly believed to be. "which he there proves by two very familiar Arguments, and "that its Ilness has not its Rise where most Authors suppose: "but that it is maintained after a different manner than what "they Alledg, tho' he did promise to evince his own Opinion, " there hinted by him, even evidently, and to a demonstration. "which cannot be done in an Observatory way, and amongst "Histories of Medicine; and therefore at this time he only "intends to relate somewhat new, both to himself and to o-"thers also, as he supposeth; where he relates of a Sea-Man, "who dying of a violent Feaver, commonly by Physicians al-"lowed malignant, after he had been 12 days perplext with a "running; and after having laid open the Penis on one fide "of the Urethra, to prevent any hindrance of his discoveries, "and the Parts not being fullied by the Blood that attends any "other way of cutting open the Yard, he found the whole "passage of the Urine retain its Natural smoothness, excepting "about half an Inch farther than the Glans; and in all that "way, but especially in the lower Part, it was very rough, "and exactly turn'd up like the fine holes of a Nutmeg-grater. "From these Roughnesses and Inequalities he presumed that "the Matter of the Difease did flow: He not pretending to "bring into this place the Improvement which was made by "the Experiment, nor the collateral Arguments with which "he endeavour'd to strengthen his former Hypothesis, doth "rather choose to hint, that the Parts, where the Glans, and "Yard do joyn, are always the most notoriously Ulcerated, and "that thefe fretted, and grated Cells are of Irregular, tho' ge-"nerally of pentagonal Figures, and filled with that fort of "fuff of the running, as he once Observ'd by the help of a "Microscope in a Patient of his, which he hapned to see in "the latter end of his Life, and of a third fluxing he had un-"dergone for a very gentle Clap. This Observation he sup-"poles to give a mighty clearnels into this obscure and pre-" carious 'carious affair, tho' he is of opinion that every other circumflance in this Disease fairly laid for our consideration, does "as evidently discover the common Mistake; but this is neither the proper time or place to run the Parallel; so that he con-'cludes, that fince there are plainly so many Ulcers, so many 'small Emissaries made in the Blood-vessels of the Yard, that 'are fit to transmit the Parts of that Liquor that are propor-'tioned to the Diameters of these holes, and these in such a length only, that these are consequently the fountains of this 'afflux of corrofive Matter, without alledging places that are not so well seconded by Experience or Reason.

Petr. Borell. Obs. 20. Med. Tells us of a Girl who lived 15 days after her Birth; and being dead, and opened, many things hapned to be feen in her worth our Observation; for first, she had two Bladders in her Hypogastrick Region, distant half a fingers breadth from each other, into either of which one of the Uriters was directly Inserted; Her Uterus took up the place of an Intestine, and the Restum was put over it, and obtained the place of the Bladder; her Navel

was lower than usual, &c.

This you have at Tab. VI. Fig. I.

Sphineter Ani, or the Fundaments Closer.

THIS from its use is called both Sphineter, Constrictor or This keeps Orbicularis, it being annexed to the lower Margent of the in the Excre-Os Sacrum; it arifing thick, large, and fleshy, furnished with many Annular Fibres, enwrapping the Anus, it being roundish, and broad, circularly joyning himself to the Rectum, near two Inches in breadth, and is so closely annext to the Cutis, that it is scarce separable from it; and therefore by some Anatomists is called Cuticulosus, and Cutaneus; this being contracted, doth purse up, and close the Perforation of the Anus, whereby it gives a stop to the involuntary egression of the Excrements, for which piece of Service, Nature hath planted this Constrictor here as its proper Officer.

Riverius, Obs. 391. Writes, of a Gentleman, who as oft as he went to stool, voided Stones with his Excrement, of an uneven pointed Superfecies, for many Years together, not much unlike those which usually are discharged through the Uriters from the Kidneys.

As a common Observation among those troubled with the Stone, we usually see when any Fit seizes them, they for the most part have the falling down of the Rectum come along with it, especially upon their straining to make Water.

Annotat.

Ant. Guaynerius Tract. de Colic. pass. Cap. 1. Writes, That the Stone may be bred in any part of the Body, as in the Stos mach, Lungs, Guts, &c. and that he saw in a Country-man, not only one Stone as big as a Nut, but many Stones bred in the Guts, and Discharged thence. Brasavolus tells us, That he saw five Stones taken out of a French Womans Guts. And Vallescus writes, That he Extracted a very large Stone out of the Resum. And I know a Person of Honour in this Town, who every time he goes to stool, discharges diverse small Stones with his Excrement.

This you have at Tab. VI Fig. II. & at Tab. XIV.

Elevatores Ani, or the Raisers of the Anus.

This draws the Anns upwards.

THESE are allow'd to arise from the Ligament of the Os Sacrum, as also from part of the Coxendix, from which places they do take their dimensions, and then descending down to the Sphineter, and lower Part of the Rectum, are Inserted at its lower end into each side of the Anus.

These are best shewn before you remove the Rectum, Vefica, and adjacent Parts, their chief use is ordain'd by Nature to keep the right Gut in its due Place, and to reduce it when it is forced down by any violent Expulsion or Straining in making Water, or in fits of the Stone.

Hiltory.

Gerhardus Lib. de Calculo, writes, That he saw one at Antwerp, who after having made his Incision, he sound a large Stone lodg'd between the Restum, and the Neck of the Bladder.

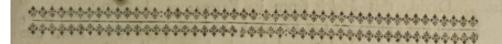
Salius Annotat. Cap. 79. writes, That Experience hath taught that the Collick Pain has been caused from a Stone bred in the Guts; and he knew one so desperately troubled with it, that his Pains could no ways be removed till he discharged a Stone by his Fundament.

And Peter Forestus, Schol. ad Obs. 26. lib. 14. writes, of one being for a long time troubled with the pain of her Stomach, and her Belly; after his given her some Pil. Alephang. and Massich, she discharged a round Stone by her Guts, the bigness of a Pigeons Egg, which he saw.

And

And Crato in Epift: ad Jordan, Writes, That he faw many Stones excreeted from the Body of a Priest, by the Guts, as big as Chefnuts, whose Pains were like those of the Collick, and Iliac Passions, who lived many Years after it.

> This you have at Tab. VI. Fig. II. with the Rectum, and the Corpus Vesica.



Lecture IV.

In which are Contained these following MUSCLES, viz.

Trapezius, Levator Patientia, Rhomboides, Latiffinus Dorfi; Serratus Posticus Superior, Serratus Posticus Inferior. Splenius, Complexus, Recti Majores, Recti Minores.

Obliqui Superiores, Obliqui Inferiores, Transversalis Colli-Spinalis Colli, Sacrolumbalis, Sacer, Semi pinatus, Longiffimus Dorfi, Quadratus Lumborum.

Trapezius, or Cucullaris.

HE first Name it takes from its Geometrical Figure, and the second from the Resemblance it carries with a the Scappile Monks Hood: The Scapula being made as Natures Buck. ler, formed in a Triangular Figure, and inwardly exsculpt with a concave Surface, and with a convex one outwards, was truly made for the Inarticulation of the Shoulder; to which are allowed Variety of Muscles, fastning the Scapula to the Ribs and Occiput, to which it is annexed; as also to some Spines of the Vertebres of the Neck.

This with its Partner covering the Back, does very well represent the Figure of a Monks Hood, it arising sleshy from the lower part of the Os Occipitis, and Tendinous from the Ff 2

Apex of the Spine of the last Vertebre of the Neck, and from the 8th: or 9th. upper Spines of the Thorax; and then narrowing its felt, is inferted into the whole Spine, and broader part of the Clavicle; and according to its various Originations. and Diverfity of Fibres which are allowed it, it brings the Scapula obliquely upwards or downwards, or directly backwards according to its Diversity of Fibres, imployed in their Contractions.

Annotat.

Divide this Mulcle from its Partner at their Originations, from the Spines of the Vertebres, and tracing it clear from the Os Occipitis, the Muscles underneath them, will with great Ease thew themselves.

History.

Ferrandus Sen. Lib. de Nephrit. pag. 8. writes, That in the Year 1567, upon opening of a dead Body, he found a large Tumour in the left Scapula in the inner part, of which was contained a very large Square Stone, bred there from coagulated Blood, which he took thence.

This you have at Tab. XV.

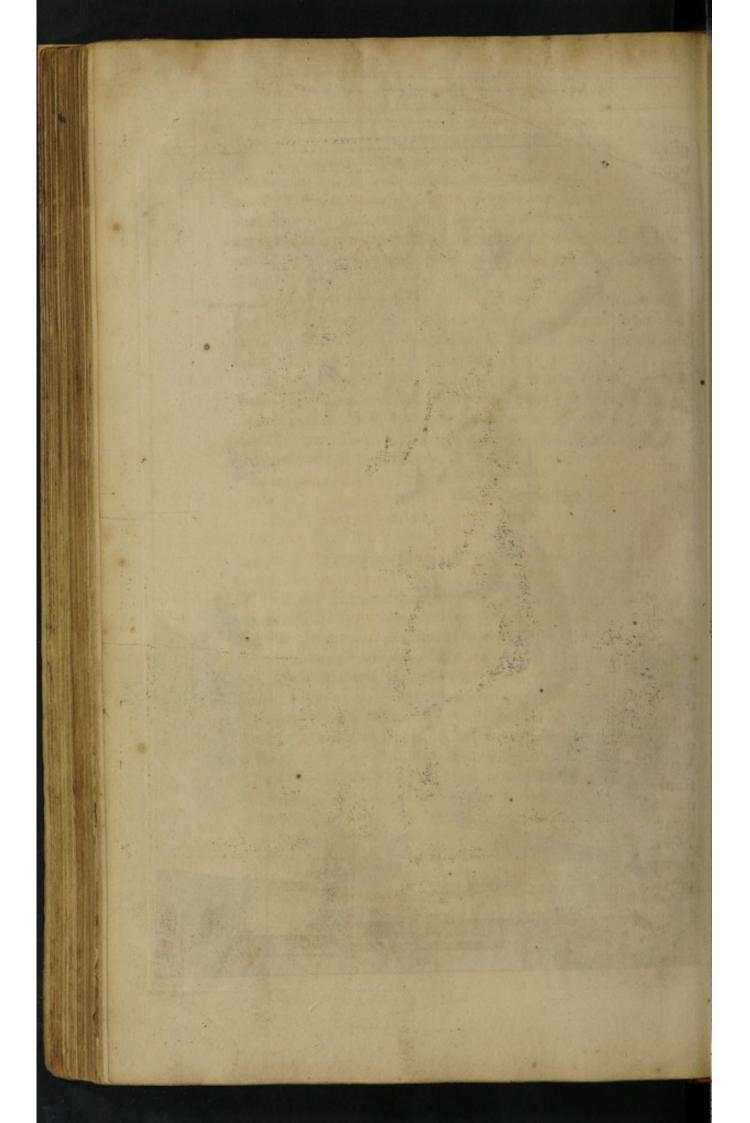
Levator Scapule, or Patientie.

it Upwards.

This brings THE first Name it has from its Use, in raising the Scapula and Patientie, from the Ule Porters make of it, in carrying their Burthens; this immediately laying under the former. (as Diemerbroeck observes) doth arise from the second, third, and fourth, and fometimes from the fifth Transverse Processes of the Vertebres of the Neck, which joyning in one large fle-Thy Body, fixeth it felf with a broad and fleshy Tendon, into the upper and elated part of the Scapula, bringing it upwards and forwards, as also the Arm with it.

> Fabritius Hildanus, Obs. 78. Cent. 6. Writes of one, who on the 12th. of December 1602, had been shot, and had his right Arm wounded; and the Bullet being cut out about his left Scapula, the Wound afterwards became so sordid and fetid Ulcer, that it was not to be cured by Chirurgeons; the Man coming about a year after he received the Wound to him, upon his Dilating the finewous and cunicular Ulcer, befides Splints of Bones, he found two spongy Tents, which had been left for some Morths in a certain Cavity of the Ulcer, by the Inadvertency of the former Chirurgeons; which being extracted, he





was wholly restored, and lived many years without any Deprivation of the Action of his Arm, altho' some part of the upper Process of the Scapula, which we usually call Rostrum Porcinum was exempted; by all which we may fee, that Nature will not admit fo much as a piece of Sponge to lodge in any part of the Body, altho' its fofter than Silk.

This you have at Tab. XV. and at Tab. XX. it is laid bare.

Rhomboides.

THIS lath its Name from its Figure, and affixeth the Sca-it Backwards. pula to the Neck, and the back parts of the Trunk, it arifing thin, broad, and quadrangular, and fleshy from the Spines of the three lower Vertebres of the Neck, and the upper of the Thorax, whence obliquely descending, it becomes thick and fleshy, being inserted into the outward Basis of the Scapula, which it draws somewhat upwards and backwards,

In raifing this Muscle, you must take Care, that you do not bring up the Tendon of Serratus Posticus Superior with hims it joyning its felf very closely to it, and laying just under it.

This is commonly faid to bind the Scapula to the Back; and hence it is, that in old people, and confumptive persons, their Scapulaes are feen to prominent, which usually happens, from either the Weakness or the Witheredness of this Muscle.

Ambrose Parry. lib. 14. Cap. 9. writes, if a Fracture happens in the Neck of the Omoplate, or in the Diarticulation of the Arm, they feldom are Cured; an Example of which, he tells you succeeded in Anton. Bourbone King of Navarr; in that about this Dearticulation, there are planted many large Vessels, both Veins, and Axillary Arteries, and Nerves, arising from the Vertebres of the Neck, which are distributed into all the Muscles of the Arm; where if ever any Inflammation, or Putrefaction arise, it communicates the same immediately to the Heart, and other principal Parts, which sharing with it, they fummon in a train of direful Symptoms, and oft times prove the confequence of Suddain Death.

This you have at Tab. XV. & at Tab. XIX.

Latissimus Dorse, or Ani Scalptor.

the Arm down

This brings THIS hath its first Name from its largeness, and the other from the Use sometimes made of it; it arising with a broad, thin, and membranous beginning from the Apices of the lower Spines of the Vertebres, between the Os Sacrion, and the 6th. Vertebre of the Thorax; and sometimes it is seen to take its Origination from the upper part of the faid Os Sacrum; and growing fleshy, is implanted into the Basis of the Scapula; from whence by some Anatomists it is thought to receive its chiefest part of Fibres, and by a short, and strong, but broad Tendon, is implanted beneath the upper Head of the Os Humeri, between the Pettoralis, and Rotundus, it bringing the Arm down backwards, and sometimes somewhat upwards, or downwards, as its Course of fibres are variously employed and contracted.

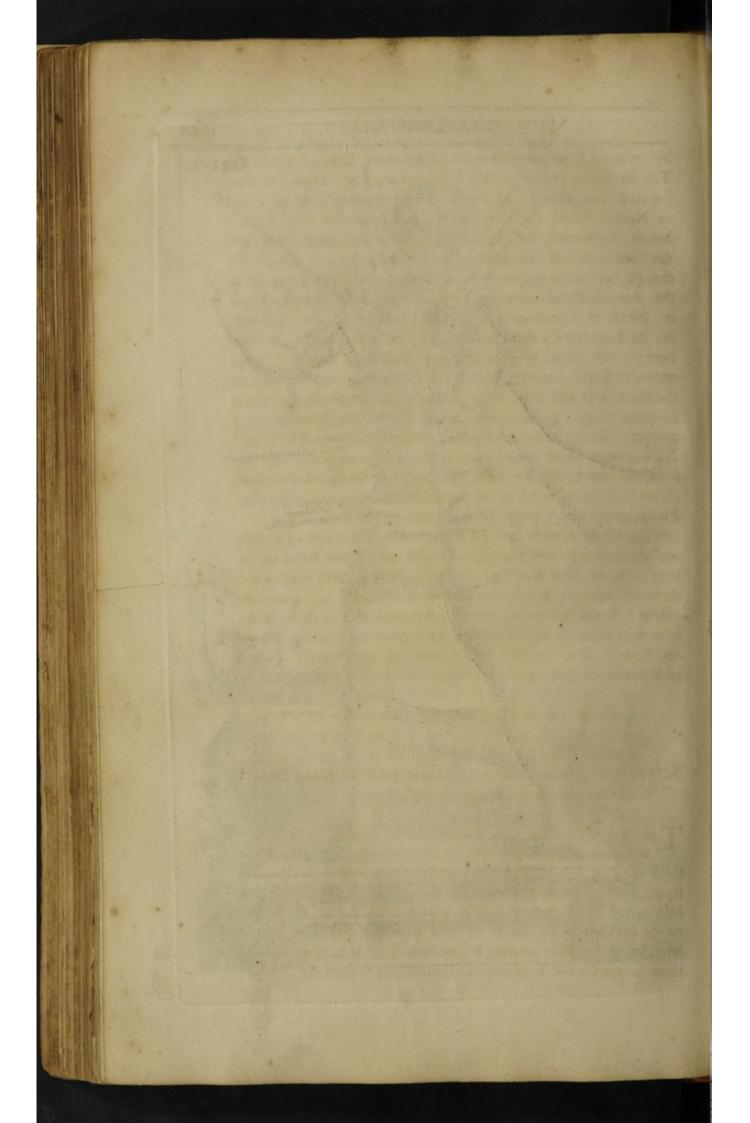
Great care must be had in raising this Muscle from its O. rigination, least with it, you do also raise the Origination of its Subjacent Muscle, Serratus Major Posticus; if you be not very careful in your Diffection, you will also borrow from Quadratus Lumborum, as you raise him from the Ileon, to which it firmly joyns it felf, as also near the Scapula; if care be not used, you will find some part of it come up with

him.

The Ancients fond of their own Opinion, have affigned the motion of the Os Humeri, as being Orbicular, to be celebrated in a round Socket of the Scapula, by way of circumrotation, which cannot be accomplished, by reason the Os Humeri is strongly fastned by a Ligament to the inside of the Scapular Bone, to prevent Luxation: Secondly, the Fabrick, Rife, and Infertions of the Muscles of the Arm, are not apposite for the circumrotation of its Bone, but for the production only of opposite Motions in several Segments of a Circle, alternately performed, directly upwards by the Deltoides, directly forwards by the Pectoral Mufcle, and backward by the Infraspinatus, and somewhat backwards and downwards by the Teres, whilst it is brought outwards by the Latissimus Dorsi, so that all these Mulcles, in their alternate and opposite motions, do move the Os Humeri as it were Circularly in different interrupted moments, and not

Annotat.





by way of Circumrotation in one entire Orbicular motion, The Pectoralis, Supraspinatus, Infraspinatus, Teres Minor, & Subscapularis are inserted in the Os Humeri, either into its Head or Neck: And the Teres Major, and Latissimus Dorsi a little below its Neck; and the Deltoides about the upper part, and the Coracobrachialis about the inward part of the middle of the Os Humeri, as the most advantageous for the raising up of the Arm; but the other Muscles are implanted into the Head or Neck in a semicircular manner, to confine the Os Humeri in, by Ligament to its Socket, as to its proper Sphere of mo= tion: But these Muscles being Inserted in the Os Humeri, near the Scapula, as the Prop of their Motion, cannot manage the motion of the Arm, with fo much advantage to the lifting up the weight of the Arm, as if they were Inserted at a greater distant from the Scapula, their Fulciment; whereupon Nature hath most Wisely contrived the Insertions of Coracobrachialis, and the Deltoides, as the Elevators of the Arm, about the middle of it, as more beneficial for the readier Elevation of the Weight of the Arm, and the Cubite articulated with it; but the more frail Motions of the Arm, laterally and downwards are more readily performed by Muscles inferted in the Head and Neck of the Os Humeri, near the Scapula, their Fulciment; and if the Muscles of the Arm had been implanted in the Os Humeri, near its Articulation with the Radius, it would have elevated the Arm with greater ease, if it would not have swelled the Bulk of the Arm, to a deformed Greatness in the Contraction of the Muscles.

This you have at Tab. XV. & at Tab. XIX. laid bare.

Serratus Posticus Superior, or the upper backward Saw-like Muscle.

THIS hath its Name of Serratus, from its faw-like Indenti- This Dis ons, and Posticus, it being an Antagonist to those planted in Trans the Fore-parts, as also Superior and Inferior from their Scituations: This is a small Muscle immediately lodged under the Rhom. boides, as I have already faid, it arifeth with a thin Tendon between each Scapula, and is inserted over the first Pair of the Muscles of the Head, arising membranous from the Spines of the three lower Vertebres of the Neck, and the first of the Thorax, and Gg 2

and marching under the Scapula, is inserted into the inner spaces of three or four of the upper Ribs; by the Elevation of which, it dilates the Thorax.

Hiftory.

Felix Plater. de sais Obs. writes of a Butcher, who for a long time complaining of an intollerable Pain in his Back, had an Abscess arose in the midst of it, which being laid open, a large quantity of Water was thence discharged: And altho' this plentiful Evacuation thus dayly coming from him, so emaciated him, that it brought him into a Confumption; yet a stop being given to its Running, and a piece of a Vertebre of the Trunk, which was eroded by this corrofive Liquor being Extracted, the Man beyond all Expectation amended and recovered.

This you have at Tab. XVI. both in and out of its place.

Serratus Posticus Inferior, or the lower backward faw-like Muscle.

the Lowerpart of the Trunk.

This Dilates THIS has its Name as the other, and is called Inferior from its situation; it is a Muscle broad, thin and membranous, planted almost in the middle of the Back, under the Latissimus Dorfi, it arising from the Spines of the lower Vertebres of the Back, and the first of the Loins, and marching transversly, becomes fleshy, and is inserted into three or four of the bastard Ribs, by so many distinct Terminations, and by drawing them outwards, does at the same time dilate the lower part of the Trunk.

Hiftory.

Peter Pigray writes of a Soldier wounded in the Trunk, by a Musket Bullet, who 3 or 4 Months after he was cured, vomitted up a Fragment of a Rib, the length of 3 Fingers by his Gulet, and yet recovered; nor was he troubled with any ill Symptoms while he was under cure.

This you have at Tab. XVI. both in and out of its place.

Splenius, or Triangularis.

This brings the Head Backwards.

THIS takes its Name partly from the Figure it hath with a Spleen, and Triangularis, as some say, from its Make, it arifing partly nervous, and partly fleshy from the Spines of the 5th. 4th. 3d. 2d. and first Vertebres of the Thorax, and from the Spines Spines of the lower Vertebres of the Neck, and then running broad and long about the third Vertebre of the Neck, both its Originations do there unite, and with its oblique Fibres, both of them do infert themselves into the middle of the Occiput; You must take it off from its Origination, and preserve as ma- Annotati ny of its Anfulæ as you can between the Spines, by running your Knife between them, and recovering its Tendon.

If both move, they bring the Head directly backwards, if one Its Use

only move, it turns the Head sideways.

Of the Use of the Muscles of the Head and Neck.

The Muscles of the Head and Neck do sport themselves in opposite Motions backwards, forwards and laterally: The Musculi Renuentes & Annuentes being Antagonists, do make quick and apposite turns of the Head and Neck; backwards by the Recti Majores & Minores, affisted by the Obliqui Superiores & Inferiores, arising from the first and second Vertebres of the Neck, and are inferted into the middle, or fides, or top of the Os

Occipitis.

And the Head is moved forwards by the longer or shorter Contractions of the Mastoidei, and longer Muscles of the Neck, the former arifing from the top of the Sternon, and are inferted into the Processus Mammiformis, and the latter arising out of the Forepart of all the Vertebres of the Thorax, and do terminate into the Forepart of all the Vertebres of the Neck: But the Tenfors and Flexors of the Head and Neck, do by their To. nick Motion ballance each other, and keep the Head in an erect Posture; and the Musculi Recti, & Obliqui, being short, and fmall Muscles, cannot by any fingle Contraction move the Head laterally, which by its weight is carryed forwards and downwards, (as being top heavy) was it not supported by the constant and gentle Contractions of many Tenfors, which being more vigorously performed by the Retti & Obliqui, do pull the Head a little backwards, in Nodding, as Renuentes, and is brought further backwards to acute Angles by the Complexi, coming from the Transverse Processes of the Neck, and are laterally inferted to the upper part of the Occiput; and the Head is also brought backward by the Splenii, (Assistants to the Complexi) arising out of the Spines of the four upper Thoracic Vertebres, and these being Partners of greater Dimenfion, do move the Head further backwards, than the Relli and Hh

the Obliqui; and each of them acting fingly, as being stronger and longer than the former Muscles, do draw the Head to one side backwards; and on the other Hand, the Head is pulled more and more forwards by the Mastoidei & Longi; and when both the Tenfors and Flexors do act separately, they bring the Head backward, and forward laterally, alternately, and each come batant, when highly invigorated as Conquerors, relaxeth his unactive vanquished Antagonist.

This you have at Tab. XVII.

Complexus, or Trigeminus.

the Neck

This extends. THIS hath a threefold Origination, first from the fourth and fifth Processes of the Vertebres of the Thorax, then become ing fleshy, doth ascend over the rest of these Vertebres, until he reacheth the lower Vertebre of the Neck, where it becomes a round Tendon; not far from thence again, it appears fleshy, and doth insert its self into the upper part of the Occiput late. rally: Its second Origination is with a short Tendon from the same Process of the last Vertebre of the Neck, then becoming fleshy, is joyned to the other before its Insertion: Its third Origine is partly fleshy, and partly nervous, from the Transverse Processes of the first and second Vertebres of the Trunk, and running obliquely outwards, after having united with the former, is inserted into the Root of the Mammillary Process, bestowing an Ansula on every Process.

Annotat.

