

Myographia nova: or, a graphical description of all the muscles in [the] humane body as they arise in dissection ... 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 ... / by R. Lower.

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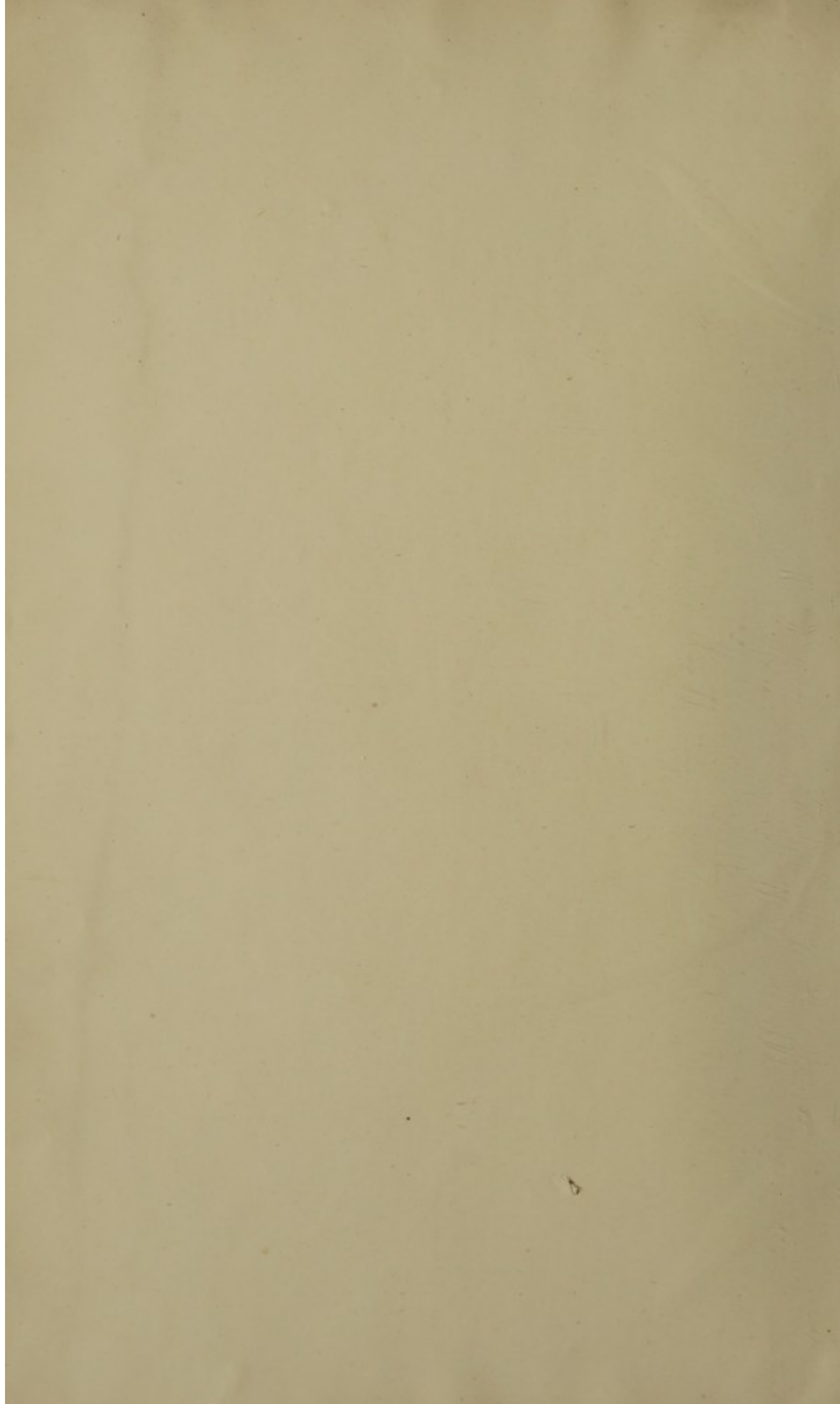