To find this fairly, divide the Spinatus, and Longissimus Dorsis,

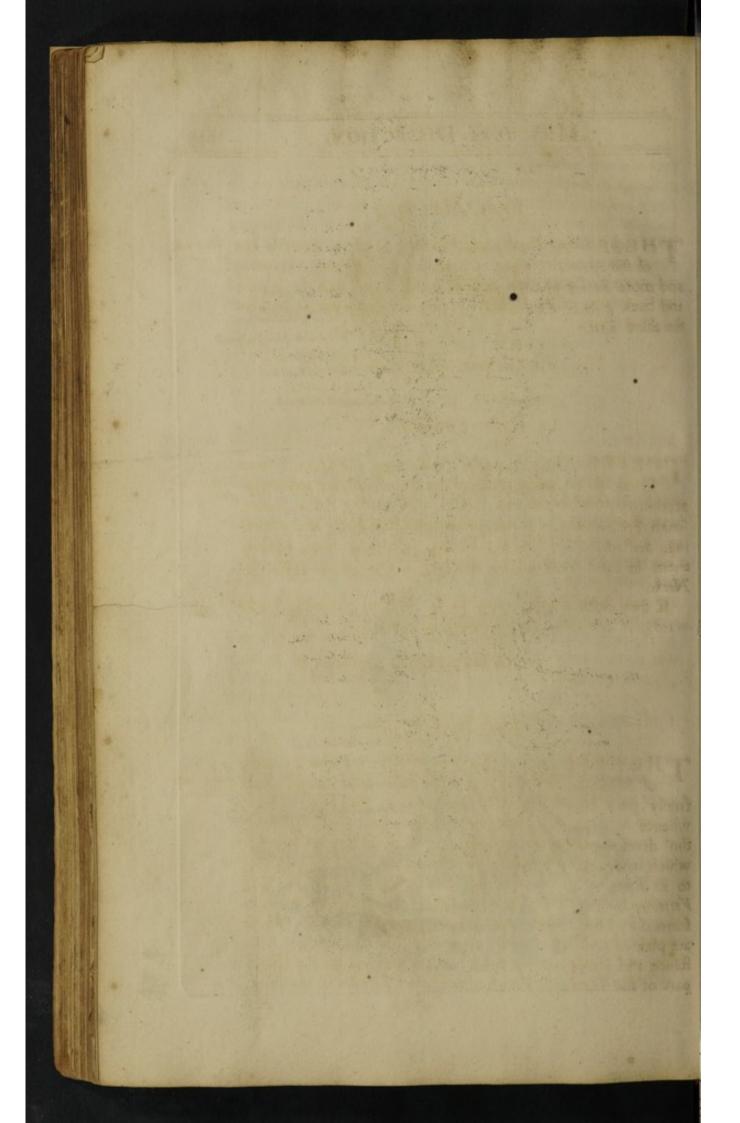
and its Origination will plainly appear.

Ulfe.

Riolan observes, that the Fibres both of this Muscle, and Splenius being variously interwoven, do decussate each other in acute Angles, and do add Strength to either of them in their Contractions:

This you have at Tab. XVI. in its place, and laid bare, and also at Tab. XVII.

TAB. XVII This brings it back This bring the Head back This turns the Hoad backwards The asift the former This bring the Head back This extends the Trunk These bring it back These bring the Head back These assist the former This turns it backwards This extends the Neck This extends the Nock



Recti Majores.

THESE being small, thin, fleshy and short, do arise out the Head of the Spine of the second Vertebre, and growing broader, back. and more fleshy in their Ascent, are inserted into the middle and back part of the Occiput, helping forwards the Motion of the third Pair.

These you have at Tab. XVII. Fig. I, II.

Recti Minores.

THE SE Pair lodging under the former, are likewise two These do fmall Mu/cles, being much of the same Substance and Shape, affift the fore accompanied with the like Ductus, they arising sleshy from a small Protuberance of the first Vertebres of the Neck, and ascending, are implanted like the former, just under them, affisting them in their Motions, by drawing the Occiput towards the Neck.

If they both operate, they bring the Head directly back-Ufe? wards, if one only acts, it brings it laterally.

This you have at Tab. XVI. Fig. I, II.

Obliqui Superiores.

THE first Use of the Dentisorm Process, is to be a Centre These turn of Motion, on which the first Vertebre being pliant, does the Head back. freely play backwards and forwards, as Dr. Collins writes; whence he proposeth, that the first may be called Epistrophis, tho' diverse Anatomists have affigned this to the second Vertebre, which may more properly be termed an Axis, in reference to its Process; about which, it being immoveable, the first Vertebre doth variously sport its self in oblique Motions, performed by these, and the other lower oblique Muscles: These are planted under the Relli, answering both their Form, Substance and Shape, being small, arising fleshy from the hinder part of the Transverse Process of the upper Vertebre of the Neck,

and being carryed along in an oblique Course, are inserted into the sides of the Occiput, near the outward side of the ReEti.

Baubine will have them to arise in the Occiput, and that they do end in the Apices of the lateral Processes of the first Vertebres of the Neck, and the Heads of these Muscles being affix'd to the second Vertebre as being immoveable: The Right Oblique Superiour and Inferiour Muscles being planted in an oblique Situation, and ending in the right side of the Occiput, when contracted, must necessarily bring the Face towards the Right Shoulder, and in a contrary manner, the Lest being implanted as their Antagonists, ending in the same manner on that side, must also bring it to the Lest Shoulder.

This you have at Tab. XVII. Fig. I, II.

Obliqui Inferioris.

These affist

THESE are seen to arise slessly, thin, and long from the Spinal Process of the second Vertebre of the Neck, near the beginning of the Recti, and growing more slessly, and obliquely ascending, are inserted with the Obliqui Superiores into the Transverse Process of the first Vertebre of the Neck, where the former Muscles had their Originations.

This you have at Tab. XVI. Fig. I, II.

Transversalis Colli.

This extends

THIS hath its Name, it arising from the Transverse Processes of the Neck; that is, it ariseth sleshy from their roots, and growing more sleshy, are thereunto annext at their outside; this being allowed to bring the Neck obliquely backwards, one only acting; between these are carryed the Nerves of the Spinal Marrow, which do arise out of the Vertebres of the Neck.

This you have at Tab. XVII. Fig. II.

Spinalis Colli.

Tendens of Sucretambalis do draw allo Ribs downware

THIS hath its Name from its place, it bordring upon the This ex-Spines of the Neck, and ariseth from the Seven Spines of former. the Vertebres of the Thorax, and the five Spines of the Vertebres of the Neck, bringing them together, and not diftinguishable but by the faid Spines; and becoming fleshy in its descent, is implanted into the Lower Part of the Second Vertebre of the Neck, and is faid to bring the Neck directly Backwards.

This is shewn at Tab. XVII. Fig. II.

Sacrolumbalis.

THIS arising from the back part of the Spine of the Os This affilts the former in Ilean, and Upper of the Sacrum, and the Spines of the its Extension. Lumbal Vertebres, has this Name from hence given it; and it lodging under Serratus Posticus Inferior, and having the same Origination with Latissimus Dorsi, and adjoyning to him sideways, outwardly all its length even until it has arrived at the 1 2th. Vertebre of the Thorax, where they feem to be two, altho' fearce diviseable by the Knife, and then growing thinner, doth infert its felf by two small Tendons into every Rib of the Thorax, at their Incurvations. There is a great dispute among Anatomists about these Tendons, some alledging, that this Muscle doth fend forth a double Tendon, one upwards to the lower parts of the Ribs, and the other downwards to the upper parts thereof, and these are said to raise the Ribs upwards in Inspiration, and to bring them down in Expiration, which contrary Motions were never allowed to any one Mufcle: And it may well enough be supposed, that these Tendons thus descending, do arise from some other peculiar Muscle; which upon a diligent Enquiry, Diemerbroeck tells us, he found to come from the Muscle just laying under this; and to which it is so closely affixed, that it is scarce thence diviseable; which Muscle he calls Cervicalis Descendens, whose Tendons being variously planted contrary to those of this Muscle, do operate as variously in their Contractions; for that we see, as the Tendons of the Cervicalis Descendens do draw the Ribs upwards in Inspiration;

so the Tendons of Sacrolumbalis do draw the Ribs downwards in Exspiration, for their more easy and better Contraction.

This you have at Tab. XVI. in and out of its place.

Sacer.

This extends the Loiss.

THE Vertebres belonging to the Loins are much larger and thicker, than those of the Neck and Back, where we may see them drill'd with many small Holes to let in the Arteries and Veins thro' them, by which our Vital Liquor is fent into their spongy parts; and as the Os Sacrum is an admirable strong Structure fo made, both for Strength and Thickness; fo is it made as a proper Basis to support this long Train of Vertebres, which have their Dependance from it, and which do border upon it; and over which are planted many Muscles of great Use to the Body, among which, this is one, which hath this Name given it, because it ariseth sharp and fleshy from the upper part of the Os Sacrum, and from all the Transverse Proceffes of the Loins, and is joyned to their upper Spines, and is allowed three tendinous Infertions; the first in the upper pare of the Transverse Processes of the Vertebres of the Loins, the second in the Root of the same Processes, and the third in the Spines of the Vertebres.

To find this out, you must raise Latissimus Dorsi & Sacrolums balis, from their membranous Originations at the Os Ileon, Os Sacrum, and from the Lumbal Spines, and imediately under these, this will appear in Situ, it being allowed to assist La-

tissimus Dorsi in its Operations.

Hiftory.

Forestus writes of a Physician, who had a crookt back Girl for his Patient in Burgundy, whose Back itching, made him suppose there might an Abscess arise there; hereupon he applying a Mucilage Playster to it, brought it to Suppuration, which being layd open by a Chirurgeon, in the bottom of it were seen no small quantity of Lice, which he washing away with a Decoction made of Centaury and Lupines, and cleansing the Ulcer therewith, and afterwards applying proper Sarcoticks, he fill'd it up with Flesh, and with Epuloticks skinn'd it.

This you have at Tab. XVIII.

Finis Prælectionis quartæ



A F PORT OF A COUNTY Company of the Company

Semispinatus.

THIS ariseth with a tendinous Origination according to This extends the Diemerbroeck, tho' by some its Origination is said to be tends the Heshy, from all the Spines of the Os Sacrum, and the Loins, and becoming stessy, bestows a nervous Tendon upon every Spine of the upper Vertebres, and marching obliquely upwards, is inserted into the upper Spines of the sirst Vertebres of the Thorax extending it.

These with the former acting together, are said to bring the whole Spine obliquely backward, or to either side, they are also allowed to assist in raising the Trunk of the Body.

Riverius in Obs. 196. tells us of one who had five Impostumations in his Back, near the Back Bone, bred from a cold
matter, collected by degrees, without Pain, or Inflamation, or Change of Colour; and tho' the Tumours were soft,
like that of an Oedema, and as big as a mans Fist, yet when
opened, a Laudable Pus was thence discharged: The first three
sunk in three or four Months, the fourth was cured by large
Incisions made into the Back, laying open all the Sinus's, &c.
and the fifth cured by opening it with a Potential Cautery, and
the Ulcer asterwards cleansed with proper Injections, &c.

This you have at Tab. XVIII:

Longissimus Dorfi.

This hath its Name from its length, it being one of the sends the the longest Muscles belonging to the Body; and a Muscle tends the cle not only of great Use, and Service to the Trunk, in allowing it a direct Motion, but also of no small Assistance in Progressive Motion: And therefore I have more properly placed this next to Semispinatus, and just before Quadratus Lumborum: This ariseth from all the Spines of the Os Sacrum, and all the Lumbal Veriebres, as also from the inner part of the Os Ileon, where it adjoyns its self to the Sacrum, its outward beginning being very strong, nervous, and somewhat acute, but in wardly stelly; it adjoyning its self in its Ascent to the Transverse Processes of the Loins, and then becoming more stelly

Its Ufe.

Hiftory.

in its march, is feen to narrow its self, it bestowing a small nervous Tendon on every Transverse Process of the Thorax, except the twelsth Rib, and doth insert its Self into the first Vertebre of the Thorax, altho' sometimes it hath been seen to reach even the Mammillary Process.

Observat. Upon this, the whole Sacrolumbalis is said to rest its self, it obtaining the same Origination with it, and is continued so from the end of the Os Sacrum, to the twelsth Vertebre of the Thorax, and in its whole Progress to the Loins.

This you have at Tab. XV. and at Tab. XVII.

Quadrams Lumborum.

This extends the Loins. IT takes its Name from its Figure, it having somewhat of a Square, or Quadrangular Figure, it ariseth short, thick, and slessly from the back part of the Spine of the Os Ileon, as also from the upper part of the Os Sacrum, and is inwardly inserted to all the Transverse Processes of the Loins, just beneath the Psoas.

and the filth court by opening it with a Potential Cartery, and

HIS back its Manne from its keepel, it bestes one tot

direct Merion, but tallo of no frank Allen et de

a Manufalliant could felt be annual fundament

as the from the smeet part of the College

This you have at Tab. XVII. and at Tab. XXVIII.

Lect.

Lecture V.

To which these following MUSCLES do belong, viz

Deltoides, Pectoralis. Biceps, Supraspinalis, Infraspinalis, Teres Major, Teres Minur, Nonus Humeri Placentini, Subscapularis, Brachialis Externus, Brachialis Internus, Anconaus, Gemellus, Palmaris, Caro Musculosa Quadrata, Flexor Carpi Exterior, Flexor Carpi Interior, Extensor Carpi Exterior, Extensor Carpi Interior,

Perforatus, Perforans, Extensor digitorum Communis, Indicis Extensor, Lumbricales, Flexor primi Internodii Pollicis, Flexor tertii Internodii Pollicis, Pollicis Adductor, Pollicis Abductor, Extensor primi Internodii Pollicis, Extensor secundi & tertii Internodii Pollicis, Interossei Manus, Auricularis, Minimi Digiti Abduttor, Pronator Quadratus, Pronator Radii Teres, Pronator Radii Longus, Supinator Radii Brevis.

Deltoides.

HE Bone inarticulated above with the Scapula, and beneath with the Cubite, is by Celfus called Os Humeri, the arm, or commonly the Arm Bone; among the Muscles allowed it, we begin with this, which takes its Name from its Figure it has with a Greek A, and therefore by some it is called Deltoides, or Triangularis, and by others Humeralis; it arifing with a broad and nervous Beginning from the middle part of the Clavicle, the Arm, and the whole Spine of the Scapula, and is expanded outwardly with a strong sleshy Covering, and inwardly with a nervous Membrane almost reach? ing the middle of the Arm, and is allowed to bring the fame either upwards, forwards, or backwards, according to the various working of its Fibres. KK

Annotat.

Many unskilful Men do usually make Fontanels, or Issues, in the midst of this Muscle, tho very disagreeable both to Sense and Art; since upon every Contraction of the Arm, the Orifice being therewith contracted, is seen to turn the Pea out of its Place.

Hiftory.

We read of an Infant born without Arins, having all the other parts of his Body rightly made, whose Feet, when he arriv'd at the Age of twenty years, acted the part of other mens Hands, in taking, cutting, and ferving himself with his Toes, as others do with their Fingers, and feveral other Exercises he performed with his Toes, besides feeding himself.

And at the writing hereof, we have a man lodging over against me, whose Name is John Sayer, and born at the Isle of Sarden, in the Coast of Italy, who now is about twenty four years of age, who has arrived at that dexterity of his Toes, That he can play at Cards and Dice, comb his Hair, threads a Needle, and sows with his Toes, writes with them, draws out a Sword, and puts it into the Scabbard, shaves himself, fans himself, feeds himself, and fills his Liquor, and drinks it, cuts his Meat with a Knife, and feeds himself with a Fork, charges and discharges a Pistol, sounds a Trumpet with two Fingers added to one Shoulder, and beats a Drum with his Toes at once, and some other Tricks he performs very dexterously with the help of his Toes only.

This you have at Tab. XIX. both in and out of its place.

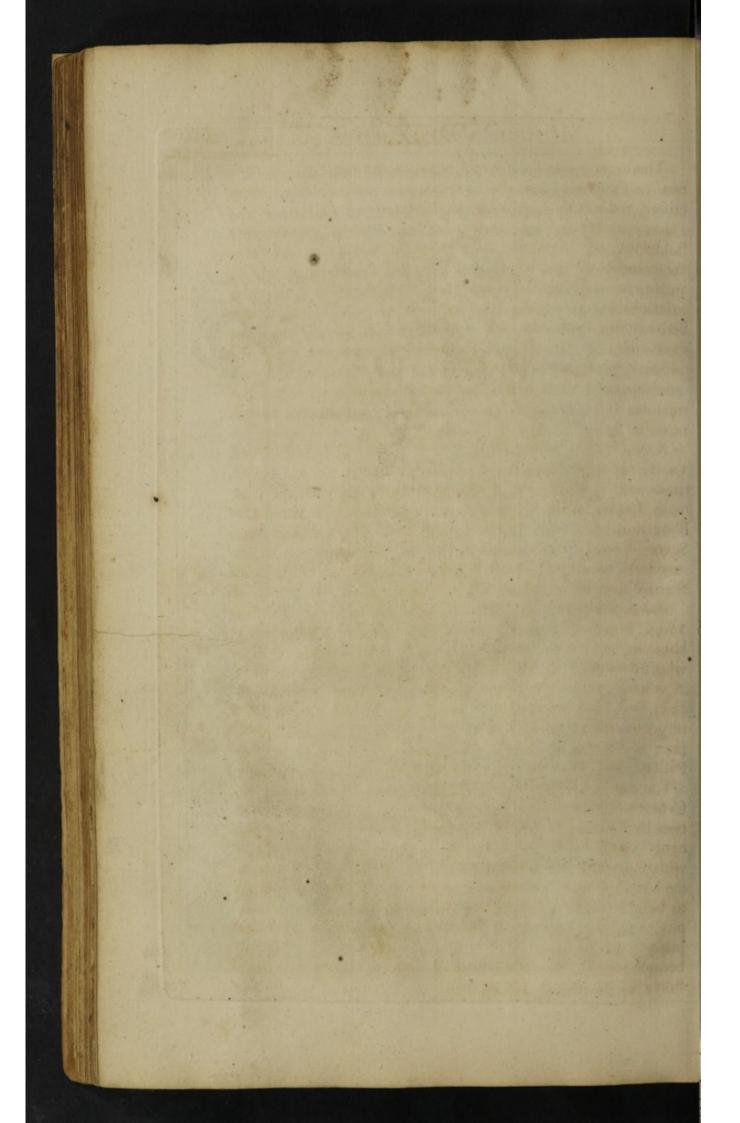
Pettoralis.

This brings the Arm forwards.

THIS hath its Name from its Situation, having a semicircular fleshy Origination on the Fore-part of the Breast; then arising with a Membranous beginning from the middle Cavity of the whole Sternon, as also from the Cartilages of the 6th. 7th. and 8th. Ribs, (fram'd as it were out of many Muscles) and narrowing its self towards its end, is implanted by a short and strong Tendon to the upper part of the Os Humeri, a little beneath its Head; this bringing the Arm to the Breast, or Forwards, sometimes directly, or obliquely Downwards, according to the various Actings and Movings of its Fibres; by some this is called the Boxing Muscle, or Adducens Humerum.

There





There are generally two unfortunate Accidents which hapben to the Arm, from bold Pretenders, and ignorant Pra-Etifers, they both arife from the ill Exercise and Use of the Lancet; and fince wee Live in an Age, where almost every bold Emperick, Horse-leech, common Barber, and Apothecaries Boy, are commonly seen to let Blood, not knowing a Vein from an Artery, or a Tendon from a Cartilage: How ought every one to take that especial Care of himself, as to make use of the best in their Profession, where he may be safe and free from those unlucky Hazards, and most certain Dangers, these Impudent Quacks are dayly seen to run those into, who are so unfortunate as to come under their Treatment? I shall only mention the pricking of an Artery here; and a Tendon in the next, it being its most proper Place,

Fabrit. Hildan, tells us, Obf. Chir. Cent. 6. That in the Year Histories 1612, of a Noble Man who was Wounded in the Night time with a Pocket Pistol, whose Bullet grazing on his Pectoral Muscle, made its way into his left Arm, not much difrant from the Deltois; in which, after having been lodged near Seven Weeks, (an Abscels arising on the Part) the Bullet made its way thro it, and beyond all expectation, the Gen-

tleman received a perfect Cure thereof.

Fabrit. Hildan Obs. 44, Cent. 3. tells us of one in the Year 1604, troubled with the Itch arising from a Melancholick humour, who went to a Barber to be blooded in the Arm, who upon pricking the Bafilick Vein, entred the Artery with it, whence prefently an Aneurism arose; to whom, when Media cines had been applyed in vain above a Month; other Chirurgeons were consulted in his Case, who judged him desperate, and much questioned the Cure; He coming to see the Patient, and observing where the Incision was made, and that a Tumour there arising as big as a Goose Egg, looking pale, and fomewhat hard, in which he not only perceived a Pullation by his Finger, but plainly by his Eye, and that the Patient could not Extend his Arm, altho' not accompanyed with much Pain, but when he tryed to Extend it; he feeing the Man not to be undertaken without much difficulty, refused to be concern'd with it; but being afterwards moved with pity, at the request of his Friends, undertook it, and prescribed the Method he there inserts, by which the Tumour became repreft, the Influx hindred, and the whole Arm Restored to its perfect Use again,

KRZ

Galent

Admonit-

Galen de Anat. dissett. lib. 6. writes, That an Artery is made with a double Coat, and that as the outward is thin and soft, intertext of right and oblique Fibres, so the inner Coat is five times harder and thicker. In an Anewism therefore, the inner Coat is rent, and the outward only dilated, or stretcht, as I have formerly shewn; just so was it in this Man, where, altho he had both the Coats of his Arteries cut, yet the outward Coat, being thin, and planted outwards near the Veins, seemed readily to heal, while the inward, by reason of its vehement and continual Motion, and of its hardness also, could not so easily and readily agglutinate, and the Blood slowing by degrees thro this into the other, caused this its Extension.

This is shewn at Tab. XIX. in its proper Place, and at Tab. I.

Biceps.

This bends

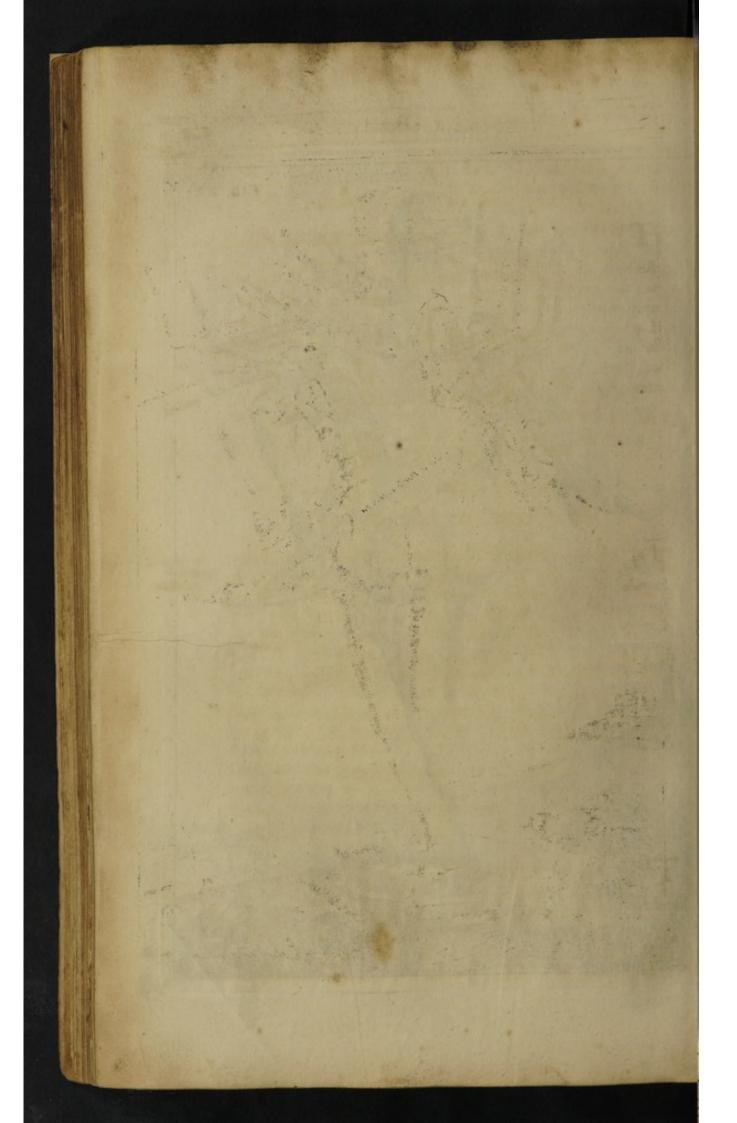
THIS hath its Name from its double Head, or Origin; it first arising from the top of the Acetabulum Scapulæ outwards, by one Substance, and then running under the Ligament of this juncture over the Head of the Os Humeri, and thro a Channel insculpt from him, it is there bound in by a proper Ligament; next it ariseth broad, slessly and nervous, from the Coracoidal Process of the Scapula, and is carried over to the inner head of the Os Humeri, and in his descent meets with the former, and do there make one strong and slessly Muscle; then narrowing himself, is converted into a strong, thick, large, and nervous Tendon, and is inserted by an oblong and round Tendon to a Prosuberance at the upper Head of the Radius, where some have declared to have found it double.

Annotat.

Its the Tendon of this Musele, which lodgeth under the middle Vein of the Arm, whose outward tendinous Fibres are to be kept free in Venelection, which being once divided by ignorant Blood letters, does usually produce convulsive Symptoms, which frequently happen upon these their bold and unskilful Incisions.

This you have at Tab. XIX. and at Tab. XXI.





Supraspinalis, or Suprascapularis.

HIS hath its Name from its Situation, it being planted This brings above the Spine of the Shoulder blade, it arising long and it about upfleshy from the Bafis of the Scapula above its Spine, filling the whole Space between the Spine, and the upper part of the Scapula, and marching back towards its Neck, gets under the second Ligament of the Humerus, as doth the Biceps, and is obliquely inferred by a strong round and broad Tendon, into the Neck of the Os Humeri, affifting the former in bringing the Arm about, whilst others as strenuously declare, that it lifts up the Arm with the Deltois.

This you have at Tab. XX. laid bare.

Infraspinatus, or Infrascapularis.

THIS hath its Name from its Situation being planted below This brings it about ditabout the Spine, that is, covering the whole outward part of the really back-Scapula, which is under the Spine; it arising fleshy from the lower Basis of the Scapula, and taking the greater part of its Cavity with it, runs backwards, and narrowing its felf, according to the Form of the part, as it passeth over the Jun-Eture in a semicircular Manner, and then becoming tendinous, is inserted to the Head of the Os Humeri.

I humbly conceive, that this Muscle according to its Situation, cannot but affilt the Deltois & Coracobrachialis, in lifting the Arm upwards.

This you have at Tab. XX.

Teres Minor.

THIS hath its Name from its Figure and Make, and by This brings Fallopius it is held to be the eighth Muscle of the Scapula, the Arm upand from its Situation he calls it Transversalis & Brevis, & Rotundus, from its Origination and Shape; it ariling tharp and fleshy from the lower Angle of the Scapula at its Basis; and then growing more fleshy towards its Venter, doth again les-

sen its self in its oblique descent, where becoming Tendinous, is inserted into the Neck of the Os Humeri, helping forwards the motion of the 4th. Muscle: Some Anatomists supposing it to be only a part thereof; this by Spigelius is called UEtavus Humeri Placentini.

This you have at Tab. XX.

Teres Major, or Rotundus Major.

This brings the Arm backwards and downwards.

THIS ariseth fleshy from the lower Angle of the Scapula, and then growing round, doth obliquely ascend with the former, ending with a short, flat, and strong Tendon, a little below the Neck of the Os Humeri, it bringing the Arm somewhat backwards and downwards.

This you have at Tab. XX.

Nonus Humeri Placentini.

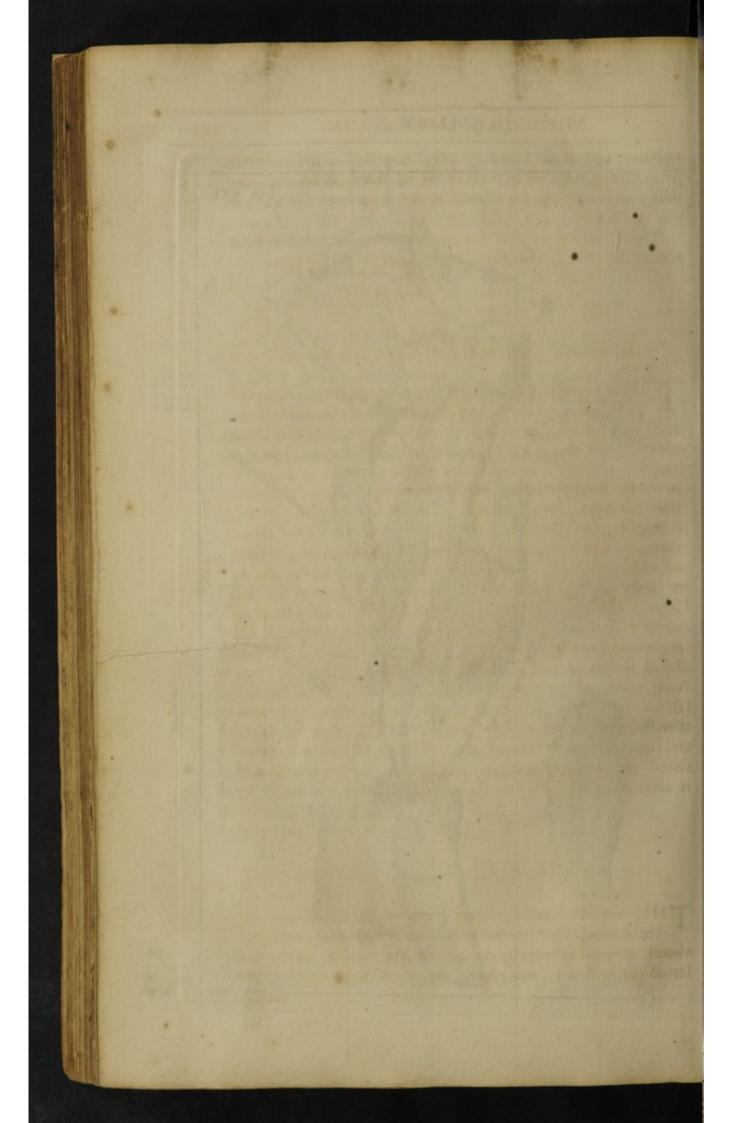
This doth affift the former in its Motion. THIS is so named by Spigelius, as being the 9th. Muscle of the Arm; & by some it is called Peforatus, its Venter being Personated, and thro' which passeth a Nerve; and Coracoides, and Coracobrachialis, it arising from the Coracoidal proses cels of the Scapula, it being partly Fleshy, and partly Tendinous, at its said Origination from the same Process, and marching sorwards in its descent, it grows larger, and inserts it self with a strong Tendon, at the inner part of the Os Humeri, about its middle; bringing the Pestoralis with it sorwards to the Breast, and being personated in its Venter, a large Nerve is seen to pass thro' it, which brancheth its self into several Muscles of the Cubite: Riolan supposeth this to be only a part of the Biceps.

This you have at Tab. XX. Fig. I, II.

Subscapularis.

This brings THIS takes its Name from its place, and Origithe Arm outwards. This brings a large fleshy Muscle, filling the inner hol-

TAB XXI. Scapula Dectra Fig. 11.



hollow part of the Scapula; and arising sleshy from its Bafis inwards, and leffning its felf in its march along the Bone, doth Infert its felf in a Semicircular manner to the Neck of the Os Humeri.

These Muscles of the Arm working together, do bring it about; this by all Anatomists being supposed a Depressor.

This you have at Tab. XII.

Brachialis Externus, or Gemellus Major.

THE Cubite being framed of two oblong round Bones cale This exled Radius & Ulna, the first planted near the Orbite of the Cubite. lower part of the Shoulder-blade, with which the Ulna is articulated; the Ulna being thick and solid in its upper part, has ving two visible Processes, in the middle of which, a large Sinus is exsculpt, for letting in the Process of the Scapula, not far from the upper Joynt, where the Neck of the Radius is planted, it sending forth another Process near the inside of the Cubite, where it frames a proper place for the Infertions of the Flexors of the Cubite, and the Radius, being thicker and broader in its lower part, does there make a fit Articulation with the Carpus: This Muscle hath also the Name of Gemellus, from its double Origination, it arifing double, broad and strong, first tendinous from the upper part of the lower Cofta, or Rib of the Scapula internally, it having a peculiar Cavity a little under its Neck, and then growing fleshy in its descent, doth joyn its felf to the infide of the Os Humeri, where it meets with anos ther fleshy Origination both broad and fleshy from the upper and back part of the same Bone, and there making one, is inferted to the upper and outward part of the Olecranum, and is allowed an Antagonist to Biceps Internus.

This you have at Tab. XXI. Fig. 1.

Brachialis Internus.

THIS ariseth from the inner Head of the Os Humeri, and the formers becoming fleshy, doth ascend to the Middle of the same, almost inseperably mixing its felf with the former, and is Inferted partly fleshy, and partly nervous to the outside of the Lla

Olicranum, in that part which we usually lean on; and by some it is allowed one of the Cubits Flexors.

This you have at Tab XXI. Fig. I. in its place.

Anconœus.

This extends the Cubite. THIS being a small bodied Muscle, is by some Anatomists supposed to be a part of the Brevis, it has the Name of Anconœus given it, from its Situation, as Riolan supposeth, it arising sleshy from the lower and back part of the Os Humeri, and is planted between the Cubite, and the Radius; being inserted with a Nervous Tenden into the side of the Ulna, a Thumbs length below the Olicranum or Elbow, and is said to assist in Extending both of Longus & Brevis.

This has no Figure here.

Gemellus.

This extends the Cubire. Thath its Name from its double Origination, it first arising Tendinous from the upper part of the Lower Rib of the Shoulder-blade in its side, and growing sleshy in its march, doth joyn its self with its other Origination; it appearing broad and sleshy from the upper and back part of the Os Humeri, where shewing its self sists outwardly Tendinous, and then inwardly sleshy, is plainly seen to Insert its self into the upper and outward part of the Olecranum, it being generally allowed one of the Cubits Extensors.

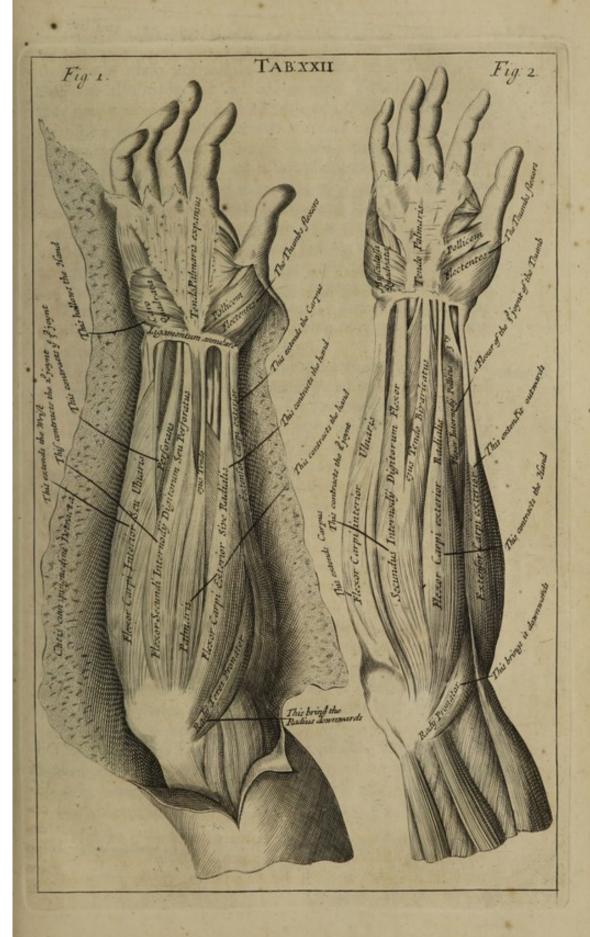
This you have at Tab. XXI.

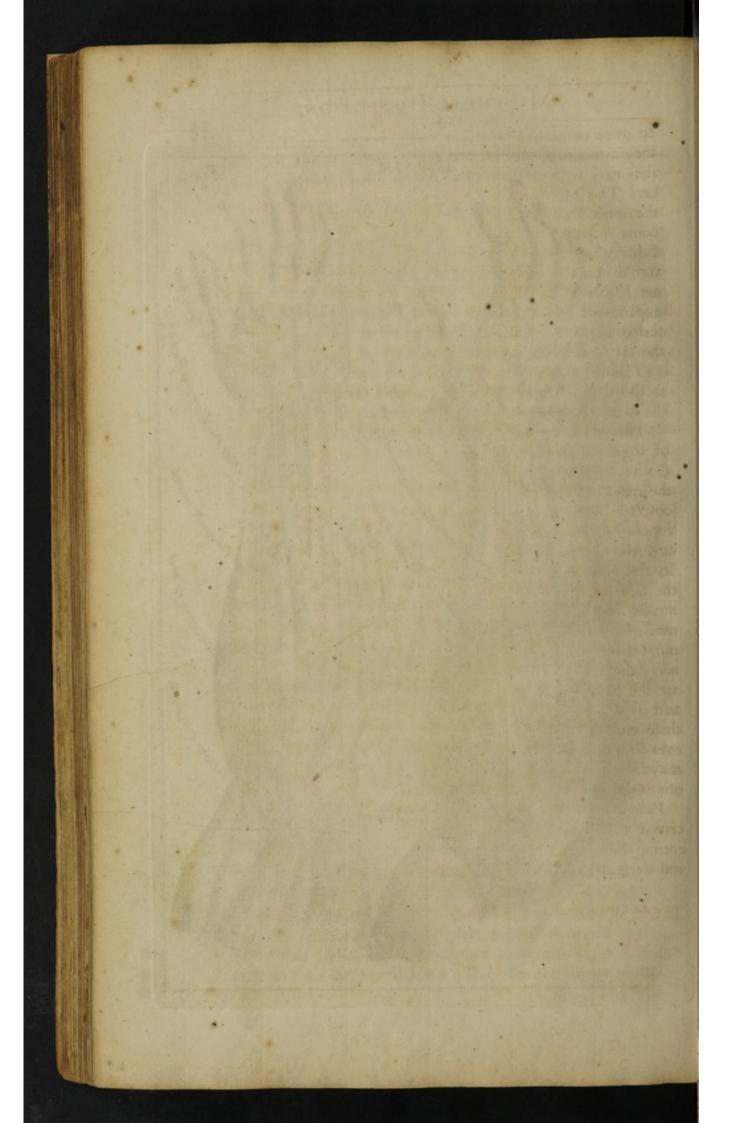
Palmaris.

This constracts the

THE Use of the Hand doth evidently demonstrate in Dissection, that the Bones of the Fingers are not made of one Shape and Size; but that they are rather framed of a disferent Set of Bones, formed for the most part round, and covered with Muscles and Skin, they being also somewhat deprest in their upper and lower parts, for the better enabling

them





to gripe or grasp any tactile thing, within their Touch; and they are also made less and less in their Terminations, that they may with more ease close with any Object in Contraction on: This Muscle arising somewhat round and nervous, from the inner Extuberance of the Os Humeri, doth afterwards become fleshy, and narroweth it self about the middle of the Cubite, where being carryed somewhat obliquely, is afterwards turn'd into a long and round Tendon, and passing over the inner Ligament of the Radius, it arrives at the Palm, where it expands its felf into a very broad Tendon, and is laterally inferted into the roots of the Fingers, and so closely fixed to the Cutis, that without difficulty its scarce separable thence.

This being contracted, does occasion a fast grasping of any tactile thing, and the Skin over it being movable, doth make

the Gripe stronger and more fixing.

The Hand, as both Aristotle and Galen write, is the Organ Observation of Organs, and as the Tongue was allowed us for Speech and Conversation, so this is given us for Commerce and Trade; the Hand obligeth and supplies all our Faculties, thus the Eye observes all its Actions, it has the Ear at its Fingers ends, it Supplies the Nostrils with Perfumes, it raises a Gusto to the Palate, and its seldom or never seen without the Sense of Feeling : Its the Hand that delivers the Scepter to the Prince, that gives the Lawrel to the Victor, that pays Cafar his Due; our Hands are the Registers of all our Laws, and the very Nerves and Sinews of all our Government; by them we falute and embrace our Friends, and defend and guard our selves against our Enes mies; these are the Instruments that wage War abroad, and these are the happy Mafters of all Arts and Sciences, of all Professions and Trades, exercised in the times of Peace at home; with these we Work and we Write, we Cut and we Cure, and whatever Good or Ill we do, are the Works of our Hands; fo that we may in the whole, account them either our best Friends, or our worlt of Enemies.

Valleriola Lib. 3. Enarrat. 8. tells us of one, who having received a very flight Wound in the Palm of his Hand, (scarce entring beyond the Skin) afterwards fell into Convultions, and dyed on the 7th. day after the Receipt of the Wound.

History;

This you have at Tab. XXII. Fig. I. and at Tab. XXIII. Fig. I. it is laid bare.

Caro Musculosa Quadrata, or Palmaris brevis.

This hollows the

Ulfe.

THIS has its Name from its Shape and its Origination; it ariseth in the lower part of the Mons Luna, as Diemerbroeck writes, or as Fallopius says, from the eighth Bone of the Carpus; and marching under the Palmaris, even to the middle of the Palm of the Hand, is inserted into the outside of the Tendon, which divides the Little Finger from the rest.

This Muscle hollows the Hand in its Contraction, drawing

the Mons Lune to the middle of the Hand.

This you have at Tab. XXII. Fig. I, II. and at Tab. XXIII. Fig. I.

Flexor Carpi Exterior, Radialis, or Bicornis.

This helps the former in Contraction.

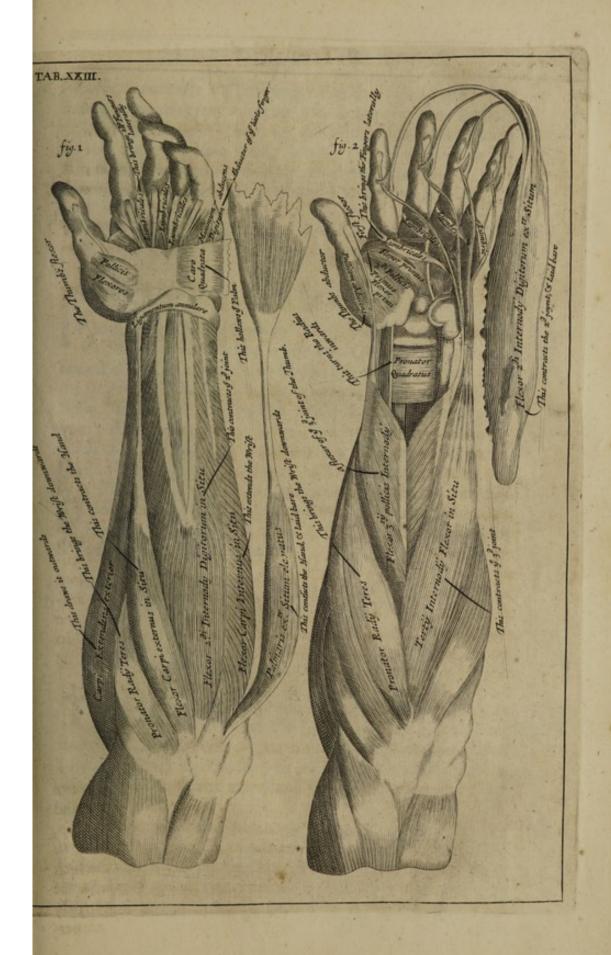
IT has the first Name from its Use, and Radialis from its Situation, and Bicornis, it shewing its self with a double Head; it ariseth tendinous from the inner Extuberance of the Os Humeri, and running somewhat transversly, near the outward part of the Primi Digitorum Flexores, is fixed to the Radius, and a little before its arrival at the Carpus, in its oblique Progress, it becomes a flat Tendon, and passing over the Transverse Ligament, does there begin to enlarge its self, and is inserted into that Os Metacarpi which secures the Fore singer; these two acting together, do both contract the Wrist and the Hand; one only acting, it brings it somewhat obliquely lateral in its Contraction.

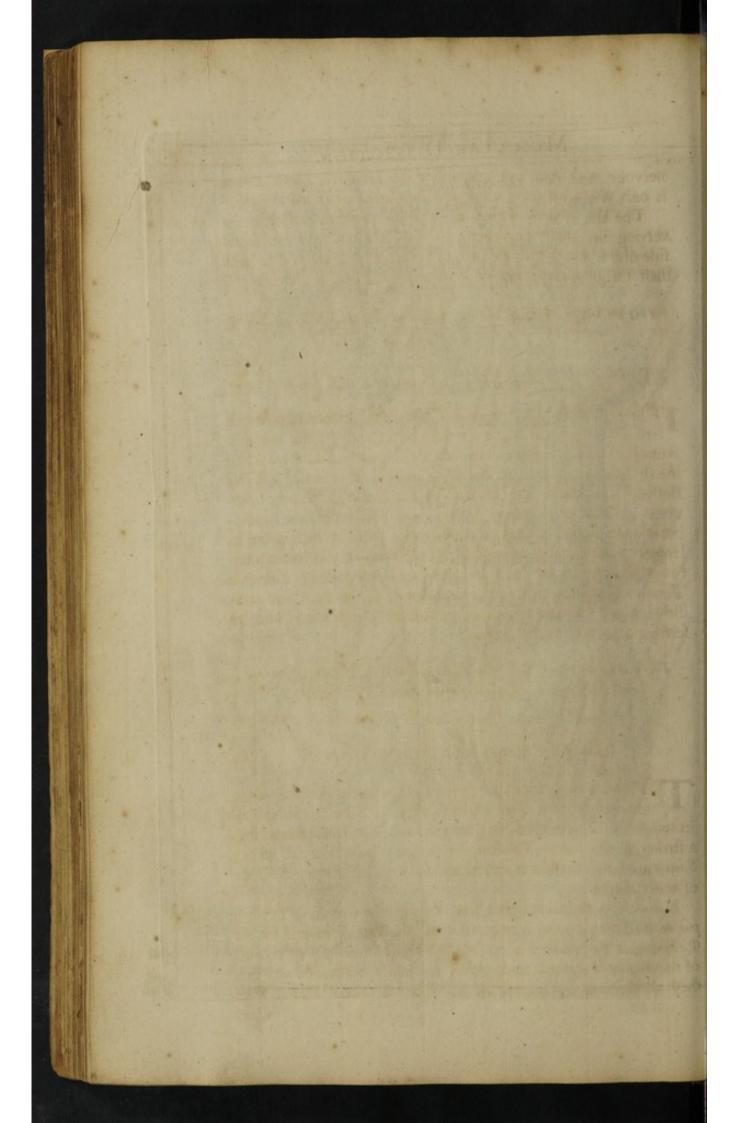
This you have at Tab. XXII. Fig. I, II. and at Tab. XXIII. Fig. I.

Flexor Carpi Interior, or Ulnaris.

This contracts the of the Arm, and Ulnaris, it arising also from the upper and outward part of the Ulna; it being a Muscle that is both sharp, sleshy and nervous, arising from the inner Process of the Os Humeri, and running sleshy the length of the Cubite, to which it adheres, hath its Insertion by a short and strong Tendon, at the fourth Bone of the Radius, being partly sleshy, and partly

nera





nervous, and doth not pass under the Transverse Ligament, but is only wrapt up in the common Membrane of all the Muscles.

The Use of these Flexors is, that as they are made for receiving any thing into them, fo they always arise in the in= fide of the Arm, while we plainly perceive the Extenfors do take their Originations from the outward Extuberance thereof:

This you have at Tab. XXII. Fig. I, II. and at Tab. XXIII. Fig. I. II.

Extensor Carpi Exterior, Radialis, or Bicornis.

TT hath its first Name from its Office, and its other two from This exits Situation and Make; it has two Originations, the outs Carput. ermost of which ariseth fleshy above the outer Extuberance of the Os Humeri, and in its declining march, it becomes a fleshy Belly, and above the middle of the Radius, it appears nervous; the other is partly fleshy, and partly nervous underneath the former, and continues the same according to its length; but having arrived near half way, it is converted into a strong Tendon, and is afterwards inferred by a double Tendon into the first and second Bones of the Fore and middle Fingers; and in respect of its double Origination, and Infertion, it is also called Geminus.

This you have at Tab. XXII. Fig. I. and at Tab. XXIII. Fig. I. and at Tab. XXIV. Fig. I, II. and at Tab. XXVI. Fig I, IL.

Extensor Carpi Interior, or Ulnaris.

HIS arising from the inner Extuberance of the Arm, as This exalso from the Top of the Cubite, and being dilated all tends the its whole Length thro' it near the Carpus, it is converted into a strong and round Tendon, by which it inferts its felf into a Simus, above the lower end of the Cubie, and to the 5th. Bone of the Carpus.

Nature hath framed two fets of Bones for making the Care Observat. pus or Wrist; by the Benefit whereof, the first is joyned to the Radius, and the fecond to the Metacarp, and the first Bone of the Thumb; the upper being fo closely put together, that they all seem but as one Bone, which is taken in as it were

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into the Sinus of the Radius, making up an Articulation in the lower part of the Cubite, and the first and second Bone of the Carpus; being also let in as it were into a Sinus, hollowed at the Appendix of the Radius, and the third Bone thereof; all which are thus prudently managed, for the Performance of those various Offices, which we dayly see the Hand and Fingers exercised with; as also by the Benefit of these aforesaid Muscles, we plainly see the Arms either to be carryed upwards, or brought downwards, or drawn sideways, as we please to move them.