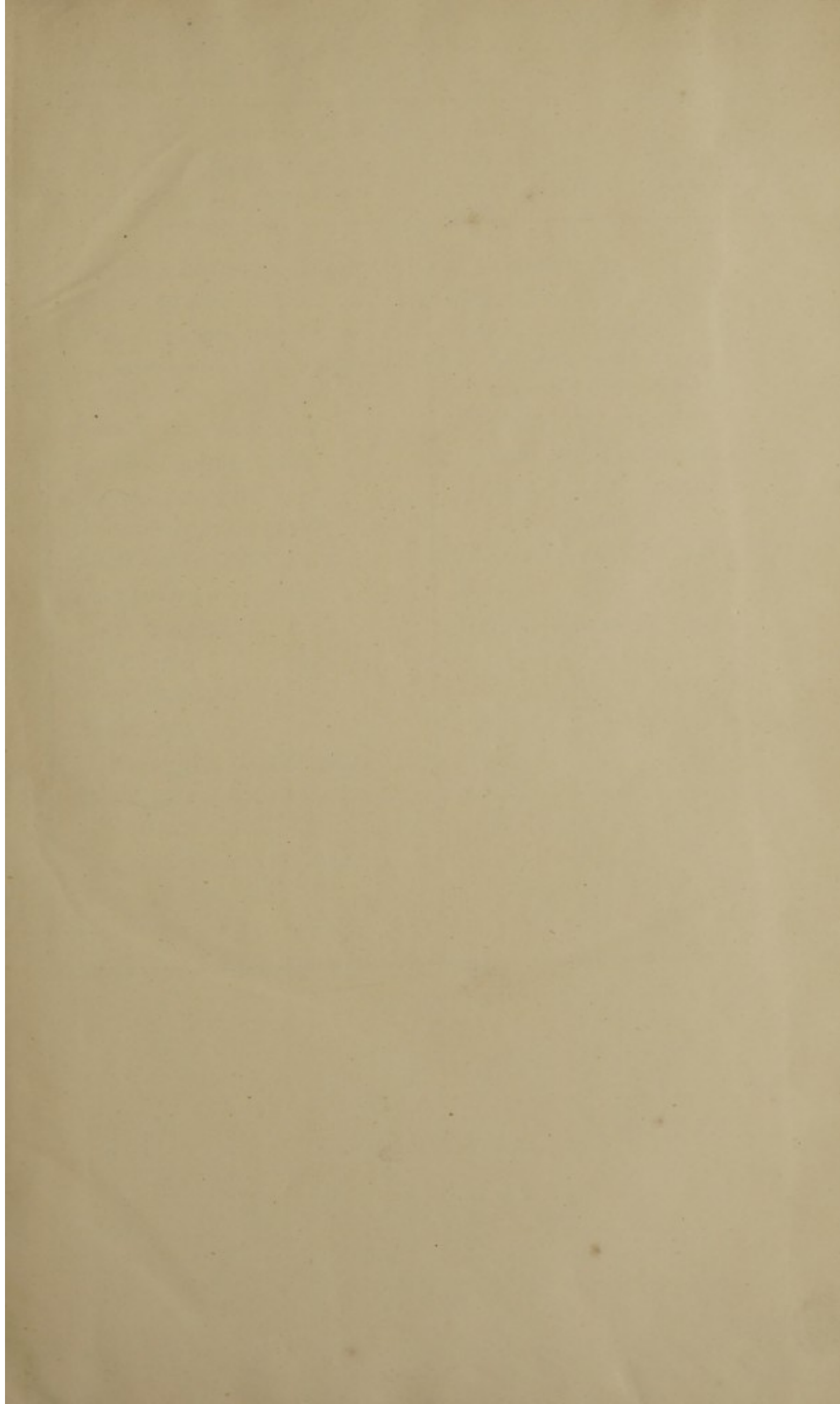
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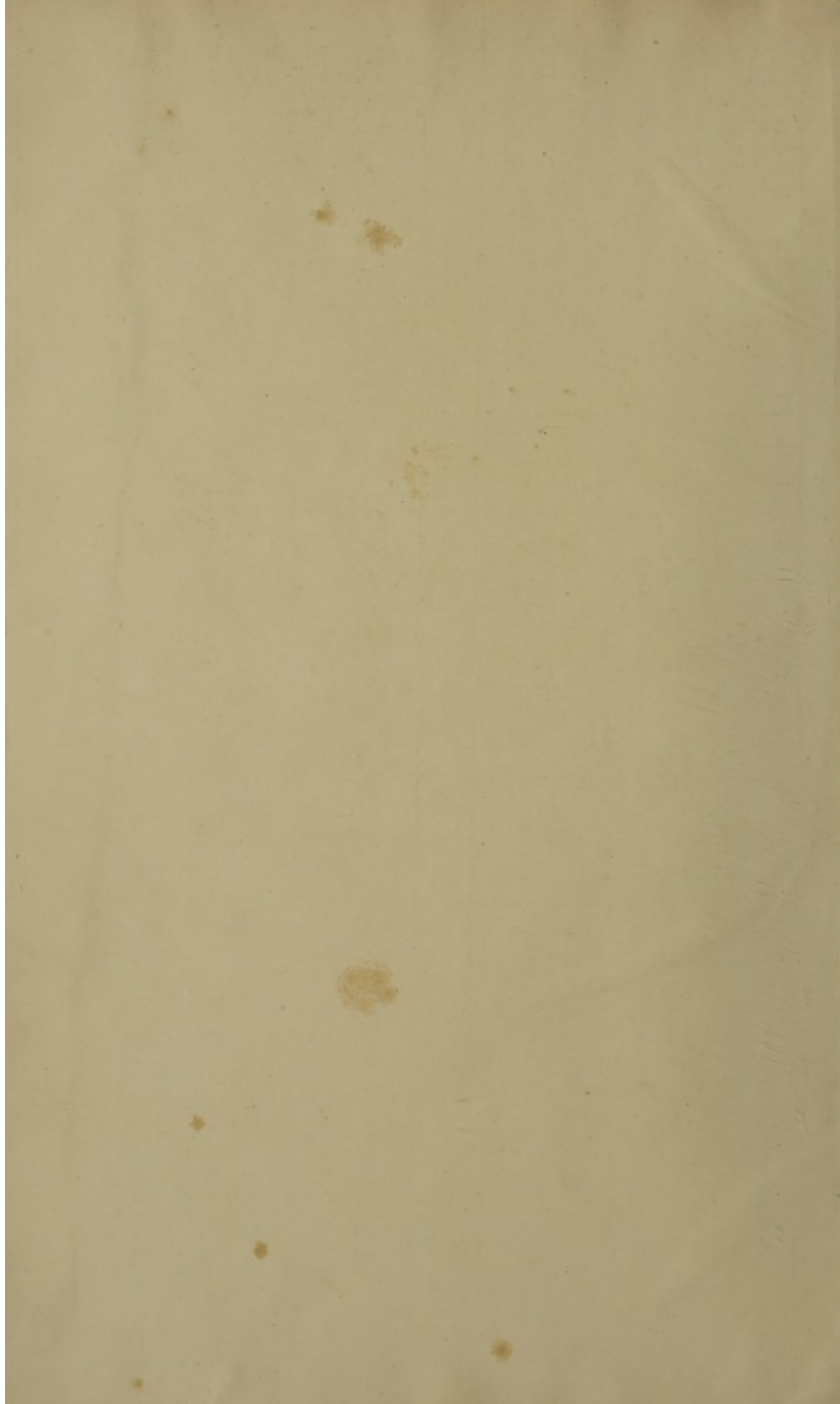
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