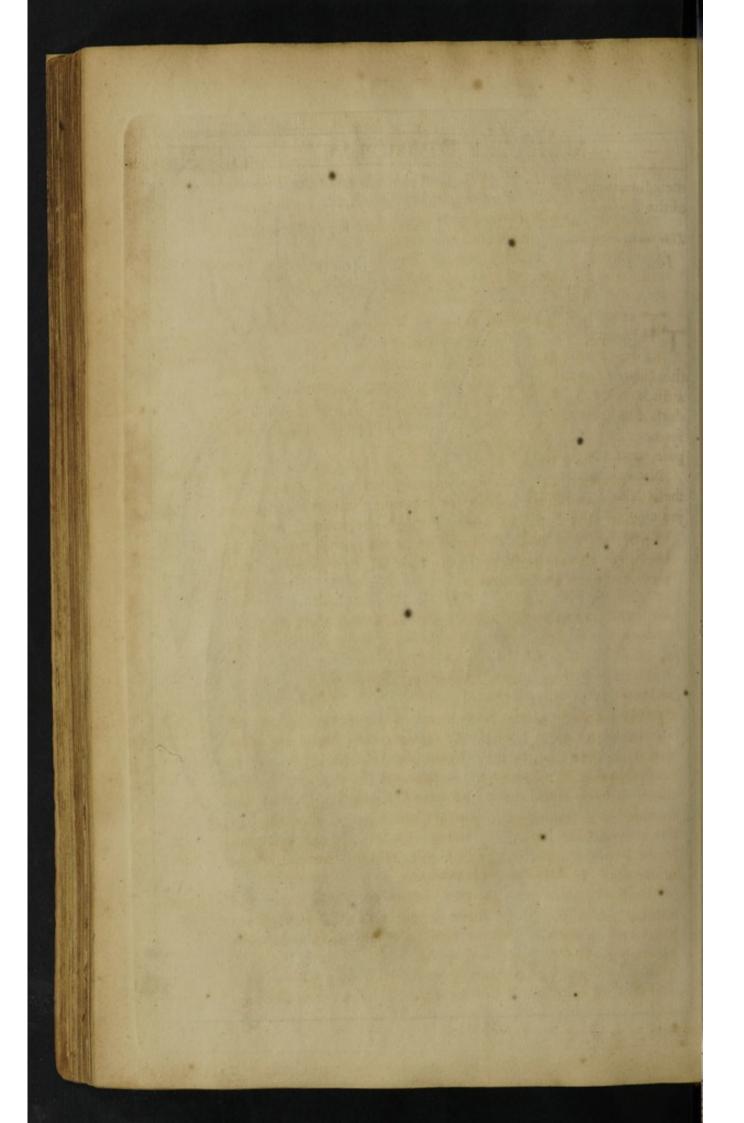
This you have at Tab. XXII. Fig. I, II. Tab. XXIII. Fig. I. and at Tab. XXIV. it is laid bare, and you have it again at Tab. XXVI. Fig. I, II.

Perforatus, or Flexor secundus.

This contracts the 2d. Joynt of the Fingers.

THIS has its Name, from its suffering the Tendons of the next Muscle to pass thro' it, and is also called Flexor Jecundi Internodii Digitorum, from its Use: The Bones of the Metacarp carrying an equal Correspondence with that of the Fingers, being as it were their next Neighbours, are of no small use towards the supporting them; these also being larger in their upper parts, than in their lower; Nature contriving them fo on purpole, for their taking in of their Muscles into their empty Spaces, which they are seen to have between the Bones of the Metacarp, framing these as so many proper Lodgments for there several Receptions; and therefore they are not only feen furnished with Appendages for their better Terminations, but have also allowed them Asperities, for the more ready Admisfion of their tendinous Infertions: This Muscle ariseth neryous from the inner Protuberance of the Os Humeri, and growing broad and fleshy about the middle, between the Cubitus and Radius, somewhat adjoyning its self to them in its march, it wholly becomes fleshy and round; after this, it divides its felf into four fleshy Portions, from each of which are sent our as many Tendons, every one of them being involved in a Mucaginous Coat or Membrane, and running internally under the Transverse Ligament of the Carpus, sill it reacheth the Palm, and afterwards is seen to distribute these its perforated Tendons to the first and second Internodes of the Fingers, a little before their





their Insertions, for the more ready Transmission of the Tendons of the Perforans, or the Tertii Internodii Flexor.

This you have at Tab. XXIII. Fig. II. Tab. XXII. Fig. 7, II. it is laid bare.

Perforans, or Flexor tertius.

HIS hath its Name from its Tendons passing thro' the former Muscle; it ariseth fleshy from the upper part of tracks the 3d. the Cubite, a little beneath the Joint of the Radius, becoming a thick bellyed Muscle, and then growing outwardly nervous, doth divide its self into four Tendons, which passing under the former, and then thro' their Clefts, is implanted into the Forepart, and third Bone of every Finger.

Nature hath made a very excellent Order in the forming Observation these Muscles, that each of them may freely act without prejudicing each other; as also for securing them in their proper Motions, she hath cut a way through the former, for these to pals freely in order to their Operations; and not only fo, but these also are so framed, that they are seen to move without any Injury to the former.

This you have at Tab XXIII. Fig. II. and at Tab. XXII. Fig. L.

Extensor Digitorum Communis.

THIS ariseth partly fleshy, and partly nervous, from the This extends outward Apophysis of the Os Humeri, and becoming more the 2d and and ad Internodes fleshy, in less than half its Progress, it is seen to narrow its of the Fingers felf, where it is also divided in three fleshy Portions, which afterwards do terminate in as many Tendons, all which are included in a common thin mucaginous Coat, and passing under the Annular Ligament, being thus divided, they are inserted into the upper parts of the first, middle, and third Bones of the Fore, middle, and third Fingers.

These Tendons reaching the Ends of the third Bone, and Observation lodging under the Nail, shews us the reason of those sharp pains, which usually happen upon a Prick, or a Fellon here

growing or breeding on these parts.

This you have at Tab. XXIV. Fig. I. laid bare.

Indicis Extensor, or Indicator.

This extends the Fore-finger.

THIS proper Extensor of the Fore-finger, which both by Riolan and Vessingius is called Indicator, ariseth from the outward and middle part of the Cubite, next the Radius; and descending obliquely, do pass under the Annular Ligament, with a double Tendon, into the second Joynt, and meeting with the Tendon of Extensor Communis, is carryed to the

third Bone of the Fore-finger.

History.

I cannot pass by the Story I met with in Pet. Borellus, Obs 28; Cent. 1. of a Fisherman about Monepelier, who being wounded in his Fore finger with a sharp Bone or Spine of a Fish, not only an extraordinary Pain did arise upon it, but a large Tumour followed it, which Tumour could not be cured by any Medicine whatsoever; at length it being laid open by a Surgeon, there was found in the middle thereof, a small Fish near formed, carrying in it much the Shape of that Fish, whose Spine made the Wound.

This you have at Tab. XXIV. Fig. E.

Lumbricales, or Vermiculares, or Flexores primi Internodii.

These contract the 1st. Joynts laterally. THEY have their Names from the likeness they carry with common Earth worms, considering their Shapes; and are also called Flexores primi Internodii, from their Use, they arising from the Tendons of the Perforans, intermixing themselves therewith; and being then again segregated thence, and growing sleshy, do intermix themselves with some of the Interossei, running out of the sides of the Fingers, even to the third Joynt; bending them laterally.

This is shewn at Tab. XXIII. Fig. I, II. and at Tab. XXV. Fig. I.

Flexor tertii Internodii Pollicis.

This bends THIS oft times bath shewn its self with a double Orithe 3d. Joynt of the Thumb. The gine, it first arising sleshy, from the inner Extuberance of ħ. the or showing ports or one the state of the s A C Y RESIDENCE

the Os Humeri, partly fleshy, and partly nervous; and then from the upper part of the Radius, running forwards to the first and second Joynes of the Thumb, and doth implant its felf at the upper part of the third Bone thereof.

This you have at Tab. XXII. Fig. I, II. and at Tab. XXIII. Fig. I, II.

Flexor primi & fecundi Internodii Pollicis.

HIS ariseth fleshy from the Ligamentum Annulare, and from the Bones of the Carpus, under the former, and is extende the 1st. and ed to the middle of the Thumb; its variety of Motions arising the Thumb. from its diversity of Fibres allowed it, and it is generally allowed a Flexor of the first and second Internodes of the Thumb, from whence it properly takes its Name. Riolan will not allow this a a Flexor, but thinks, that these Muscles ariling from the Bones of the Carp or Metacarp, ought rather to be called either Abductors or Adductors.

This you have at Tab. XXII. Fig. I, II. and at Tab. XXIII, Fig. I, II,

Pollicis Abduttor.

THE Thumb, when it is drawn to any side, is said to be either adduced or abduced; this Abdultor ariseth broad and the Thumb Heshy from the inner part of the Transverse Ligament of the Car- Fingers. pus, and lefning its felt in its descent, at its insertion becomes tendinous, marching along to the upper and second Bone of the Thumb, drawing it from the Little Finger; by some Anatomists, this is called Thenar.

This you have at Tab. XXIII. Fig. II. and at Tab. XXV. Fig. I, II.

Pollicis Adductor

HIS ariseth nervous, as did the Indicis Abductor, and then growing fleshy, doth ascend obliquely to the upper part the reambinof the first Bone of the Thumb, where, at its inside, it is inser- wards. ted broad and fleshy, and by some this is called Antithenar,

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and is allowed to bring the Thumb towards the Fore-finger, whence it gets the Name of Adductor.

This you have at Tab. XXVI. Fig. II.

Extensor primi Internodii Pollicis.

This extends the 1st. Internode of the Thumb. HIS ariseth tendinous from the upper part of the Ulna, under the Supinator Radii brevis, and then growing fleshy, does again appear nervous in its oblique descent over Radii Extensor, and is implanted into the first Bone of the Thumb.

This you have at Tab. XXIV. Fig. I. and at Fig. II. it is laid bare.

Extensor secundi & tertii Internodii Pollicis.

This extends the 2d and 3d. Joynts of the Thumb.

THIS ariseth broad and fleshy from that part of the Radius, near the Ulna, and obliquely ascending over it, doth divide its self into two inequal parts closely put together, and is carryed along in a proper Channel to the Appendix of the Radius, its upper part being somewhat fleshy, and afterwards ending in a round Tendon, is inserted into that Bone of the Carpus, which receives the Thumb; the other being subdivided into two small Portions of Flesh, doth at length likewise become tendinous, the first of these being inserted into the first Joynt of the Thumb; the other by a Membrane fixeth its self to the second and third Joynts thereof, and is said to extend them.

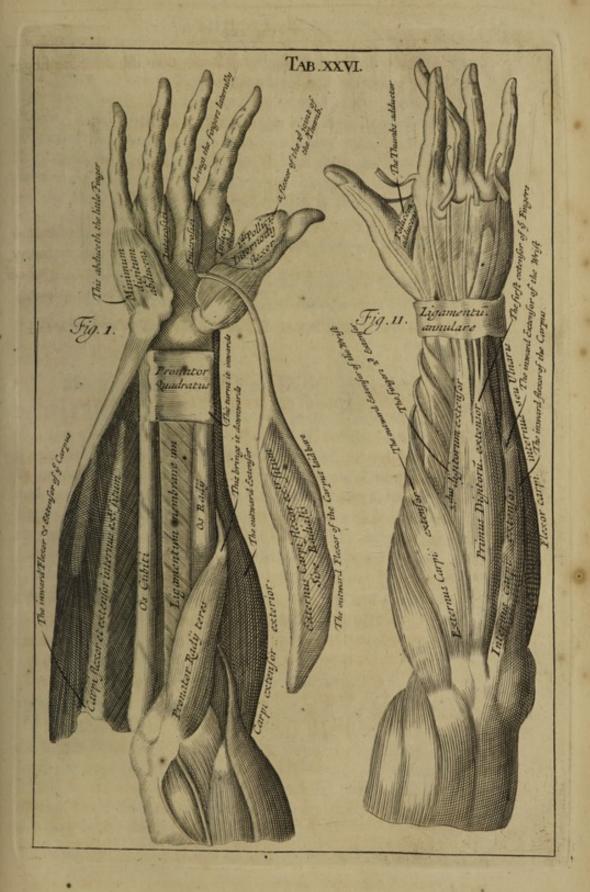
This you have at Tab. XXIV. Fig. I, II.

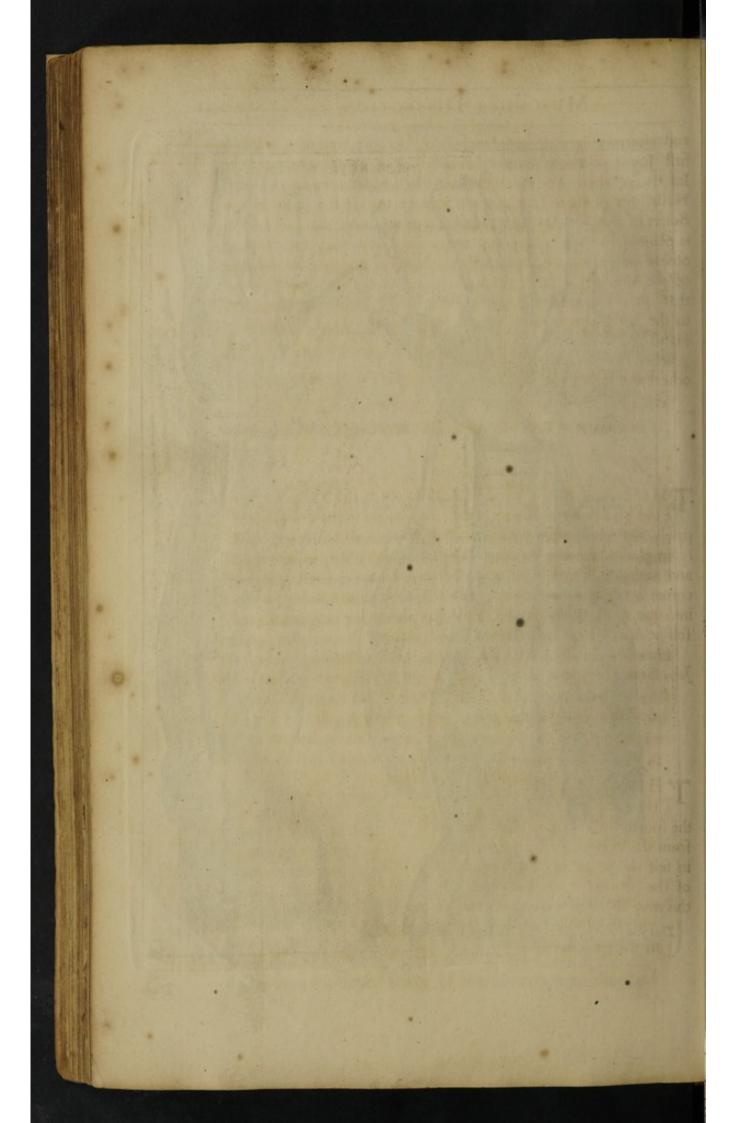
Interessei Manus.

Take son have at Tab. ALVIN Fig. II. and at Tab. FAVE Fig. I, III.

These bring the Fingers laterally. THE Fingers are brought to the sides, or to the Thumb, or drawn from thence by the help of these Muscles, they being allowed eight in number, and are divided into Externals and Internals, being sleshy and small Muscles, arising inwardly sleshy from the upper Bones of the Metacarp, near the Carpus,

and





and intermixing with the Lumbricales, become tendinous at the first Joynt of every Finger laterally, and marching to their Infertions, their Tendons are seen to end at the roots of the Nails, fix of them are planted into the three Internodes of the Bones of the Metacarp, viz. two into every one; and as one is planted inwards, the other is planted outwards whilft the others are feen more particularly to belong to the first Bone of the Metacarp, fastning the Index; and is also incumbent on that part which doth receive the Thunb; the last adhering to the last Bone of the Metacarp in the outward part of the Hand, or in the back part thereof.

When they work together, they bring the Fingers' nearer each other, and do also promote their Extensions, as Galen observes.

This you have at Tab. XXV. Fig. I, II. and at Tab. XXVI Fig. I.

Ufe.

Auricularis, or Minimi Digiti Extensor.

THIS ariseth partly nervous, and partly fleshy, nervous at This extended the end of the outward Apophysis of the Os Humeri, and the Little partly fleshy from the upper part of the Ulna, and is outwardly implanted with a double Tendon into the Little Finger; and having past under the Annular Ligament at the Carpus, it becomes a large, round and nervous Tendon; which is inferred into the third Bone of the Little Finger, it intermixing its felf in its passage, with the Tendon of the Tenfor Communis:

Horatius Augenius Lib. 9. Fpift. 2. writes, That he observed Observat? John Baptist Argentine dyed of a Wound of his Little Finger.

This you have at Tab. XXIV. Fig. II.

Minimi Digiti Abductor.

THIS Muscle is planted in the bottom of the Hand, under the Little Finger, short and strong; it arising sleshy from off the Little the fourth Bone of the Carpus, as also from its third Bone; and from the upper part of the subjacent Metacarp, and extending its self by it, is inserted laterally outwards, to the first Joynt of the Little Finger, and doth abduce it; Riolan writes, that this may be divided into two Muscles.

This you have at Tab. XXIII. Fig. I, and at Tab. XXV. Fig. I. II. in its place, and laid bare.

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Pronator Quadratus.

This turns the wrift inwards.

TH IS ariseth broad and slessly, (being transversly extended) from the lower and inner side of the Ulna, and so passing over the Ligament, that joyns the Radius and the Ulna, doth implant himself into the upper and outward part of the Radius, with a broad Beginning, much resembling a mathematical Square, with four equal sides.

History.

Horatius Augen Lib. 9. Fpift. 2. Writes, that Marcus Antonius dyed of a small Wound hapning in his Elbow.

This you have at Tab. XXIII. Fig. I, II. and at Tab. XXVI. Fig. I.

Pronator Radii Teres.

This brings the Radius downwards.

THIS is called Teres from its Form, it arising fleshy from the Radix, of the inner Prominence of the Os Humeri, and from the inside of the Os Cubiti, and is there joyned by a large fleshy Origination to the Radius, and thence obliquely descending downwards by its side, a little above its middle, is implanted into him fleshy, and afterwards a nervous Head or Tendon ariseth from him, which is inserted into the outward Head of the Radius, and is said to bring it downwards.

This you have at Tab. XXII. Fig. I, II. Tab. XXIII. Fig. I, II. and at Tab. XXVI. Fig. I.

Supinator Radii Longus.

This brings the Arm outwards.

THIS has its Name from turning the Radius upwards and outwards; and Longus, from its length, it arising broad and fleshy from the upper and outward part of the Os Humeri, and running obliquely inwards, it grows less in its descent, and becomes a flat, broad and membraneus Tendon, and is fastened to the outer and lower part of the Radius near the Carpus.

ufe.

If this, and its Partner do act, they bring the Radius forwards, and the Hand with it.

This you have at Tab. XXVII. Fig. I, II.

Supinator Radii Brevis.

This affifis T HIS being shorter and thinner than the former, doth arise the former. The from the outward part of the lower Head of the Os Humeris



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meri, and from the Process of the Ulna, partly tendinous, and partly fleshy; and upon its recovering the middle of the Radius, is inserted to its upper part, a little below its Prominence.

This you have at Tab. XXIV. Fig. I, II. and at Tab. XXVII. Fig. I, II.

Lecture VI.

This Last Lecture concludes with these following MUSCLES, viz

Ploas Magnus, Ploas Parvus, Iliacus Internus, Pettineus, Gluteus Major, Glu aus Medius, Glutaus Minimus, Pyriformis, Mar supialis, Quadratus, Triceps, Obturator Externus, Membrano us, Sartorius, Gracilis, Seminervolus, Semimembrano us, Biceps, Rectus, Vastus Externus, Vastus Internus,

Suppoplitæus, Gasterocnemius Externus, Plantaris. Gasterocnemius Internus, Tibiæus Anticus, Peronaus Primus, Peroneus Secundus, Tibiaus Posticus, Extensor Pollicis, Flexor primi & secundi Internodii Pollicis, Abductor Pollicis, Adductor Pollicis, Extensor Digitorum Longus, Extensor Digitorum Brevis, Perforatus, Perforans, Lumbricales, Abductor Minimi Digiti, Transversalis Placentini, Interoffei Pedis.

Psoas Magnus, or Lumbalis.

Aving cleared the Muscles belonging to the upper parts, This Constraints and those of the Trunk; we now arrive at the lower Things the parts of the Body, beginning with the Flexors of the Thigh, where we first meet with Psoas, which has its Name, and appear, they being Muscles planted in the inner part of the Loins, as Hippocrates writes: And whereas these

these parts are the proper Pedestels, on which the two former had their dependance; here may we see what Contrivance Nature hath made, in giving them a System of strong Bones, so tyed together, and so artificially connexed, that they seem to be all of a piece, tho' indeed they are diverse Bones closely put together, (for the better fecuring of the Trunk of the Body) by the advantageous Ligaments allowed them, for the better fastning them one to another: Thus we see, as it is tyed to the Share Bone before, and backwards to the Os Sacrum. and downwards to the Coxendix; so also is the Foot divided into three parts, the Thigh, Leg and Foot; to all which parts, Nature hath given the Machinism of Muscles, as so many diffinct Bodies, appointed as fo many Machines of Motion: And Man being framed in an erect Posture, and naturally requiring these bony Pillars to sustain and bear up his Fabrick. which we see is every where well stored with various and different Bodies, and Forms of Muscles, both for the better countermanding each other in their Motions, as also for keeping the Limbs in an erect Posture.

I shall begin with this of the Psoas, which is planted in the hollow or inside of the Abdomen, and doth arise livid, slessly and large, from the two lower Vertebres of the Thorax, and the three upper of the Loins, and descending somewhat round from the inner part of the Os Ileon, even to the Os Pubis through its Sinus, is inserted by a round and strong Tendon into the less Trochanter of the Thigh, drawing it upwards, and at the same time bending it inwards. Because the Kidneys do frequently press upon this Mulcle, as Laurentius well observes, over which runneth a notable Nerve; such as are troubled with the Stone, do frequently perceive a Sleepiness on that side of the Thigh, in which the Stone is lodged, occasioned by its

compressing this part.

This you have at Tab. XXVIII. both in and out of its place.

Psoas Parvus.

This affifts THIS is not seen in all Bodies; whenever you find it, you will meet it arising fleshy from the upper part of the first Vertebres of the Loins, internally within the Abdomen: Baubine saith, it ariseth fleshy the length of a Little Finger, and is dilated with



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a flender and broad Tendon, above the Ploas Magnus, and ends with the Ploas and Ileon, embracing them both very firm. ly: Riolan declares, he could never find this in Women: Bartholine writes, that which he found in a Man at the Hague had a fleshy Origination, equalling the breadth of three trans verse Fingers, and was inferred fleshy into the upper and back part of the Os Ileon; at the beginning of Iliacus Internus, it being made as a Pillow to the former: Mr. William Molins in the year he was Mafter of Anatomy, shewed this Muscle in a Body then diffected by him, at the Theatre in Chirurgeons Hall.

This Muscle laying under the former, is not here shewn in Figure.

Iliacus Internus.

HIS ariseth with a thin and fleshy Beginning, in the inner Cavity of the Os Ileon, and in its descent over it the rhigh Alin its lower part, it joyns its felf with the former, and is implanted into the same Rotator, a little below it: This and the former are allowed the Thighs Elevators, and by the Benefit of both of them, the Thighs are lift up, and brought forwards in Contraction; and whilst the Tarsus of the hinder Foot is ready to land on the Ground, the hinder Foot by wheelingupon the Metatarse and Toes, does seem to draw the Trunk of the Body forwards; so that the other Limb being extended, the Centre of Gravitation, may be turned upon the Heel of the Fore Foot, which is the reason why we are so subject to fall in running: Our Bodies being hurryed in a violent Motion, does fuddenly raise the hinder Foot, from the Tarse to the Metatarse and Toes; and with that Briskness and Violence, that the Fore Foot, upon the least Hindrance or Obstruction, cannot so well, and fo readily land its self on the ground, or receive the weight of the Body, so as to prevent its falling, as Dr. Collins well observes: Again, as the Psoas is fastned to the Vertebres of the Back and Loins, and the Iliacus Internus to the Surface of the Os Ileon, as to the Centers of Motion, and both of them are tyed downwards to the less Trochanter, as a part more easily moveable: The Thigh is thereupon drawn upwards, by the Contraction and Abbreviation of these Muscles, they lifting up the Thigh, by making of this its Flexure, whilst the opposing Motion, or Extention of the Thigh is made good by the Glu-

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tæi; and as the Psoas, and Iliacus Internus, do pull the Thigh upwards, so the Gracilis, Seminervosus, Semimembranosus, and Biceps, do bring it backwards.

This you have at Tab. XXVII. both in and out of its place.

Pectineus, or Lividus.

This draws the Thigh upwards and outwards. THIS is so called from its arising both broad and fleshy, from the outward part of the Os Pubis, or Pettinis, or Share Bone; and Lividus from its Colour, and descending obliquely, is inserted by a flat and short Tendon into the inside of the Os Femoris, on its back part, under its lesser Trochanter, bringing the Thigh upwards and outwards: Bartholine will have this to be an Adduttor.

Observat.

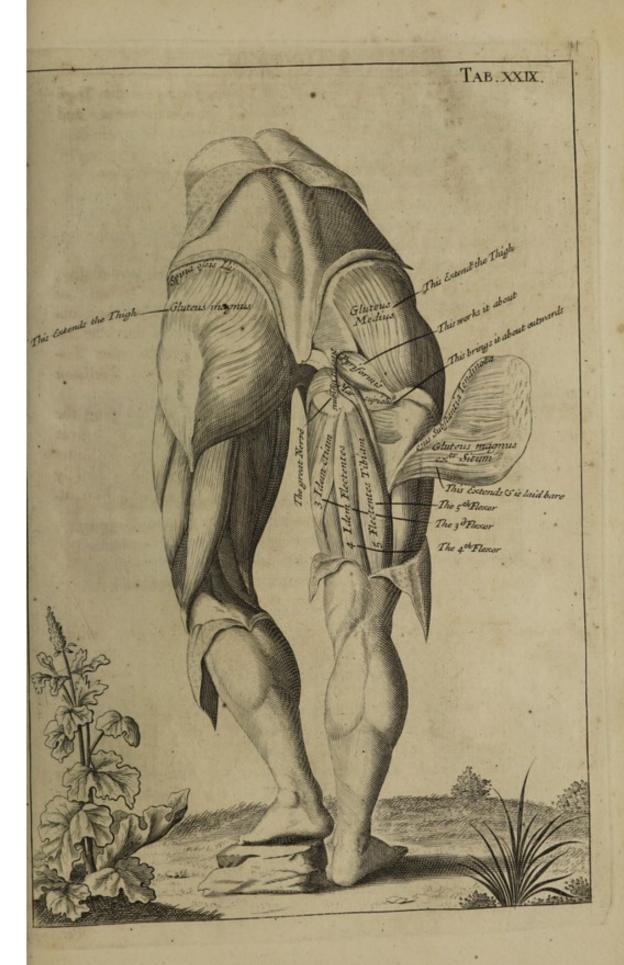
This Muscle is an Assistant to Triceps, and by bringing the Thigh inwards, it proves of great Use in Riding, in a great measure keeping the Horseman close to his Saddle; by some it is allowed as a part of the Triceps, tho' it doth not so closely adhere to it, but that it may with ease be separated from it.

This you have at Tab. XXVIII. in its place, and at Tab. XXXI.

Glutæus Major.

This pulls the Thigh directly backwards.

THIS is the first and largest of the three Extensors, which with the others do make up the sleshy Mass of the Buttocks, whence it has its Name; the Skin being laid bare, they all readily shew themselves, and this especially with a broad and semicircular Beginning, enated from diverse Bones, it arising tendinous from a great part of the Spines of the Os Ileon externally, and then thick and sleshy from the back part of the Spines of the Os Sacrum laterally; and thirdly from the Os Coxendix large and sleshy, running obliquely downwards over the Juncture of the said Bone; and then growing narrower, is implanted by a strong and broad Tendon, into the first Impression of the great Trochamer, and part of it also into the Linea Aspera, on the back part of the Os Femoris, beneath the aforesaid great Trochamer, and is said to pull the Thigh directly backwards.



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Pet. Borel. in Obs. 86. Cent. 2. tells us of one, who being troubled with a large Tumour, and great Pain in his Thigh, had many Medicines applyed to him without success; which Tumour being opened with the Actual Cautery, a plenty of matter was discharged thence at the first dressing, and afterwards several Frustules of concreted matter, with little Globes of Hair, small Frogs, and a Pea with its Shells, contained in it; all which being removed, the Patient recovered, and his Wis cer cicatrized; his Case being by some supposed natural, altho' by others thought to be done by Magick, or Witchcraft.

This you have at Tab. XXIX. in its place, and laid bare.

Glutaus Medius.

HIS being lodged under the tendinous part of the for This affilts mer Muscle, and being much like it in its Situation and in Extensions Make, doth arise fleshy from near the whole outward part of the Spine of the Os Ileon, as also broad and semicircular, and obliquely descending, does narrow its self, enwrapping the Toynt as the former, and is inserted by a nervous, broad and ftrong Tendon, to the upper and outward part of the great Trochanter, drawing the Thigh upwards and inwards, as some suppose, whilst I humbly conceive it doth contract, and affift the former in depressing of the Os Femoris.

This you have at Tab XXIX.

Glutaus Minimus.

HIS lodging under the former, being less than it, as the This extends second is smaller than the first, doth also arise like it, as the former. both broad, semicircular and fleshy, from the back part of the Os Ileon, and is inserted with a large and strong Tendon, into the upper and inner part of the Root of the great Trochans ter; this assisting both the former in all their Actions, its Fibres carrying in them the same Series with those of the former; and I do humbly conceive, they do all agree in pulling the Os Femoris downwards and backwards, after it has been raised up by the Psoas and Iliacus Internus, as I have formerly thewn.

Hiftory.

Ppz

Thele

Ule.

Observat.

These three are commonly called the Cushion Muscles upon which we sit, and all of them joyntly assisting each other in extending the Thigh; as they are fastned above either to the Os Ileon, Sacrum, and Coccix, and are inserted either a little beaneath, or into the great Trochanter of the Thigh, which being less ponderous than the Trunk, is more easily moved, than the other more fixed and heavy Bones; because the Thigh Bone playing in a Socket, may be easily deprest in Extension by the Glutai, which being contracted and abbreviated, do pull the Thigh downwards, and cause it to be made more streight in progressive Motion.

This you have at Tab. XXXIII. laid bare.

Pyriformis, or Iliacus Externus.

the Thigh a- bout.

IT has its first Name from its Figure, and Iliacus Externus from its site; it ariseth thick, round, and sleshy from the three lower Vertebres of the Os Sacrum, and marching obliquely to the great Sinus of the Os Ileon, is inserted by a round Tendon into the sourth Impression of the great Trochanter, bringing the Thigh upwards and outwards; and considering its bigness, it is allowed one of thickest Muscles in the Humane Body, and is stuft up with variety of Fibres.

This you have at Tab. XXIX. and at Tab. XXX. it is laid bare, and at Tab. XXXIII. you have the same again laid bare.

Obturator Internus, or Marsupialis.

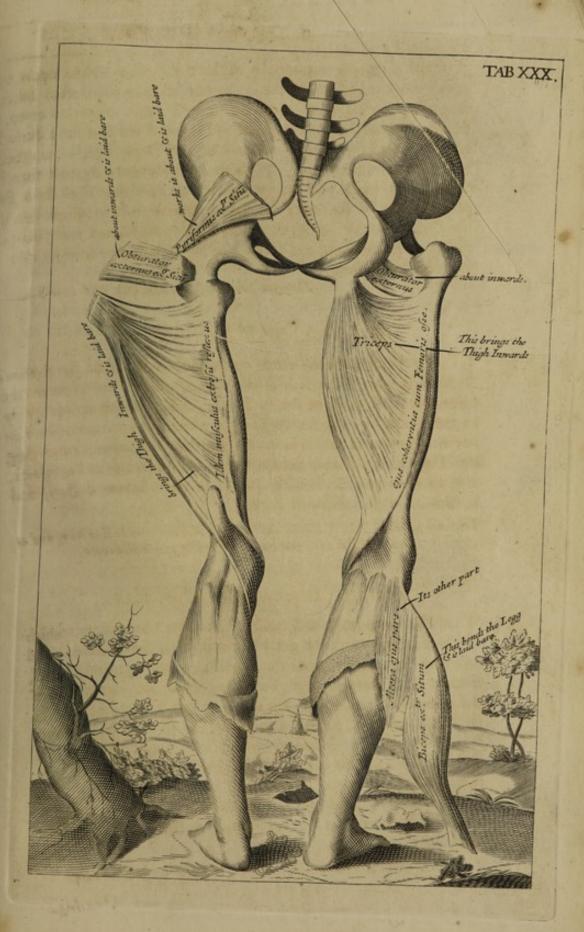
This brings the Thigh 2bout outwards

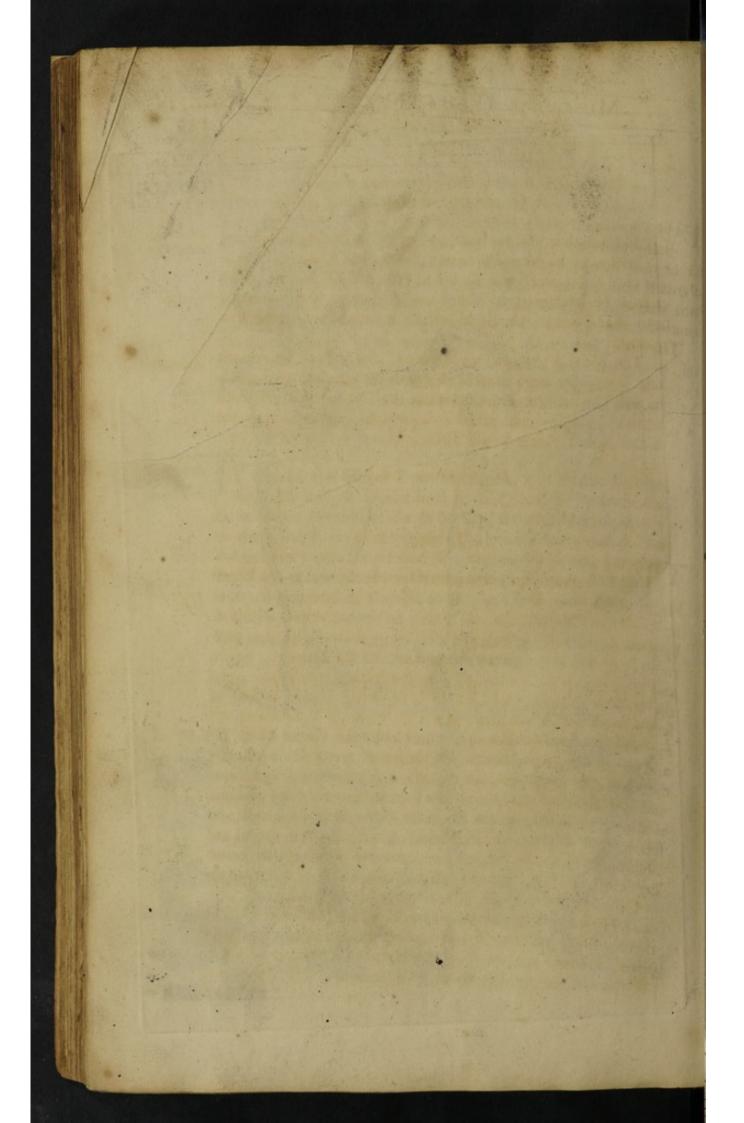
THIS ariseth large and sleshy, from the Membrane which internally covers the great Perforation of the Os Pubis; and covering that Bone, and the Coxendix, doth narrow its self, sending forth three or four Tendons, which are carryed thro the Sinus of the Coxendix, which is arched over according to its length with a strong Ligament, backwards to the outward part of the Coxendix, where they are received into a slessy Purse; and so making one Tendon, are implanted into the Sinus of the great Trochamer.

Observat.

This Muscle must be raised inwards, where having got thro' the Sinus, under the Ligament, you will plainly see the Purse shew its felf.

This is shewn at Tab. XXIX. and at Tab. XXXIII. it is laid bare.





Quadratus Femoris.

HIS hath its Name from its Figure, it arising broad and This brings fleshy from the rising of the Os Ileon, and from the Appenie bout backdix of the Coxendix, and doth run broad, short and fleshy towards the back part of the great Trochanter, and is inferted into that Space of the Bone, which is between the two Trochanters.

The Head of Lividus, and a part of Triceps must be thrown off, before the beginning of this will be cleared, or the Obturator Externus found out. Vesalius doth divide this into two Muscles; this is also called Quadragiminus, and you may see it carries that Name in my Table.

Annotat.

This you have at Tab. XXXIII.

Triceps.

THIS hath its Name from its three Heads, and is the largest Muscle of the Thigh, it apparently discovering its three the Thigh in-Heads or Originations, all which do conclude and terminate in one; its first and largest Head being partly sleshy, and partly nervous, ariting from the Appendix of the Coxendix; where tumifying, it dilates its self into the back part of the Thigh; and then growing small, ends in a strong round Tendon, at the inner and lower Head of the Os Femoris; the second arifeth fleshy from the Coxendix, at its Conjunction with the Os Pubis, and doth terminate at the Root of the lesser Trochanter, and in the upper part of the Apera Linea of the Thigh Bone; the third arileth fleshy from the lower part of the Os Coxendix, and is implanted into the Linea Alba of the said Os Femoris: This is allowed a riding Muscle, bringing the Thighs inwards, and fixeth the Rider to his Seat, and may well enough be called Musculus Pudicitia, it being affisted by Lividus in keeping the Legs close.

I shall here infert an Observation, which happied in St. Thos Observat. mas's Hospital, in one Thomas Lowdal, a Patient of mine once there with a fractured Thigh; who being a Servant to a Carpenter, and imployed in his Majesties Service at the Tower, and

being there at work on the Top of the House, fell thro' the Toice three Stories high, and broke his left Thigh Bone in feveral Pieces; for the Cure of which, he was fent thither by the Right Honourable my Ld. Lucas, chief Governour thereof; and being my Taking in week, he became my Patient; his Thigh was very much tumefyed, and his Thigh Bone came thro' the Fleih, he had continual Pain, and Impostumations dayly arifing thence; all which, with good Fomentations, and other warm Dreflings were fo much lefned, and fo far abated, that we endeavoured to reduce the fractured Bone, but could not; it readily flying out again upon our dayly opening him; at length the whole piece of Bone exfoliated the length of three or four Inches at the least, which being removed, with several small Splints of Bones, which were afterwards discharged, his Thigh dayly abated of its Swelling, and a callous reacht down from the upper to the lower part of the Bone; and by keeping it all along well extended, the Callous thickned and hardned, fo that in about fix Months time he began to get up, and arrived at greater Strength dayly, and bore upon his Leg very well, and when he was discharged the House, his fractured Leg was not seen to be above half an Inch shorter than his other.

This you have at Tab. XXX. in and out of its place, and also as Tab. XXXI. and at Tab. XXXII.

Obturator Externus, or Marsupialis.

the Thigh a-

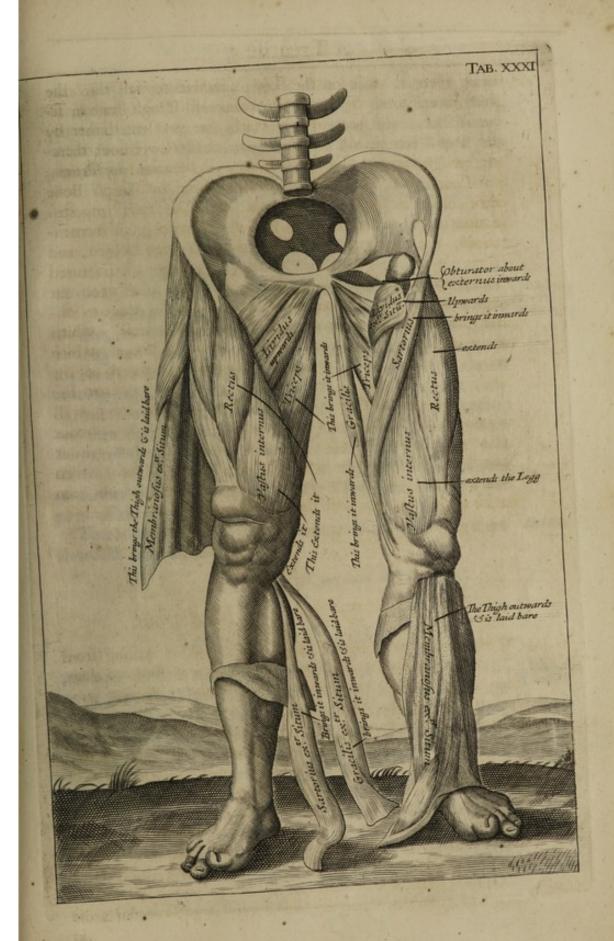
This works THIS hath its Name from its Situation, it arising from the outward part of the Cavity, between the Os Ischium, and the Os Pubis, lying under the Pettineus, it arifing large and fleshy from the Membrane that enwraps the Perforation of the Os Pubis outwards, and then transversely marching to the back part of the Thigh, (becoming narrower) is inferted by a strong Tendon into the Sinus of the great Trochanter of the Thigh Bone, near the Termination of the Triceps, and and doth turn the Thigh inwards.

Annotat.

You must carefully bring your Knife inwards about the edge of the Perforation of the Os Pubis, then this will plainly appear, and shew its Origination,

History

Marcel. Donat. Hift. mirab. Lib. 4. Cap. 30. Writes of a Wo= man, who after her lying in, had a very large Tumour arose



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her Thigh, which dayly encreased in bulk; after the Applia cation of diverse suppurative Medicines, the Tumour being opened, out of it was discharged a white Stone, the bigness of a Hens Fgg, which being removed thence, the Patient Soon recovered, &c.

This you have at Tab. XXX, XXXI, XXXII, and XXXIII.

Membranofus.

HIS hath its Name from its membranous Expansion, This brings it arising sharp and fleshy from the upper Spine of the Leg outwards Os Ileon, to that fide near Sartorius, where it turneth into a very long and broad Tendon, not much unlike the transverse Ligament; and is therefore called by some Fascia lata, it almost enwrapping all the Muscles of the Thigh in it, and not only so, but those of the Patella and Focils, in their outward parts, and then doth joyn its felf with the Ligamentum Amulare, which keeps in the Tendons of the Toes and Feet, as some will have it, whilst others as readily say, that this Fascia lata goes no farther than the lower part of the Thigh Bone, or the upper parts of the Focils.

This Muscle doth affift the Legs in extending, by bringing them Annotat.

forwards and outwards.

This you have at Tab. XXXI.

Sartorius, or Fascialis.

IT hath its first Name from its use, and the other from its This brings croffing the Thigh like a Swathing Band, in keeping the rest of the Muscles aright in their places; it ariseth with a sharp and fleshy Beginning from the fore part of the Spine of the Os Ileon, near the former Muscle, and running obliquely inwards over the Muscles of the Thigh, it becomes tendinous in its Passage over the inner and lower Head of the Os Femoris, and is inferted by a broad Tendon, (as some Authors affirm) and round, (as others write) below the upper Head of the Tibia: Riolane writes, that this brings the Leg inwards, and therefore thinks, that it tather extends it.

This you have at Tab. XXVIII. & at Tab. XXXI. in and out of its place.

Gras Qq2

Gracilis.

the former.

HIS has its Name from its Make and Shape, it being a very slender Muscle, lying next the former; it arising parts ly nervous, and partly fleshy from the middle of the Os Pubis internally, between the first and second Heads of the Triceps, and growing narrower in its streight descent, in the infide of the Thigh, doth then become a round Tendon, at the inner Head of the Os Femoris, it inserting its self into the Tibia next the former; this affifting it in its Contraction, and bringing the Thigh and Leg inwards.

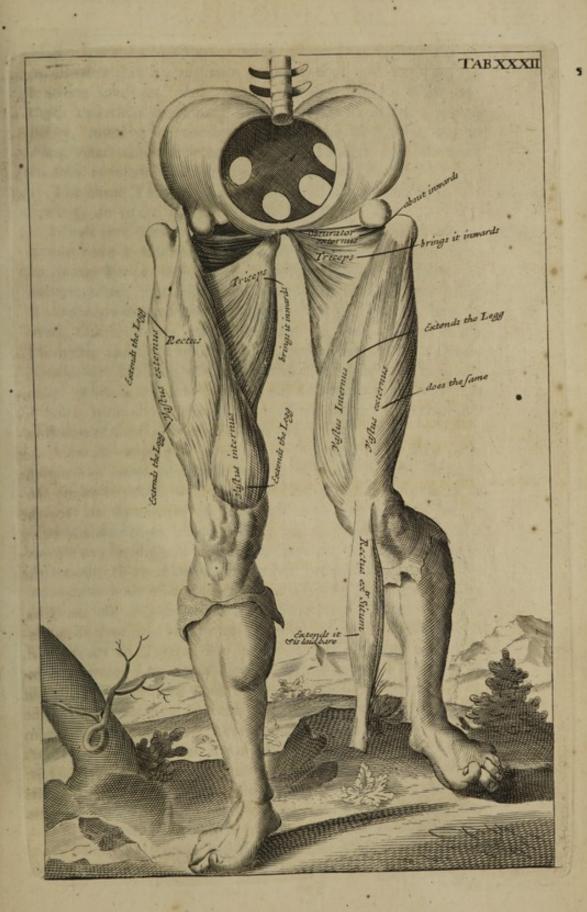
This you have at Tab. XXXI. both in and out of its place. e Minfels of the Third in it, and not only

to their outware parts, Seminervosus.

the Tibia backwards.

er and ire, as fome will This bends A T the outfide of the Thigh Bone at its Head, arifeth a Ligament, which binds both the Thigh and the Leg together; and in the Tibia, as well as in the Cubite, Nature hath planted two Bones, which by us Surgeons are commonly called Focils, or Tibia, and Fibula; the Tibia being inwardly hollowed, hath an Appendix at either end, the upper being larger than the lower, and furnished with a Prominence parting the two Sinus's, which are well guarded with a cartilaginous Margent, causing the Sockets to have a deeper Impression, for the more firm Articulation of the Knee; the inner Appendix being much less than the former, and allowed a Protuberance growing on the infide of that Bone, which we generally call the inner Ancle Bone.

The Fibula does not climb so high as the top of the Tibia, but hath allowed it its proper Appendix, which has a Sinus insculpt in its inside, into which a small Protuberance is receiv'd. And to the Fore part of the Knee, a round Bone is affixt, commonly called the Patella, or Knee-pan, which is not tyed to it by any Ligament, but only strongly fastned thereto, by the Tendons of Muscles passing over the Joynt of the Knee, from the Thigh Bone: Having giving this short Account of the Bones belonging to the Leg, we now come to treat of its Muscles: One of which, is this we are now describing, which takes its



and the same of the same Constant of the constant of th A Shou Lib the state of the s

Name from its Substance, being allowed either nervous or membranous, or if you please, partly nervous, and partly flethy, it arising small and nervous from the same Appendix as the former, and then continuing so half way in its descent, grows fleshy, running by the back part of the Os Femoris, to the Ham, near which it becomes a round Tendon, and reflecting its self, is inserted into the Fore-part of the Tibia.

The three Tendons of these three Muscles, and these fol- Observat.

lowing, do make up the inward Ham-strings.

I shall here insert the other Observation of Monsieur de Blegny, History. as you have it under his own Hand; of a poor man who came to be my Patient in St. Thomas's Hospital, whose left Ham was so contracted, that for near twenty years he could not bring it down lower than his other Knee, and yet I cured him so well, that for some years he became my Skillet Carrier in the Hospital, and since which I understand he sets up for a Country Practitioner, walking as streight with that Leg as with his other; altho when I first saw him he had a Cancerous Excrescence that reached from above the Calf of his Leg, and prest on the great Tendon of the Gasterocnemius even to his Heel.

Je vis par occasion au mesme lieu un fort grand Ulcere a La Jambe gauche d'un homme partie posterieure & inferieure, que Mr. Browne me dit' avoir succedé a L'amputation d'une excroisance charnue de la

grosseur de deux poigns qui contragnoit auparavant de telle sorte le Tendon d'Achilles que le malade portoit toujours sa jambe en L'air a la bauteur du genovil opposé: Mais, les Caustiques, les Catheretiques, les Suppuratifs, & les Mondificatifs que Mr. Browne avoit mis en Usage depuis environ une Mois avoint tellement dissipé la Tumeur & de chargé la partie, que Malade pouvoit alors Mettre son pied à terre avec asses de facilité pour faire prejuger qu'ill pourroit s'appuyer d'essus apres la Cicatrifation de L'ulcere, dans le fond du quel on ne voy oit plus de

chair fongeuse; Lors que la Chyrurgie est pratiqué de la sorte, elle est un grand Ornament dans L'art de guerir. Thus translated,

I law by accident in the same place a very large Ulcer, on the left Leg of a Man, coming from behind the Calf thereof, reaching down near to the Heel, which Mr. Browne told me did arile from a Cancerous Excrescence, the bigness of two Fifts, which did press so hard upon the great Tendon, that the Patis ent was forced to carry his Leg as high as his right Knee, but by the Causticks, actual Cauteries, Suppurating and mundifying Mediemes, which Mr. Browne had used for near a Month, he had so disperst the Tumour, and so discharged the Fungus, that the

Patient could fet his Foot upon the Ground with great ease, that we could easily foresee he would speedily stand upon it, the Ulcer being cicatrized, and the Fungus being discharged: When Surgery is practised in this manner, it is a great Ornament to the Art of Healing.

This you have at Tab. XXIX. by the Name of the third Flexor. and at Tab. XXXIII. both in and out of its place.

Semimembranosus.

This Contracts the Leg.

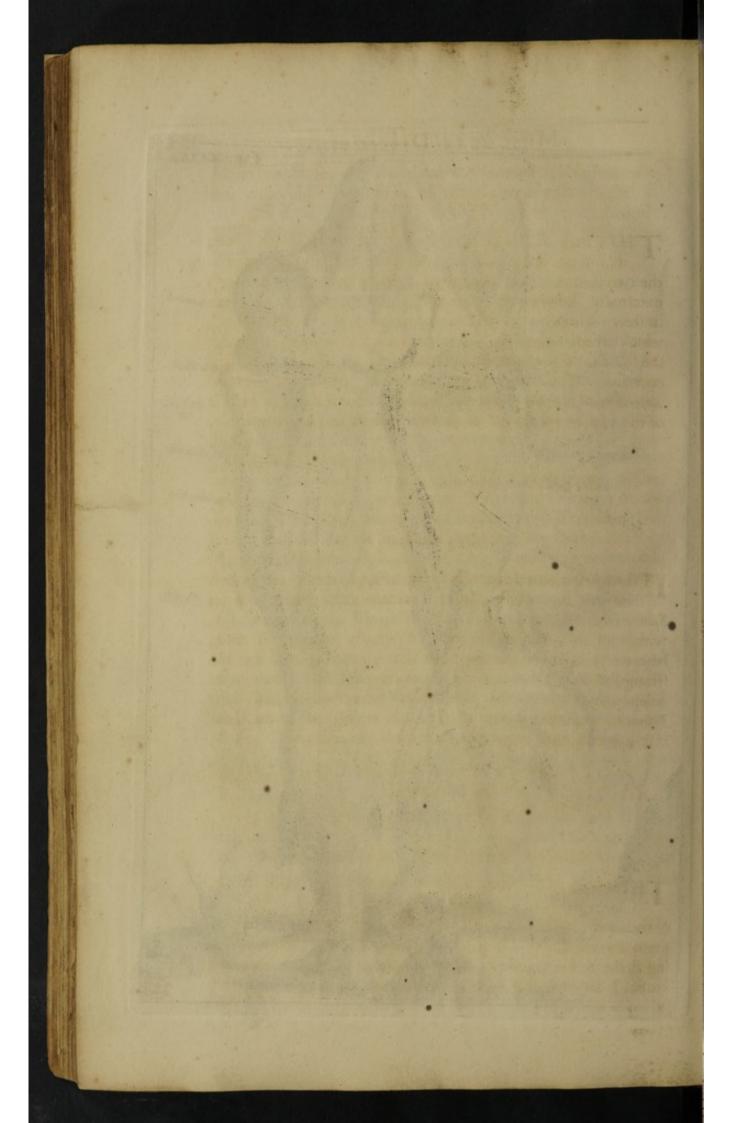
THIS hath its Name from its membrane-like Substance laying just under the former, it arising broad and membranous with it, and running downwards from the Protubes rance of the Os Ischium, where growing broader, doth still continue membranous near half its Progress, and after growing slessly, and thick, and then getting under the round Tendon of the former, does afterwards make a short and thick Tendon, which inserts its self into the inside of the Tibia; the slessly of the former Muscle lodging above, and this just lying underneath, have their Tendons quite contrarily distributed and disposed.