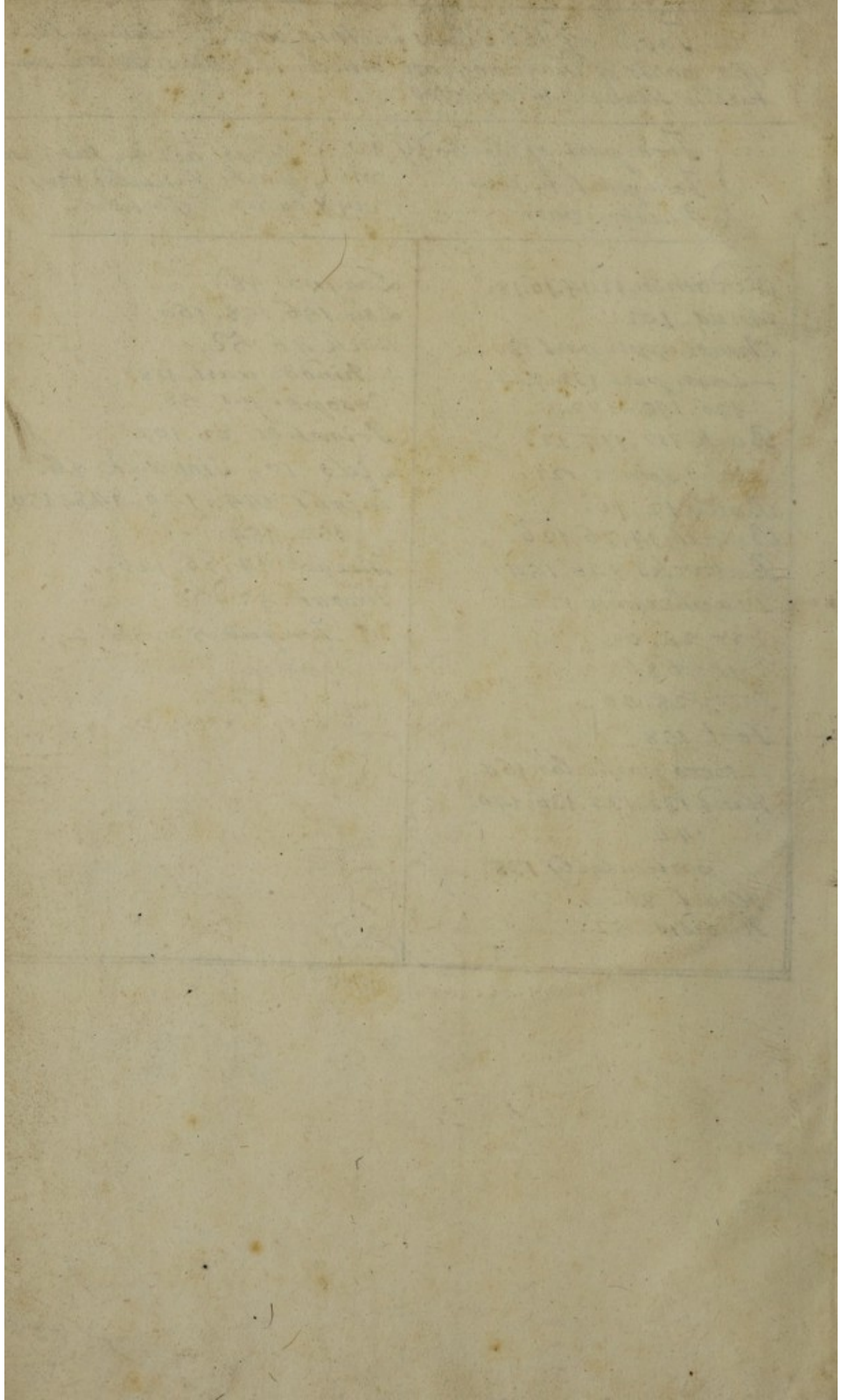
A Table of the Plates in this book, directing to the parts of the body, on which the muscles are naturally situated & exposed.

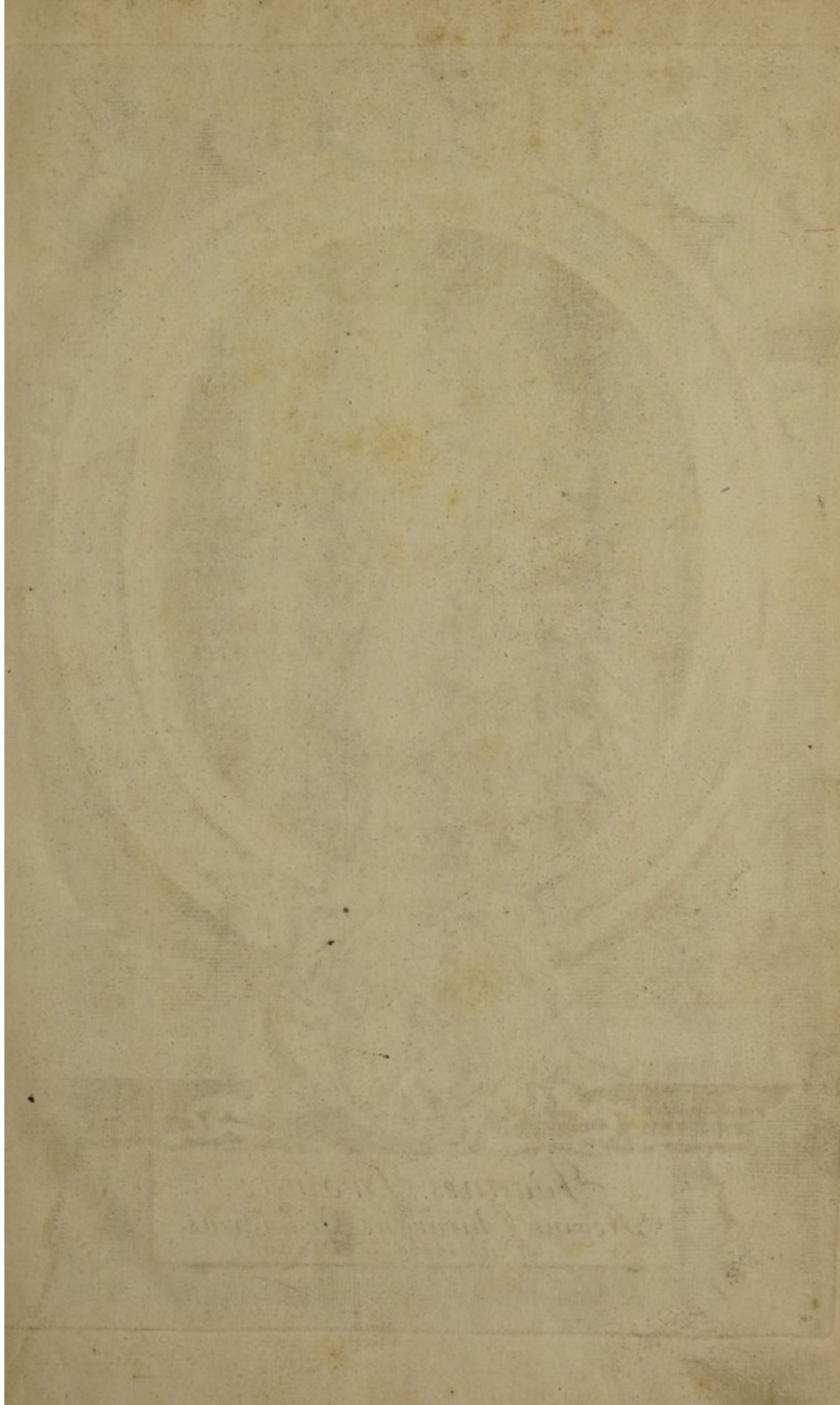
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 Rehn