History.

I shall here relate another Case of a Patient of mine, when I belonged to St. Thomas's Hospital, which is as followeth: One Peter Palsey, a very able Seaman, being at the round top of the Ship, unhappily fell from thence into the Hold, and fractured his left Leg all in pieces, and being fent to St. Thomas's Hospital, he was my Patient there, out of whole broken Leg, I took near forty splints of Bones, at several times, and besides these, there came out thence a very large piece of the Major Focil equalling a Hands breadth; he having a continual pain on him, this occasioned a symptomatick Fever, which wafled him to that degree, that many times he despaired of recovery, all which being abated by the Dr. of the faid Holpis tal, and afterwards by vulnerary Decoctions, and other convenient Drinks inwardly taken, and proper outward Medicines being applyed to him, I at length made him fo well, that no one could by the Frame of his Leg, see, which had been fractured; for which Cure I had the particular Thanks of the Governours then attending.

This you have at Tab. XXIX. as the fourth Flexor, and at Tab. XXXIII. you have the same both in and out of its place.





Biceps Femoris.

THIS hath its Name from its two Heads, or Originations; it arising sharp, and nervous from the same Appendix as trasts the the two former; and then growing fleshy and large in its march externally downwards, and having got near half its progress, is feen to narrow its felf; and joyning with the other Head, which ariseth from the Linea Aspera of the Os Femoris, where the Glutaus Major hath its Infertion, and growing thicker, tho' outwardly Tendinous, as it marcheth in a Channel in the outward Appendix of the Os Femoris, it firmly ties its felf to the outfide of the upper Appendix of the Fibula, with its tendinous Infertion.

This you have at Tab. XXIX. as the fifth Flexor, and at Tab. XXX. it is laid bare, and at Tab. XXXI, and Tab. XXXIII. its

Rectus Femoris.

shewn both in and out of its place.

TT hath its Name from its streight Progress, and carries in it This extends the true Figure of a Muscle, it arising sleshy from the lower the Leg. Spine of the Os Ileon, and running along the length of the Thigh, with its thin and fleshy Belly, it wholly becomes Tendinous, before it reacheth the Patella, where it expands its self into a strong broad Tendon, entirely covering the said Patella; and being joyned with the Tendons of Vastus Externus, and Vastus Internus, is inserted with them to the upper part of the Tibia, at a prominence there provided for its Reception.

> This you have at Tab. XXIX. Tab. XXXII, XXXII. both in and out of its place.

Vastus Externus.

THIS takes its Name from its great Mass of Flesh, it ari- This extends fing outwardly nervous, and inwardly fleshy from the the Leg. outward part of the great Trochanter, and joyning himself to the outward, and upper part of the Os Femoris, and descending fleshy to the Patella, it next becomes a membranous and broad Tendon; and mixing it self with the Tendon of Rectus;

does farther promote the making a stronger Covering for the Patella, it carrying the fame Infertion with it.

This you have at Tab. XXXI, XXXII. in its place.

Vastus Internus.

This works as the former.

HIS hath the fame denomination with the former from its largeness, it having a vast Beginning, partly nervous, and partly fleshy, it arising tendinous from part of the lesser Trochanter, and from the Neck of the Os Femoris; then growing fleshy, it joyns to the fore and inner part of the said Bone, and recovering the Patella, mixeth its Tendon with that of the Rectus, and the former Vastus, covering it, and having the fame Infertion with them.

The second Model of the fore Limb, in order to progressive Motion, is transacted by the joynt Tension of all the parts of the Limb; the Thigh being extended by the Contraction of the Glucai; and the Leg at the same time being brought forwards, by the Motion of Membranosus, Rectus, Vastus Externus, Vastus Internus, in which the Foot is brought to an accute Angle with the Leg, and to an Obtuse one with the Foot.

This you have at Tab. XXXI, XXXII.

Suppoplitaus.

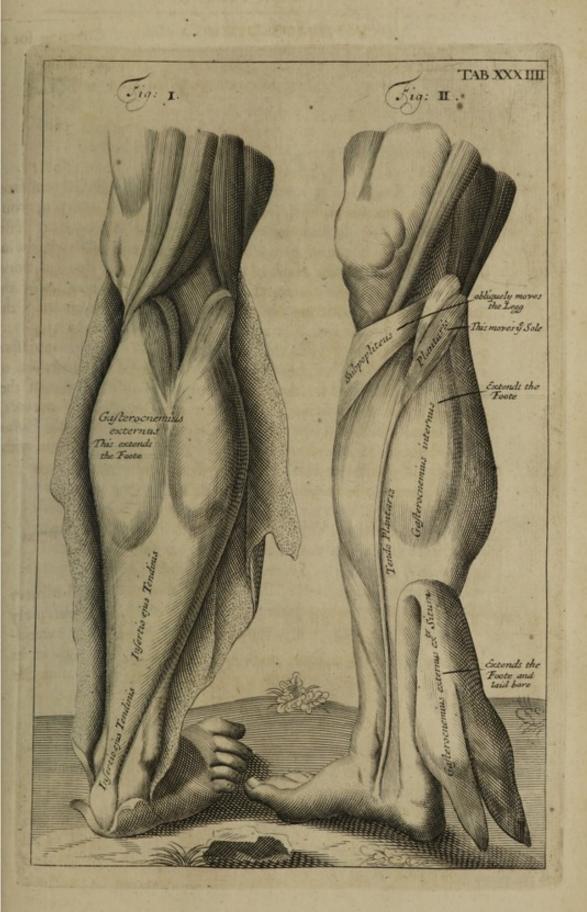
This brings the Leg obliquely.

THIS ariseth with a short and strong Tendon, from the lower and outward Extuberance of the Os Femoris, and obliquely marching over its Juncture, does become fleshy; then extending its felf, is inferted into the upper part of the Tibia, in its infide a little beneath its upper Appendix, and doth affift the former Flexors in contracting the Thigh.

This you have at Tab. XXXI, XXXII. in their places.

Gasterocnemius Externus, or Gemellus.

is extends THE Foot is allowed to be ogravor ut Bahrov, or Instrumentum Amo bulatorium; and as Man, who is granted the wifest of all Creatures, has Hands given him as his chiefest of Organs to Work



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work with, so has he given him also two Feet to walk upright, and view the spangling Heavens, and admire the won't derful Works of his Great Creator in thus wonderfully fra-

ming him.

This has its first Name from the Greek Word Gaster, or Belly, and by some it is called Sura, quasi consuit Tibiam Femori, by some called the Calf of the Leg, which no other Creat ture but Man hath the like Mass of Flesh allowed it, on the back part of its Leg, and Gemellus from its double Originatis on: The Foot we generally allow to be made of a Tarfe, Metatarse and Toes, and the Tarse has 7 Bones allow'd it, as the Astragas lus, Naviculare, Os Calcis, Os Cubeiforme, and the other generally called either Innominata, or Cuneiformia, from their Figure ! The back part of the Talus is hollowed, we see, for the reception of the Tendons of the Muscles; and the Metatarse being made of five Bones, are separated each from other, to make room for the Interoffeal Muscles; this Muscle ariseth broad and fleshy, from the inner Head of the Os Femoris, having a different Set of Fibres allowed it, as also from the outward Head of the same Bone, and by some is taken for two proper Muscles, having in their descent, two large fleshy Bellies; then marching towards its Infertions, are joyned to each other about the mid-way, where they become one entire strong and nervous Tendon; and upon narrowing its felf, doth intermix its felf with the Tendon of Gasterocnemius Internus above its Insertion into the Os Calcis, making one strong Muscle with a double Origination: Riolan faith, that there are two Sesamoidal Bones found at the two begins nings of this Muscle, this being not only allowed an Extensor of the Foot, but is very affifting in pulling it backwards.

This is shewn at Tab. XXXIV. Fig. II. laid bare with both its Heads.

Plantaris.

THIS takes its Name from its expanded Tendon, which it This moves fends into the Sole of the Foot, it arising fleshy, round the sole of and slender under the former, from the upper and back part the Foot. of the lower Appendix of the Os Femoris, and then obliquely descending between both the Gasterocnemii, it becomes a strong flat Tendon, and passing along between these their sheshy Bellies, by their broad Tendons, does run over the Os Calcis, and Aretcheth its felf over the Sole of the Foot, firmly adjoyning

Ulfe.

to the fleshy part of the Perforatus, and is afterwards inserted on both sides, to the first Internodes of the Toes.

This Muscle is allowed the same Service to the Foot, as

Palmaris is to the Hand, in extending it.

Gemma Cosmogrit, Cap. 8. writes, that he saw in the space of three Hours time, a Mortification, which had marched from one great Toe of the Foot up to the Belly and Bowels.

This you have at Tab. XXXIV. Fig. II. and at Tab. XXXVI. Fig. II. it is laid bare.

Gasterocnemius Internus, or Soleus.

This extends

THIS is implanted under the two former Muscles, and hath the Name of Soleus, from the likeness it hath with a Soleus Fish; it ariseth from the upper and back Commissures of the Tibia and Fibula, being livid, strong and nervous, from the backward Appendix of the Fibula, and growing larger and more sleshy, it joyns its self to that and the Tibia, and descending near half its progress, doth narrow its self, and becomes tendinous, making one with the Gasterocnemii Externi, both in its Origination and Insertion.

Annotat.

These three Muscles are all united in their Terminations, forming one very strong Tendon, implanted into the back part of the Os Calcis, which by reason of its largeness, and singular Strength, above the Tendons of other Muscles, does gain the Name of Chorda magna, which being bruised and wounded, (as Hippocrates writes) proves very dangerous, if not mortal, and this part also being any wise inflamed, soon runs into Mortification.

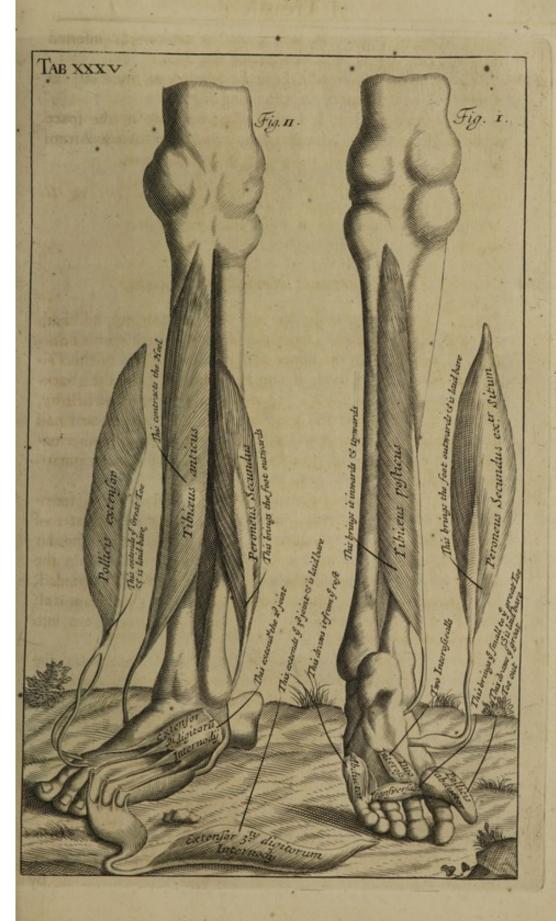
Ulfe.

These three Muscles contracting themselves, do relax the Tibialis, and Peroneus Secundus, when they have drawn the Foot upwards, and do also extend the Tarsus, by reducing it to a streight Position; making then direct Angles with the Leg.

History.

Altho' Hippocrates tells us, that wounds here hapning, proves very dangerous if not mortal; to prove the contrary, I had a Patient not long fince, some few miles distant from London, who fracturing his Leg by a fall from his Horse, near the Joynt; when I came to him, he had several Mortificastions on the parts, but one more particularly arising on the great Tendon, which I removed by the help of Escaroticks,

by



Mary and a special of the The state of the s the state of the s chime the contract of the cont THE RESERVE OF THE RESERVE OF THE PARTY OF T by the Application of which, the Gentleman became freed of them, and was afterwards relieved as to his Fracture, and walks now very well with it, his Leg being somewhat shorter than the other, which was occasioned by the former Surgeons neglect, in not keeping it extended, and in a good Posture, while the Bone was a knitting, as I told him, when I first saw it.

This you have at Tab. XXXIV. Fig. II. and at Tab. XXXVI. Fig. I, II.

Tibialis Anticus.

HIS hath its Name from its Situation, it arising sharp the Heel. and fleshy from the upper Appendix of both the Focils, and closely adhering to the sides of the Tibia, and to the Ligaments which binds them together; then being dilated, grows narrower about the middle of the Tibia, where it makes a strong and round Tendon, which runs obliquely over the said Tibia, and under the Ligament of the Foot; and is implanted into that infide of the Os Tarfi, that is before the Os Pollicis; and sometimes under the same Ligament of the Foot, being divided into two Tendons, one of which is inferted into the Os Primum Innominatum, the other into the aforesaid Bone of the Os Politicis of the Metatarle.

This Muscle, as I do conceive, governs the Foot in its Motion, in keeping it from squailing too much outwards.

Valleriola, Lib. 3. Enar. 8. writes of one receiving a slight Wound in her Heel, who dyed within 17 days after it.

This you have at Tab. XXXV. Fig. II. and at Tab. XXXVII. Fig. I.

Peroneus Primus.

HIS Muscle doth arise nervous outwardly, and inwardly fleshy, the Foot outfrom near the upper Appendix of the Fibula, and in its de- wards. scent, doth adjoyn its self to its outward part, being outwardly round, and inwardly livid, and red next to the Bone, and having marched near half its Progress, it becomes a strong flat Tendon, running obliquely backwards thro' the Sinus under the outer Malleolus, and is inserted into the Root of the Os Metatarsi of the great Toe.

Ufe.

Hiftory.

This

This Muscle draweth the Foot somewhat outwards, and also governs it in progressive Motion, keeping it from being thrown too much inwards.

This you have at Tab. XXVII. Fig. I, II. it is laid bare.

Peroneus Secundus.

the former.

This affilts THIS by some is called Semifibulaus, and Peroneus à Perone Fibula, or the Minor Focil, it arising long and sleshy about the middle of the outward part of the Fibula, under the former, and having made half its Progress, it becomes tendinous, as it runs under the Malleolus Externus, and is implanted with its Tendon, and the Tendon of the former, into the Os Metacarfi of the little Toe, and lerves to bring the Foot and Toes outwards.

Annotat.

And as the Tibialis Anticus and this Muscle contracting themselves, do raise up the Tarsus from the Ground in progressive Motion, so the Gasterocnemii and Plantaris are said to relax the same also in their Contractions.

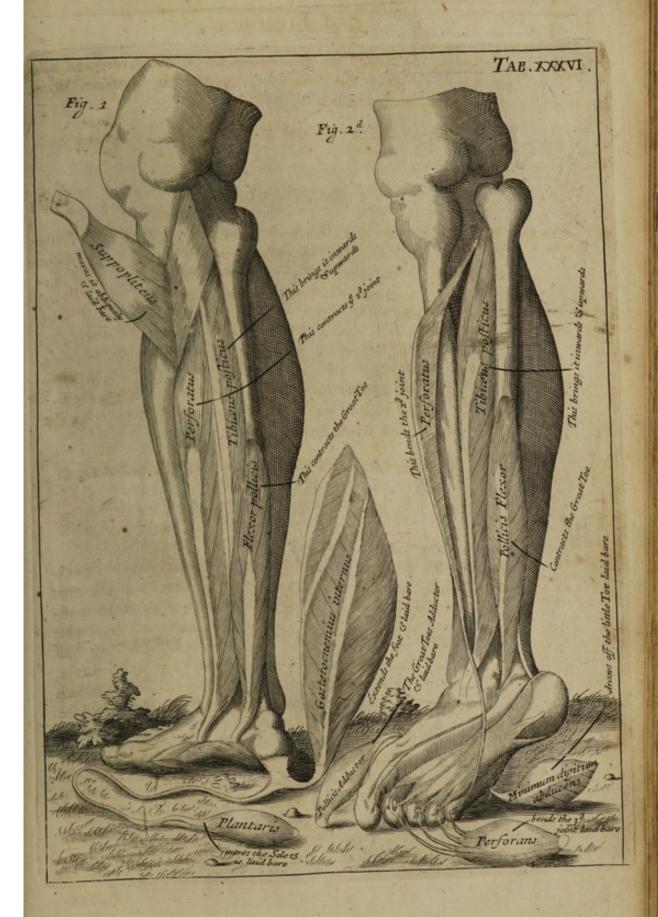
This you have at Tab. XXXV. Fig. I, II. and at Tab. XXXVII. Fig. I.

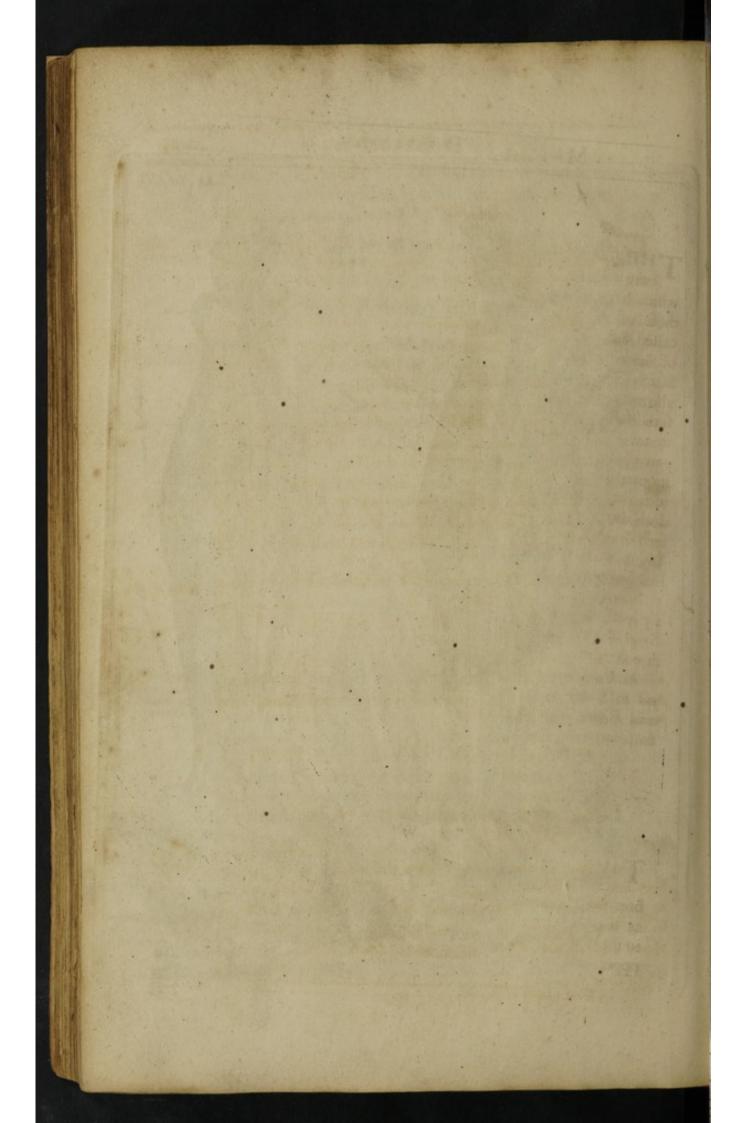
Tibieus Posticus, or Nauticus.

This brings the Foot in-wards and upwards.

IT hath its Name from its Situation, it being planted backwards, as also the Name of Nauticus, from the Use that Saylors make of it, in climbing the Shrowds; this ariseth partly nervous, and partly fleshy, from the upper and back part of the Fibula, as also near the Tibia; and having past near half its progress, it narrows its felf; and then growing fleshy again, is afterwards converted into a strong and round Tendon, which marcheth in a Sinus on the back part of the lower Appendix of the Malleolus Internus; where being bound by a strong Ligament, overspreading it, and recovering the Sole of the Foot, is inserted into the lower part of the Os Metatarfi, which joyns its felf to the Os Cubeiforme; and sometimes it hath been seen to afford two Tendons, one of which hath been implanted into the Os Naviculare, and the other into Os Innominatum.

This is shewn at Tab, XXXVI. Fig. I, II. and at Tab. XXXVII. Fig. II.





Extensor Pollicis.

HE Toes of the Foot, as well as the Fingers of the Hand, This extends are allowed three Sets of Bones, the great Toe excepted, which has only two; and the Tendons of the Foot, as well as those of the Hand have various small Bones allowed them, called Selamoidea, being much like the Selaminseeds, or Seeds of Indean Corn, they being very different both in Shape and Size: These Bones, as well as those of the Hands, are also moved by the Benefit of their Muscles; this Extensor arifeth fleshy from the outside of the Tibia, as Vesalius writes, where it parts from the Fibula, somewhat below its upper Appendix, and passing under the Annular Ligament of the Tarsus, in its progress along the upper part of the Foot, it inserts it self into the second Bone of the Great Toe, in its upper part, and doth directly extend the same; sometimes this Tendon hath been feen divided into two, one of which is inferted into the laft Toynt of the Great Toe, and the other in that Os Metatarfi, which lies under it:

Valleriola, Lib. 4. Obs. writes of a monstruous Boy, about 15 years of age, who had seven Toes in either Foot, and the Great Toe was double in each Foot, and had also fix Fingers in either Hand.

And M. Jansonius in Tom. 3. Writes of a Monster born, hore rid in View, with the Head of an Ape, with a long Beard, and Eagles Claws at the ends of his Fingers and Toes, who fo foon as he was born, dyed.

This you have at Tab XXXV. Fig. II. and at Tab. XXXVI.

Flexor primi & secundi Internodii Pollicis.

THIS ariseth sharp and fleshy about the middle of the back part of the Fibula, with a double Set of fleshy Fis the great Toe. bres marching along, then running themselves into a Tendon, as it passeth over the Joynt, and after that thro' a Channel in the inner part of the Os Calcis, is there implanted to the upper end of the second Bone of the Great Toe.

This is shewn at Tab. XXXV. Fig. II. it is laid bare, and at Tab. XXXVI. Fig. I, II. you have the same.

Hiftories

· Abductor Pollicis.

This brings the Great Tos inwards. THIS takes its Name from its use, it arising sleshy from the inner part of the Os Calcis laterally, and in its progress at the inside of the Foot, it becometh tendinous, and joyneth with another sleshy Origination at the Os Cuneiformie, both which making one Tendon, are inserted to the Os Sesamoides of the great Toe, drawing the Great Toe laterally from the rest.

This you have at Tab. XXXV. Fig.I. and at Tab. XXXVIII. I, II, III.

Adductor Pollicis.

This brings the Great Toe inwards-

THIS ariseth partly nervous, and partly sleshy from the lower part of the Os Cuneisorme, and enlarging its self to a round sleshy Belly, then grows less, and afterwards becomes tendinous, obliquely inserting its self to the latter and inner part of the sirst Bone of the Great Toe, bringing it towards the rest.

Hiftory.

Toe made of one Bone, it being an old mans, in whom by reason of his Sedentary Life, and want of Motion, the Ligaments of his Bones were all persectly turned oscal.

This you have at Tab. XXXVI. Fig. I. Tab. XXXVII. Fig. I, II. Tab. XXXVIII. Fig. I.

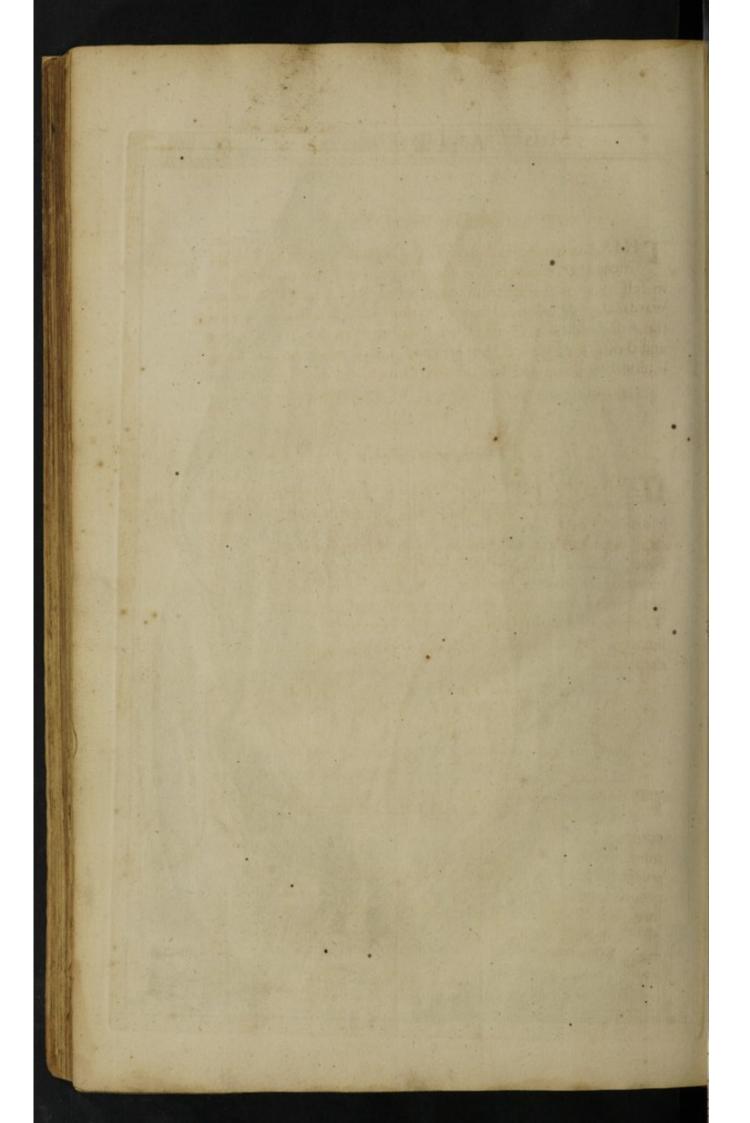
Extensor Digitorum Longus.

This extends the 3d Foyut of the Toes.

THIS ariseth partly nervous, and partly sleshy, from the upper Appendix of the Tibia, and then becoming sleshy, it joyns it self to the Ligament, that ties the Tibia to the Fibula, lesning its self in its progress along the Fibula; and marcheth under the Annular Ligament of the Talus, where it divides its self into four Tendons, which do terminate in the upper part of the third or last Joynt of the four lesser Toes, and the sistend them.

This you have at Tab. XXXV. Fig. I. and at Tab. XXXVII.





Extensor Digitorum Brevis.

HIS ariseth broad and fleshy from the transverse Liga- This extends ment that covers the top of the Foot, and then dilating the 3d. Form. its felf, it is divided into four fleshy Portions, which afterwards are converted into as many Tendons marching overthe first Internode of each lesser Toe to their upper Intertions, and they are planted to the upper part of the second Internodes, interlecting the Tendons of the former.

This you have at Tab. XXXV. Fig. I. and at Tab. XXXVII. Fig. II.

Perforatus Pedis.

T's so called upon its Tendons being perforated, and also Flexor Secundi Internodii Digitorum, from its Use and Situation, the Toes in the it arising fleshy from the lower and inner part of the Os Caleis, and having marched half way through the Sole of the Foot, it does divide its felf into four fleshy parts, which afterwards do become so many Tendons, being cleft or opened near their Terminations, for the admission of the Entrance of the Tendons of the following Muscle towards their proper Infertions, these reaching no farther than the second Internodes of each leffer Toe.

This you have at Tab. XXXVI. Fig. I, II. Tab. XXXVII. Fig. II. and at Tab. XXXVIII. Fig. I, II.

Perforans Pedis.

TT hath its Name from its Tendons passing thro' the former, it arising fleshy from the back part of the Tibia, then bes the Toes in the coming tendinous, is carryed to the inner Malleolus, and running under the Ligament that proceeds from the lower Appendix of the Tibia, to the Os Calcis, having arrived at half its progress through the Sole of the Foot, doth divide its felf into four Tendons, which passing thro' the perforated Tendons of the former Muscle, does terminate in the third Bone of every leffer Toe.

This you have at Tab. XXXVI. Fig. I. laid bare, and at Tab. XXXVIII. Fig. II. you have the same.

1 E2

Lums

Lumbricales, or Vermiculares Pedis.

These bend the Thes in the 1ft. foynt.

THey have their Names from the resemblance they bare with Earth-worms, both in their Make and Shape; as also Flexeres Primi Internodii Digitorum, from their Situation and Uses, they arising round and fleshy from the Tendons of the Perforans, being inwardly inferted by small Tendons into the first Joynt of the lesser Toes; but as I writ in my first Book on this subject, who ever well examines their Originations, will rather find they have their fleshy substance arising from a fleshy Mass, found in the Sole of the Foot, or from that Musculous Flesh which is implanted in the inner Cavity of the Os Calcis, it there appearing fleshy near half the Sole of the Foot, then becoming tendinous, does afterwards divide it self into four distinct parts, which do afterwards become Tendons, at their Infertions to the lesser Toes laterally.

> These you have at Tab. XXXVII. laid bare, and at Tab. XXXVIII. Fig. I, II.

Abductor Minimi Digiti.

This brings the little Toe from the reft

HIS ariseth nervous outwardly, and inwardly fleshy, from the outward parts of the Calcane Bone, and having attained half its progress, it becomes tendinous on the outfide of the Foot; and there adjoyning with its other fleshy part, which has its Origination from Os Metatarsi of the little Toe, they do make but one Tendon, and are inferted into the first Bone of the little Toe at its outside laterally.

This you at Tab. XXXV. Fig. I. Tab. XXXVI. Fig. II. Tab. XXXVII. Fig. II. and at Tab. XXXVIII. Fig. I, II.

Transversalis Pedis.

the fmall Toes to the greater

This brings HIS has its Name from its transverse Origination, and doth arife tendinons from the Os Sesamoides of the great Toe inwards, and then growing fleshy, is transversly carried over the first Bone of the great Toe, it bringing the leffer Toes towards ic.

The Author of this Muscle assigns it this Use, that upon drawing our great Toe towards our lesser ones, we make a Hollowness in the Foot, for the better securing our Feet in uneven places, this making our Steps more steady, it being formed like a Ligament to the Foot, to keep it from Adding afide, by drawing the Metatarfe and Toes, and fixing them to the Floor, which being affifted by Tibialis Anticus, and Peroneus Secundus, which moving fingly, the one is feen to carry the Foot outwards, and the other inwards; but when they act together, the Tibialis Anticus does keep the Foot from treading outwards, and the Peronaus Secundus prevents it from casting too much inwards, whilst this is held to give it a steadiness in binding or keeping down the first Internode of the Bone of the Toe, in form of a Brace; so that the Line of Gravitation being carryed from one Limb to another, is feen to support the weight of the Body, in order to a new Step in progreffive Motion, in which the hinder Limb becomes the fore, and the fore the hinder, which hath a double Carriage in order to motion:

> This you have at Tab. XXXV. Fig. I. Tab. XXXVII. Fig. II. and at Tab. XXXVIII. Fig. I, II.

Interoffei Pedis.

THese have their Names from their Scituations among the These move Bones of the Toes, they arising fleshy from the sides of liquely. the Bones of the Metatarse of the lesser Toes, and becoming round Bellied, do grow tendinous at their Infertions to the first Internode of every lester Toe laterally.

John Schenkius writes of Thomas Schweigker, about one and forty years Old, who was born without Arms, and performed many ingenious Tricks with his Toes; for with them he painted a Picture after the Life in a Silver Medal, by holding his Pencil between his Toes; and he shew a Copy so curiously writ with his Toes, and fet off with fuch fine Flourishes, that tew Writing masters could mend it; besides, he cast Account so dexteroully with Money, and with small Stones, that he outdid his Neighbours, and that with that admirable Dexterity, that he was the Wonder of his age.

Wonderful therefore is the Providence and Sagacity of Nature, which the Creator of all things has made as a Mother to us all,

History.

for She in all Creatures with distorted Members, with maimed, or debilitated Parts, and other Desects, hath designed these something beyond their natural Offices, and allowes them an extraordinary Dexterity and Strength, frequently purchased by long Use and Custom; as if one might say, their Persection doth not so much consist in the distinction of their Members, as in their continual use of them: Or as if Nature had made one to answer, and account in every respect for the other, or rather allowed him a Compensation of one for the want of the other, all which was as strange as pleasant to see; of whom were made these following Latine Verses.

Mira fides! Pedibus dextre facit omnia Thomas,
Cui Natura Parens Brachia nulla dedit:
Namg; bibit Pedibus, Pedibus sua Fercula sumit,
Volvit & bis Libros, præparat his Calamos;
Qui & Liturulas Pede tam hene pingere novit,
Artificis superet Grammata ducta Mamu:
Maximus hoc Cæsar stupuit quondam Æmilianus,
Donag; scribenti largus honesta dedit;
Omnia namg; potest vigilans Industria quodque,
Natura ipsa negat, persicit Ingenium.

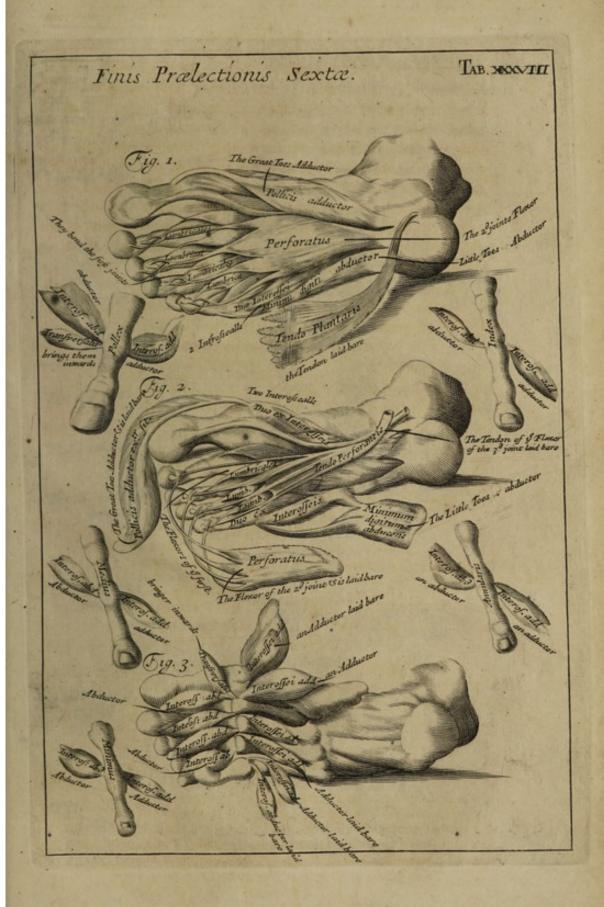
Which may be thus Englished:

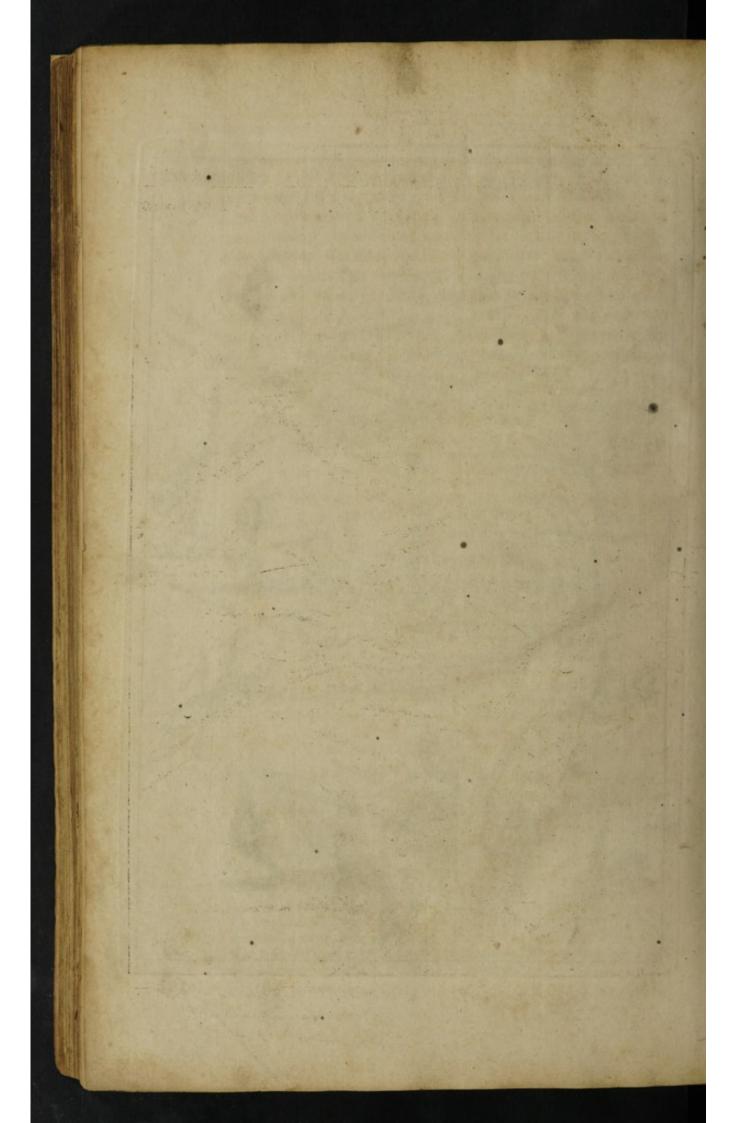
'Tis strange! What Thomas with his Feet performs, Who ne're from Nature had the Gift of Arms: With's Feet he drinks, with them he takes his meat, O'returns his Books, and makes his Pens with's Feet; Such Letters with his Toes he could command, As yet no Scribe e're finish'd with his Hand: This, mighty Cæ/ar with just wonder view'd, And with kind Gifts, the Artful Act pursu'd: 'Tis Industry can conquer all, and things Which Nature scruples, Art to Action brings.

This you have at Tab. XXXV. Fig. I. where you meet with Two Interosseals, and at Tab. XXXVII. Fig. II. you have two more, and at Tab. XXXVIII. Fig. II. IV. four others, at Fig. III. four Abductors and Adductors, and the two Interosseals of the Great Toe, and afterwards every one apart.

Thus I have finished this my Muscular Treatise, every Folio whereof presents us with a fresh repeated Theory of the Divine Goodness, in thus wonderfully contriving and forming all the various Muscles belonging to the Humane Body, and allowing them their several Uses and Offices, as the most proper Instruments and Machines of Motion and Act on: To whose Great Name therefore be ascribed, as is most due, all Honeur, Praise and Thanksgiving both now and for evermore, Amen.

FINIS.





The TABLE, shewing the Reduction of the MUSCLES, each to their proper Place, Use, and Part.

THE Forebead is lifted up by Frontalis.

The Hairy Scalp is drawn backwards by Corrugator and Occipitalis.

The Eyebrows, The Upper is { Lifted up by Elevator Palpabrae, Depressed by Clausor Superior, The Nether is lifted up by Clausor Inferior.

The Eyes are Rightly mov'd Superator, Downwards by Depressor, Inwards by Adductor, Outwards by Abductor;

Obliquely { Downwards outwardly by Obliquus Minor, Upwards internally by Obliquus Major.

The Nose is Solilated by Elevator, Dilatator, Contracted by Constrictor.

The Lips are Elevated by Elevator,
Drawn down fideways by Abductor,
Brought downwards by Depressor,
Purst up by Sphintler Labiorum.

The Cheeks are { Drawn down by Platysma Myodes, or Quadratus, Drawn inwards by Buccinator, or Constructor.

The Nether Mandible is drawn

Upwards by Temporalis, or Crotaphites,
Downwards by Digastricus, or Graphoides,
Laterally by Masseter,
Forwards by Pterygoideus Externus,
Backwards by Pterygoideus Internus.

The Ears are moved Externally Supported by Elevator, Downwards by Depressor, Forwards by Adductor, Backwards by Abductor.

Internally \{ \text{by Externus, or Laxator Externus,} \} \text{by Internus, or Laxator Internus.}

The Tongue is Posts by Lingualis,

Posts of the Tongue is th

moved

Backwards by Generation us,
Backwards by Hipfiloglossus,
Upwards by Myloglossus,
Downwards by Ceratoglossus,
Laterally by Styloglossus,

The Os Hyoides of Page 1 Downwards by Sternohyoideus, Downwards by Sternohyoideus, Obliquely Supposed Downwards by Coracohyoideus, Downwards by Coracohyoideus,

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The Palate is { Attolled by Sphænopalatinus, Depressed by Pterygopalatinus.
                       Dilated by & Sphanopharyngaus primus, Sphanopharyngaus secundus,
The Fauces are
                                        Oesophagaus,
                     Contracted by & Cephalopharyngaus, Stylopharyngaus.
             dilated & when the S Extended by Sternothyroideus, Crycoarytanoides Hyothyroideus,
                                                          Crycoarytanoides Lateralis.
                                       Contracted Directly by Thyroarytanoides, Obliquely inwards by Arytanois,
              fhut
The La-
 rynx is
                         while the
                                                  CRightly by Crycoarytænoides Posticus,
                        Arytanois is
                                      Extended Obliquely laterally by Crycoarytanoides
           opened (
                                                        Lateralis.
                   Contracted by { Mastoidaus, if both work, Laterally, if one works;
                                    Splenius, or Triangularis.
The Head is
                                   Trigeminus,
Recti Majores,
                  Extended by 2
                                    Recti Minores.
Turned about by { Obliqui Superiores, Obliqui Inferiores.
              Contracted by { Longus, Scalenus,
The Neck is .
                Extended by
                                                    Freely the Diaphragme alone con-
                                        Dilate in
                                                           tracted,
                                                      Coastively the Diaphragme and Out-
                                        Breathing _
                    Primarily by
                                                           ward Intercostals;
                   proper Muscles,
                                                       Freely the Diaphragme alone re-
                   which do
                                       Constringe in )
                                                            laxed.
                                        Breathing
                                                      Coactively the Diaphragme and In-
                                                             ward Intercostals:
The Thorax is
                  Extend- Semispinatus, ed by Sacrolumbalis, Postici.
    moved
                   Contracted by {Musculi Resti, } Abdominis.
                   Turned about by Transversi,
                 Secondarily by the { Contracted by Quadratus, Lumbal Muscles Extended by Sacer.
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Laterally & Obliqui Descendentes,
by Obliqui Ascendentes,
 The Abdomen | Forwards by Redi,
                    Downwards & Pyramidales, or fometimes by
                                    V Transversi.
                         by
 The Loins are { Extended by Sacer.
                     Contracted by Quadratus,
 The Testicles are raised by Cremasteres.
                  Retains by Sphineter Vefice,
                                   C Detrusor Vrina,
 The Bladder
                 Excreates by & Pyramidales,
                                   Cobliqui Ascendentes Abdominis.
 The Clitoris is { Raised by Musculi Graasiani, Depressed by Musculus Labiorum Contractor.
The Anus is Elevated by Levatores Ani.
                  Pursed up by Sphineter Ani,
The Penis is impro- S Erected by Erectores, or Directores, perly said to be Accelerated by Acceleratores.
                     Variously by Cucullaris,
                    Upwards by Levator Patientia,
 The Scapula is
                    Backwards by Rhomboides,
     moved
                     Forwardly upwards by Serratus minor,
                  (Forwardly downwards by Serratus major, & Antici,
                       Forwards by Pedforalis,
                       Upwards by { Deltois, Octavus Humeri Placentini,
The Os Humeri
                      Backwards by Rotundus,
    is moved
                      Is carryed about Part by Superscapularis Superior,

Superscapularis Inferior,

Nonus Humeri Placentini,
                        towards the
                                           (Internal Part by Subscapularis.
                                    Gemellus Major,
                  Extended by
                                  C Gemellus Minor,
                                    { Biceps,
Brachiæus,
                   Contracted by
                                     Quadratus.
                    Pronated by 2
                     Supinated by { Longus, Brevis.
                    Contracted by { Flexor Carpi Exterior, Flexor Carpi Interior,
                    Extended by { Extensor Carpi Exterior, Extensor Carpi Interior.
                                   { Flexor Primi, Flexor Secundi, } Internodii;
                   Contracted by .
The Fingers are & Extended by
                                    Secundus, Interoffei,
                                                  Extendentium Digitorum;
                                                                XXX
                                                                                        Moved
```

The Table.

1 - 10	
Moved Laterally by Abductor Minimi, Abductor Indicis.	
First, by \{Flexor primi Internodii, Flexor secundi Internodii,	
Contracted Secondly, by Flexor primi Internodii, Flexor fecundi Internodii, Secundus Secundus Tertius Ouartus Flexores Internodii,	
The Thumb is { Thirdly, by Tertii Internodii Flexor.	
Extended by \{ Extensor fecundus.	
Moved { Laterally internally by Adductor, Outwardly by Abductor,	
Extended Obliquely Forwards by Glut aus medius, and Glut aus minimus.	
The Thigh is 3 Directly by & Pfoas Magnus, Iliacus Internus; Obliquely by & Triceps, Lividus.	
The Thigh is & Obliquely by Lividus.	
Upwards by Pyriformis,	
Moved about Superator by Obturator Externus, Outwards by Obturator Internus, Backwards by Quadrigiminus, or Quadratus.	
Sartorius, Gracilis,	
Contracted by Seminervofus,	
Semimemor and as	
The Leg is 3 Membranofus,	
The Leg is & Membranofus, Extended by Rectus, Vaftus Externus, Internus.	
Wastus Externus,	
Obliquely moved by Subpoplitans.	
(is Extended by Gasterocnemius { Externus, Internus.	
The Ankle Contracted by ETibialis Anticus, Peronaus fecundus.	
Moved obliquely Lateral & Internally by Tibians Posticus, Externally by Peronaus primus.	
Contracted by Perforates in the Third Lumbricales in the First Joynt.	
The Four Leffer Extended by Secundi Internodii Tenfor, Toes are Secundi Internodii Tenfor, Tertii Internodii Tenfor. Obliquely moved by Interoffei, Minimi Digiti Abductor.	
Obliquely moved by { Interoffei, Minimi Digiti Abductor.	
CContracted by Flexor,	
The Great Toe is Contracted by Flexor, Extended by Tenfor, Obliquely moved by Abdustor. The Great Toe is Color Test one kept together by Transversalis Placentini.	
C Of the Sole of the Foot is moved by Plantaris,	
The Skin of the Palm of the Hand, by Plantaris, Of the Palm of the Hand, by Palmaris, Caro Musculosa Quadrata.	

Orlando Bridgman, Esquire,

SON of the Learned

William Bzidgman, Efquire,

One of the Clerks to His Majesty's most Honourable Privy-Council; Both Fellows of the R. S.

SIR,

HE Noble Thoughts of the Great Bernoullius, about Muscular Motion, command the Esteem due to their Worth, without any Name; except an Alloy of English, by none of the best Hands, may want Protection: tho' I'm convinc'd, that the Sence of this Paper will make it welcome from any-body that can give the World its meaning. All I pretend to do in this Address, is to shew; that I am glad of all Opportunities, even a Translation its self, to acknowledge the Obligations I have to your Family: but the rather, confidering the mighty Improvements you daily make in Mathematicks, and other parts of useful Learning, to recommend to you the reading of these Disquisitions; if at any time they may have escap'd your Sight, while you are comparing the Performances of the German Eruditi in their Acta Liplia, and the Journals des Scavans, with the Transactions of Our own Society: And I dare promise, you'll make Discoveries suitable to the Dissiculties of the Necessary Subject of this Sheet. But if the fermenting of the Animal Spirits with the Blood, in producing the motive Air, should prove too barsh to your nice Taste; it is but supposing such an Air (as is very reasonable) without the way of making it, and the demonstration will retain its whole force. I am sincerely,

Your most Affectionate

Humble Servant,
William Cockburn.

YY

THE

The Characters in use among Mathematicians, and that are brought into this Paper, are,

= The mark of Equality.

+ Plus.

- Minus.

:: Proportion.

M --- Multiplication-

Mathematical Disquisitions concerning Muscular Motion; communicated in the Lypswick Transactions by John Bernoullius M. D. at Basil.

157, Y Suppose, that the Fibres, which cause Muscular Motion, should represent a hollowed Cylinder, if they were divested of the transverse Fibrillæ, by which the said Fibres are divided into a multitude of Spaces, whose Cavities communicate one with t'other through the whole length of the moving Fibre, because of the loose union of the transverse Fibrils. 2dly, That there is a fort of agitation of the Animal Spirits in the Brain, when the Soul inclines that any one Member of our Body should be moved, so that by pinching the beginning of any Nerve, they force forwards the Spirituous Liquor contain'd in it; and by the same irritation of the beginning of the Nerve, a small drop of Nervous Juice is thrown out of the extream part of the adjoyning Nerve by this flight and easie Vibration; which nevertheless could not happen by any other means than an actual concussion, because the Spongy Substance of the Nerves supplies their want of a Valve. 3dly, When infinite numbers of drops are thrown, after this manner, out of the Orifices of the fmall Nerves through the whole body of the Mufele, (which is always bedew'd with Blood, like a Sponge) they do infinuate themfelves into the Blood, by being determin'd into its thinner Particles by the force of their fmall parts; by which the Blood is broke down into smaller Particles, and the condens'd Air that was confin'd in it finding vent; occasions an ebullition, and the inflation of the Muscles that attends it, by its expansion. These things being supposed, if we enquire, (1.) about the nature of a Curve Line, according to which the moving Fibre is expanded. it may be thus determin'd :

Let ABC be a Fibre; or, if you will, a flexible Thread fasten'd to the extremities of A and C, which in all its points B is drawn or propell'd perpendicularly to its bending by an equal and indefinitely small force, which is here represented by the line BH; and let the Abscissa AF be = to x its differential Ff = dx; the Applicate FB = y, its differential GB = dy; the Curve AB = f, its diff. Bb = ds; BH (the propelling power, and the multiplex of Bb) = nds, because now the propelling power BH may be divided into two others that are lateral, one Horizontal BE, and the other Vertical, BD, which make the right Angle DE, whose DE agonal is the very DE and DE are in DE as a size of the Triangles DE and DE and DE and DE and DE are in DE as a size of the Triangles DE and DE and DE and DE are in DE as a size of the Triangles DE and DE and DE are in DE as a size of the Triangles DE and DE and DE and DE are in DE and DE are in DE as a size of the Triangles DE and DE and DE are in DE are in DE and DE are in DE are in DE and DE are in DE and DE are in DE and DE are in DE and DE are in DE are in DE are in DE and DE are in DE are in DE and DE are in DE are in DE and DE are in DE and DE are in DE and DE are in DE and DE are in DE

EIG. I.

plain to any confidering person; let it be put = a; but it is evident from the Mechanicks, that that power should be as great as if, instead of the curve thread A B, there were other two strait ones substituted touching and ty'd in the points A and B, which should be drawn to the point of meeting in I, by two powers I and K, one Horizontal LI, and the other Vertical K I, the former whereof is equivalent to all the Horizontal powers B E, and this to all the Vertical B D taken together: But all in B E are equal to the whole n d x, which is = n x; therefore the power L =ny, and the power K = nx. Wherefore, that we may discover the partial power in A, which is only requir'd to sustain the power L, we must fay, (as Mr. Varignon teacheth us in his fundamental Proposition about suspended Weights) as the Sine of the Angle A 1 B, or its compliment to two Rights K I B, to the Sine of the Angle M I Bhe, as I M is to M G, or as G is to GBhe. As dx is to dy, so the power L or ny is to the partial power in A, which therefore is found $=\frac{ny\,dy}{dx}$. Now, because the direction of the power K is the tangent K I, this will all be fustained by the point A; and therefore, that we may have the total and constant power in A, which we put = a, we must add the power R, or $n \times n$, to the partial power $\frac{\pi y dy}{dx}$; and fo we shall make out this different Equation $\frac{\pi y dy}{dx}$ +nx=a, which multiplied by dx, gives ny dy + nx dx = a dx, and by taking the integrals we shall have half nyy + half nxx = ax, or $yy + xx = \frac{2dx}{x}$; which Equation shows, that the proposed Curve

A B C is circular, whose Radius or Semidiameter $=\frac{1}{8}a$; which was to be found. Wherefore if a Muscle were not stretch'd and drawn out in length by the resistence it is to overcome, its little Machines should be expanded in perfect and entire Circles: but because it has always weights and resistences of its own, and of the Bones, to remove, besides those that come from without; therefore it is that these Muscular Machines, which we consider as Planes, never obtain a circular figure entirely, but a figure made up of two equal Segments of the same Circle. By the same Proposition of Varignonius the sustaining power in B, or the power of sirmness, which is requisite that the Thread may not break, is found every where equal to the sustaining power in A.

(2) If we enquire into the proportion between the inflating and fustaining Force, or requisite Strength, of the Fibre, b. e. if when the powers in n or B H do encrease or lose, we would determine in what proportion the sustaining powers in A or B do get or decrease, the Radii of the Circles still remaining equal: Let B H be put = m d s, and the sustaining power in A or B = b, and we shall have the Equation $yy + x = \frac{2bx}{m}$; But because the Radii are put equal, $\frac{b}{m}$ will

be $=\frac{a}{n}$, and therefore n = n = 1, b, b, e, the fultaining powers, or requisite strengths, of the Fibres are in the same Ratio with the inflating powers: which my Brother sound out the same way; as we may see in the Rules which he hath publish'd in May 1692, in the Lipswick Transactions concerning the Curvatur of a Sail.

(3) These things being premised, we may easily reckon the proportion that's betwirt the dilating power and the resistences; or how great an Elasticity of motive Air is requisite at every sublevation of equal resistences, upon which account almost all Borellus's Works was made Let therefore BEAD be a Muscular Machine, made up of two Segments of a Circle,

Fre II

BDA and BEA, C the Center of the Arch AEB, and the Radii CA, C E being drawn, the former to the Extremity, and the other through the middle of the Machine, fo that D E may be the greatest breadth which the greatest length AB, or the Chord of the Arch AEB, or ADB, cuts in two in R: Now because the Angle EAC = to the right, which is = R A C + A C R, the Angle E A R will be = A C R, and therefore the Arch A E is the measure of the Angle E A R, or the double B E A the measure of the double E A D. Wherefore the half length of the Machine be, of the Arch A E in 100000 equal parts, and half of the Angle of dilatation E A R, being given, we may find the sublevation of the refistence z, it being double to the excess by which the Arch A E is more than its right Sine A R; which is thus done : Say as the circumference of a Circle to the Radius, b.e. as 44 is to 7, fo is the number of the degrees of the Circumference 360 to a fourth 57 11, 11 which will be equal to the Radius in degrees. Then fay as the number of degrees of the Angle E A R, or the Arch E A is to 57 7; fo the number of the 100000 equal parts of the length of the Arch E A is to a fourth, which will be equal to the number of equal parts of the Radius A C, of which the Arch E A contains 100000: and hence we shall have the length of AR its felf, by faying, that as the whole Sine is to the Sine of the Angle E A R, or of the Arch E A, fo the number of the parts of the Radius A C already found is to a fourth, for this fourth is equal to the number of equal parts of A R its felf, whereof the Arch E A contains 100000: and therefore the double excess of the Arch AE over and above the Sine A R now found, will be the defir'd Sublevation of the Refiftence Z. Q E I.

(4) Now we have discover'd the Sublevations, we shall determine the respective distance after this manner. We put before (N° 1) the Curve power in any point, or rather in any differential of the Curve pressing perpendicularly = n d s: therefore the distance power, or the absolute Force of the Elasticity of the motive Air, whereby the Sides of the Machine are distanced, is express by n, but by putting the sussaining Force in any point of the Thread = a, we found before that the Radius of the Arch of the Circle to which the Thread does bend to be $= \frac{1}{n} a$. Now, because by the mention'd Proposition of Varignonius the Resistence Z is to the Sustaining power in B, whose direction is the Tangent B F, as the Sine of the Angle E B D to the Sine of the Angle E B B, therefore is $a = \frac{z M \sin of E B B}{\sin of E B B}$ and so the value of $\frac{a}{n}$ being substituted in its place in the quantity $\frac{1}{n} a$, we shall have the Radius (found by the mention'd way, which therefore we shall call r) $\frac{z}{n} = \frac{z}{M} \frac{M}{of}$ the Sine E B B; and therefore the absolute force of the

Elasticity of the motive Air $n = \frac{z M \text{ of the Sine } E B R}{r M \text{ of the Sine } E B D}$: and consequently the force, by which the half-side of the Machine is prest, b. e. n A E, will be $\frac{1000000 \text{ z } M \text{ Sin. } E B R}{r M \text{ Sin. } E B D}$. By means of this Calculation, I have contrived a Table like that Borellus made for his Hypothesis; which, if compared with mine, there may be seen a vast difference both as to the moving Force and the Sublevations: for, he makes them every where either more or less than they should be.

Now it is evident, by this Table, that a Muscular Bladder A E B D can never be entirely of a Circular Figure, because the absolute force of the Elasticity should be infinitely greater than the Resistence, which cannot

be; and because the greatest contraction of the Machine, or sublevation of Refistence, which is not equal to 72728 parts of those of which the half length of the fide contains 100000. It is also evident, that no Machine can be contracted to its third part, in its greatest distention; all which must be thought as said of a Muscle. Hence 'tis obvious too, that a very fmall ebullition in Muscles can produce their immense and incredible energy; because, in the beginning of the inflation, when the angle of the half-dilatation E A R is very acute, the Reliftence bears a very great proportion to the absolute force of the Elasticity of the motive Air: fince if we suppose the Angle E A R of 30 minutes, the Resistence is to the power of the Elasticity, as 22900000 to 1; so that the least inflation of Muscles is able to counterbalance any great Resistence, and that therefore a very tender Infant may raife any weight whatfoever: but the Sublevation becomes the more infensible, the greater the Resistence is than the motive power of the Elasticity.

(4) When we would know the quantities of Animal Spirits which are ex-

pended on every Refistence, while the Sublevation of Refistences continue the

same, they may be found in this way.

The inflating Powers, b.e. the absolute Powers of Elasticities of motive Air in equal Circles are proportional to the fuffaining Powers by n 2: But because (by Verignonius's Proposition) the sustaining Powers are in the Ratio of the Refiftences Z, the Refiftences must also be proportional to the Elasticities, while the Sublevation of the Resistence remains, or the Angle E B D is always the fame. Moreover, we take it for granted, that the quantities of the motive Air, b.e. that the Densities of the same volume of motive Air, and the quantities of Animal Spirits, or Nervous Juice, are always in the same proportion; h. e. that a double, treble, or quadruple quantity of Nervous Juice does excite thicker motive Air, in a double, treble, and a quadruple proportion. Therefore the whole matter should be concluded, if we knew how the Elasticities encrease while the Densities

do. This we may fearch after this way.

In a determined Volume a. I conceive, that the Particles of Air take up FIG. III. the space b, and that the Materia Subtilis, the remainer of the Volume, possessible Space a - b. Now I conceive another quantity of Elastical air C in an equal volume a, fo that the remaining Space of the Materia Subtilis may be a-c; and therefore, by the Demonstrations my Brother has made in the 97th Page of his Book de Gravitate Æther: the Elasticity of the air of the first Volume is to the Elasticity of the second, in a compound Ratio, of a reciprocal proportion of the Spaces possest by the Materia Subtilis, and a direct one of Spaces fill'd with Air, as, viz. a b - b c is to a c - bc; but the density of the first is to the density of the second in a direct ratio of airy Spaces, as, viz. b to c. If therefore we construct a Curve ACD to the Axis of AF of this fort, that AB in the Axis being taken = a and the Applicates D F, C E being drawn, the right Angle under B E and A F may be to the right Angle under B F and A E, as D F to C E, and if the Abscissa's AE, AF be taken for the densities of the Air contain'd in the Volume exprest by the given line A B, the Applicates D F, C E will be its Elasticities. If we enquire analytically for an Equation that may express the nature of the Curve A C D, let us put the given line $AB = a_i$ and another taken at will B F = f, D F = g, the Abscissa A E = to x, and the Applicate E C = y, and we shall find this Equation f g x = a a y.

afy—axy+fxy, which shews that the requir'd Curve is an Hyperbola, and the Applicate B G in B is an Infinite, and therefore the Asymptoten of the Hyperbola; whose Center may be had by producing the Asymptoton GB to R, so that B R may be a fourth Proportional to AF, F D, and BF; the transverse half-axis is equal to the mean proportional between B R and the double of AB. Hence it is evident, that the Elasticities, but especially in a very condens'd Air, do encrease in a far greater proportion than the Densities themselves; for the Elasticity becomes at length Infinite, when the Density becomes as great as it can be, and yet is no

more than finite.

Now fince we have taken the Denfities of motive Air of the fame volume proportional to the quantities of animal Spirits expended in producing while they fermented with the Blood, and the Elasticities are proportional to the Resistences, we may conclude, that the very same Hyperbola ACD does also determine the relation of Resistencies to the quantities of expended Spirits, h.e. if C E, D F delign the Refistencies, A E, A F will denote the quantities of expended Spirits. Now let the volume of the Muscular Machine, or, which is the fame thing, let the volume of all the Machines of a Muscle taken together (which volume is represented by A B) be of ten parts, BF or f= 1, FD or g = 100000, and if the quantity of animal Spirits, b. e. A E or x be of 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 parts, it will be found by that Equation of the Curve, C E or y; that is, that the weight to be rais'd is respectively of 1234, 2778, 4762, 7407, 11111, 16666, 25926, 44444, 100000 infinite parts. This is the reason that great weights (proportionate to our Strength) may be raised to the same height with little more trouble than small ones: for I am of opinion, that the whole difficulty about the performing of animal Motions proceeds entirely from the waste of animal Spirits; but the Spirits are confumed in a far leffer proportion than the Weights to be rais'd. In example; if we are to raise any thing of a double weight, it is not requifite that there be a double quantity of animal Spirits employ'd; as 'tis evident by this calculation; whereby we find by the help of a quantity of animal Spirits, which is as 8, there may be a weight rais'd four times bigger than another quantity which is as 5; tho' the waste in that case be not indeed twice greater than the waste in this, for they are as 8 to 5. Therefore the Difficulties also which we find in lifting up Weights are in this proportion.

The Figures are on the next fide Shown.

AN APPENDIX OF THE HEART and its Use:

WITH THE

Of which the Sanguinary Mass is made, &c.

HE Great Architectonical Use of this Principal Part, is to convey the Blood to every Part of the Body, for the vivifying and nourishing of the whole, which you shall be best able to understand, when we shall have declared the Manner of this Conveyance, and the Nature

of that which is conveyed:

We shall therefore first begin, with shewing the Certainsty of the Truth of the Circulation of the Blood, wrought by the Motion of the Heart, then shall declare what the Nature of Blood is, of what parts its Mass doth consist, how it warms and nourisheth the whole, and consequently in what Life is properly said to consist: The Action and Function of every part being best understood by its natural Figure, Frame and Constitution.

That therefore we may demonstrate the proper Operation of the Heart, We must curiously observe the Parts and Vesfels belonging to it, and not only of the Heart, but of the Lungs also, which for this purpose are fastened to it, and therefore ought to be confidered with it: Neither do I think there hath been any greater reason of the long Concealment of the Circulation, from the Discovery and Knowledge of man, than the looking upon the Heart and Lungs as parts of distinct Concernments; for altho' the Circulation be as true, and sometimes more manifest in such Animals as have no proper Lungs fastened to the Heart, as in Fishes: Yet in those Animals with Lungs, there can be no accurate Confideration of the Heart, without them; because there is no Communication of one Ventricle of the Heart with the other, but by and thro' them: Let us therefore first consider the Frame and Structure of the Heart, together with the Veffels diffes minated ZZZ

minated through the Lungs, which are affixed and implaned into it.

The Heart of its felf is a firm Muscular; that is, a fleshy and fibrous part, not wholly folid, but having two Cavities allowed it, commonly called the Right and Left Ventricles; Again, being the Orifice of the Vena Arteriofa, is immediately fastned to the same Right Ventricle, and the Valves planted in the Orifice of this Vessel, are properly framed and adapted for the Admission of any thing out of this Ventricle, and hindring the return of any thing into it: Therefore it is most evident, that the Blood which passed out of the Cava into the Right Ventricle, should pass out of this Ventricle, into the Vena Arteriofa.

Thirdly, Being the Orifice of the Arteria Venosa, is fastned by the Left Auricle, to the Left Ventricle of the Heart, and the Valves planted in that Ventricle, are framed for the Admission of any thing that comes that way, and hindring all Regurgitation backwards: It is likewise here evident, that out of the very Frame and Contexture of the part, that what Blood passeth out of the Right Ventricle, through the Vena Arteriofa into the Lungs, should also pass out of the Lungs, through the Arteria Venosa, into the Left Ventricle of the

Heart.

Lastly, Being the Orifice of the Arteria Aorta, or Great Artery, is immediately affixed to the Left Ventricle, and the Valves implanted in it, are so framed on purpose to admit any thing out of the Ventricle into the Artery, and to hinder all Palfage out of the Artery into the said Ventricle, it is likewise most evident, that what Blood passeth out of the Arteria Veno. Sa into the left Ventricle, be conveyed out of the left Ventris cle into the Aorta, or Great Artery: And thus have we clearly brought the Blood out of the Vena Cava, through most mad nifest open Channels, framed by Nature her felf, through the Ventricles of the Heart, and the Vessels of the Lungs into the Great Artery or Aorta.

That the Blood may thus march, and that Nature defign'd it should do so, is hence sufficiently shewn even from the Construction of the Parts; and that it must necessarily do so, and that it actually goes this round, is next further to be de-

monstrated.

At every Pulse of the Heart, there is a small Quantity of Blood forced out of the Left Ventricle into the Aorta, and

this is manifelt by most certain Experience, now the Pulses of the Heart are so many, and the quantity of Blood so considerable that is expelled, that it cannot be denied, but there is in less space than an Hour, more Blood sent out of the less Ventricle into the Aorta, than the quantity of the whole Mals of Blood in the Body amounts to; but whatfeever cometh into the left Ventricle, must come out of the Arteria Venofa. and whatfoever comes out of the Arteria Venofa, must first come thro' the Vena Arteriofa, whatfoever passeth through that, must first come out of the Right Ventricle; and whatsoever comes thence, must have its passage from the Vena Cava, as we have before demonstrated out of the Frame of the parts: Therea fore à Primo ad Ultimum, whatfoever Quantity of Blood cometh into the Aorta, must consequently come out of the Can va, but a quantity exceeding the whole Mass of Blood cometh into the Aorta, in the space of an Hour; therefore the fame Blood must return out of the Great Artery into the Vena Cava, which is the Circulation we mentioned, and which we contend for. And thus far for the Truth and Certainty of it: now follows the Manner of this Circulation.

And although the Manner and Nature of Circulation, (as the Circle its self) admits of no Beginning, yet for Doctrin's Sake, we must begin somewhere, and for Perspicuity's Sake, we shall begin where motion doth last appear at the lest

Auricle.

The Blood in the Vena Cava, is by the Right Auricle foreced into the Right Ventricle of the Heart; the Heart by its Systole or Contraction, forceth the Blood out of the Right Ventricle into the Vena Arteriosa, by Vertue of which Stroke, it passet through the Branches all over through the Body of the Lungs, and so into the Branches of the Arteria Venosa, through which it is conveyed to the lest Auricle, each of these Ventricles having two large Vessels annext to it; one by which it receives, the other by which it dischargeth the Blood.

The Right Ventricle hath immediately fastned to it, the right Auricle, which is as it were the Extremity of the Vena Cava; by which the Blood is constantly conveyed into it; besides which, it hath a large Orifice of the Vena Arteriosa annext to it, by which it dischargesh the Blood into the Lungs, which it received from the abovesaid Auricle: In like Manner the lest Ventricle hath annext to it the lest Auricle, which

is as it were the Extremity of the Arteria Vena, thro' which it receives the Blood out of the Lungs; besides which, it hath a large Orifice of the Aorta annext to it, by which it dispenseth and dischargeth into the Arteries all the Blood which is received from the Lungs; but the use of all these Vessels will more clearly appear, if we consider the strange Artifice of certain Valves, or little Flood-gates planted at these their Orifices.

These Valves are of two sorts, Tricuspidal, and Sygmoidal; the Tricuspidal Valves being planted in the Ventricles for the Admission of Blood into the Heart, and hindring its Reslux into the Veins. The Sygmoidal are planted in the Arteries for the Admittance of Blood out of the Ventricles into the Arteries, and preventing its return out of the Arteries into the Ventricles.

Having thus confidered the natural Frame and Structure of Ventricles, Vessels and Valves, we shall now more easily demonstrate the Circulation of the Blood, and how it is naturally performed. The first Way being the Vena Cava by the Right Auricle to the Right Ventricle of the Heart, and the Valves planted in the Ventricle, are framed for the Admission of as ny thing into it, and preventing all Regurgitation back: Therefore it is most evident, even from the very Frame of the part, that the Blood passeth out of the Vena Cava into the Right Ventricle of the Heart, and is thence dispersed and dispatcht into the left Ventricle, from whence by the Hearts Contraction, it is forced into the Trank of the Great Artery, and by the Branches of that Artery, into the whole Habit, and all the parts of the Body; in all which parts there being Extremities of Veins, answering to the Extremities of the Are teries in the same manner, as the Extremities of the Arteria Venosa does answer the Extremities of the Vena Arteriosa in the Lungs.

The Blood is conveyed out of the Capillary Branches to the Arteries into the Capillary Branches of the Veins, and through these into the larger Vessels, till it arrives at the Trunk of the Vena Cava, whence it is sent back again into the Right Ventricle of the Heart; from thence, thro' the Lungs, into the left Ventricle, and so into the Aorta, and so about perpetually; and this is the manner of the Circulation: And thus have we ab-

folved the first part of our Discourse.

In the second part, we are to consider the Nature of that which is thus circulated, and the end of Circulation, which is the Life of the whole.

That

That which is thus circulated, we commonly call the Mass of Blood, which I shall not distinguish with the Ancient Physicis ans into the four Humours; but rather content my felf with that Division Nature her self maketh, when the Blood is out of the Body. In the Body of a found Man, take what quantity you please away by Phlebotomy, and let it stand some few hours, and in it you will find two diffinet Substances, of different Colours, Tafts, Qualities and Operations; the one a dark, and turned towards black; the other of a darkish white, or watery Colour. These two in the Blood, were blended and mingled together, infomuch that all the Whitiff Liquor was in a manner absorbed with the Tincture of a deep Red; of these, one is said and allowed to be the proper Substance of the Blood; the other the Chile, preserved in the Blood, prepared by it, and circulated with it, for the Nourishment of every part: And that it is of this Nature, is evident; because, fet it upon the Fire, and it will not evaporate, as does the Serum, or the Urine, but will rather coagulate, and grow to the Substance of the same Consistence, Smell, and Tast, with the white of a roafted Egg; which is the true Connatural Nourishment of the parts, whose Colour and Constitution are the fame.

This Succus Nutritius, mingled, warmed, and subtilized by the Blood, so much as is necessary for preservation of the Blood, is sanguified, (that is) conveyed into the Substance of Blood, the rest is conveyed with the Blood to the Extremities of the Arteries, and so past to the Habit of the Body in every part, which taking into it so much as is to be affimilated to the part, fends the rest with the Blood into the Capillary Veins, and fo thro' the great Vessels to the Heart, to be conveyed in the same Manner for the further Nourishment of the parts. The other part of the Mass, is the Blood its self, the Fountain and Original of Life, the Primum Vivens, and the Ultimum Moriens: This from its beginning having Life in its felt, by the Addition of this Nutrimental Juyce; and without which, the Artificer can do nothing, becoming the ArchiteEt of his own House and Frame, every part being fitted for its own Reception and Habitation: Now, as this hath a Local Motion by Way of Circulation, by which it provides for the Circulation of the parts, so hath it also a Vital one, by which it preserves its self.

This Vital Motion is a constant Fermentation or Working of the Blood, by which all the most Minute parts are secretly

divided for the Reception of what is proper for it, and Expulsion, Amandation, and casting off whatever is obnoxious or injurious to it; but this secret Agitation of its self, and Atomical Division of the Minima Particula preserves it in its usual Vigour, and so long as its Fluidity continues, as the proper Essect of this its Vitality, it becometh brisk and lively, it causing the lively part of the Blood to nourish and cherish the whole.

But alas, this Life is not immortal! Nor can the Great Architect, according to second Causes, make such a House as shall never fall on its own Head, since that by which he first builds, and afterwards repairs, is nothing else but the Nutrimental Juyce, Liquor, or moist Substance which is mingled, and as it were incorporated with the Blood, which must intimately penetrate, and enter the part which it is to Nourish: Now the Parts of the Body made and kept up by it, are so long capable of Increase and Nourishment, as they continue in them a Confistence fit to receive such a Moisture, and no longer: And whereas the Bones at first were both moist and supple, as were other Parts, which by length of time grows to fuch a Stability, Firmness, and confequently, Dryness, that they do not admit any longer Nutrimental Juyce into them, or their proper Substance, whereby they feem to obstruct and hinder the further Growth of the Animal; and for the future, they stand in the Body more like Timber in a House, than as Trees in the Ground, as they formerly did; so other Parts of the Body after full Age, do grow somewhat dryer and closer, and so consequently do make a greater Refistance towards their own Nourishment: For when the Skin, by reason of its Propinquity to the Air, does first grow dry, close, and shrivell'd, as we see in Decrepit Old Age: So we may also conceive, that the Membranes of all the inward parts proportionally do the same: And therefore, the Blood moving about to every part, does not find an admittance for that Dew of Life which it carries along with it; and yet fo long as the Blood does move, there is faid Life still to remain in it, altho' nothing else could be so said to live but its self.

But at the last, even the Blood its self fails of the quickness of its vital Motion, and not being longer able, nimbly to relieve its self by a subtile Division of its parts, it at length becomes sibrous, and gets into its self a kind of dryness, which

makes

makes it unfit and uncapable of receiving its own Nourishment; and for want of its vital Fermentation it formerly enjoyed it grows more dry and more firm, it not admitting into it its former Liquidity, to resolve or bedew its parts; whereby it becomes so fibrous, as not to allow them any surther Capacity of making use of their own proper Menstraum: So that upon the failure of this Vital, the Local Motion must consequently cease, whereby all the parts become deprived of their vital Influence: Whence follows a natural Death.

Thus have I humbly dispatch'd the Second Part of the Discourse, concerning the Nature of the Mass of Blood, and that wherein Vitality its self-consists, by which at last we clearly understand the great Use and Function of the Heart.

And seeing all the Parts do receive their vital Influence from the Blood, and this Blood (the Seat of Life) serves its self by its own vital Motion; and seeing this Blood cannot constantly be transmitted into the Parts, but by Local Motion, and this Motion cannot be continued but by a Forceable Impulse, therefore Nature must of necessity make some part of the Body to drive it forwards, which Part must necessarily have some Cavities belonging to it, or allowed it, First to contain; then fome Veffels to receive, as does the Ciftern and Pipes; and Thirdly, Strength to propel or drive out: And fuch a Part as this, in every respect is the Heart, which is furnished with Ventricles to contain, with Vessels annext to it, to Convey and Receive, and with a firm Muscular Body, to propel the Blood. Thus the Action of the Heart, is its proper Contraction by which it makes way for the Propulsion or driving forward of the Blood for its Use, and a constant Circulation, as also for the Vivitying and Nourishment of the whole Body.

This Accurate and Concise Discourse of the Heart, and its Use, as also of the Circulation of the Blood, and the parts of which the Sanguinary Mass is made, was Written by the Late Learned Dr. Lower, and Presented to a Person of Quality, who was pleased to favour me therewith, in order to have it added to this my Graphical Discourse of the Muscles.

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