R. White sculpsit.

Joannes Browne
Regius Chirurgus Ordinarius.
Ætatis suæ 46. An. Dom. 1698.

Myographia Nova:
OR, A
Graphical Description
Of All The
MUSCLES
IN THE
HUMANE BODY,

As they arise in Dissection:

Distributed into Six 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 *Uses*, fairly delineated on each Plate, as much as can be express'd by *Figures*; with an Explanation of their *Names* throughout the whole Discourse: As also their *Originations*, *Insertions*, and *Uses*, 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 **Mechanism** of Muscular Motion, and an Accurate and Concise Discourse of the Heart and its Use, 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 Flethy 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 **M A J E S T Y**, and late Senior Chirurgeon of *St. Thomas's Hospital, Southwark*.

The Second Edition, with Additions.

*Per varios Casus Artem Experientia fecit,
Exemplo monstrante Viam.*—

L O N D O N:

Sold by *Thomas Shelmerdine*, at the *Rose-Tree* in *Little-Britain*,
1705. Price 10 s.



T O T H E
King's Most Excellent Majesty,
William III.

May it please Your MAJESTY,

TH E 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 Judge 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 enlarge the boundaries of *Anatomical Science*, I shall sufficiently 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 daily Prayer of,

Y O U R M A J E S T Y ' s
Most Loyal Subject, and most Obedient Servant,
J O H N B R O W N E.

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,

Censores.

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

Iconismos hosce Anatomicos, de Universis Corporis Humani Musculis, tam in Situ Naturali, quam extra situm positis; cum eorum Nominibus, Usibusq; nec non propriis cuique adjunctis, Summo Artificio, à Joanne Browne, Regio Chirurgo Ordinario expressos, ad vivum delineatos; una cum Tractatu Cordis, Circulatione Sanguinis, Motu Musculari, variisq; Observationibus de Arteriis, & Venis, &c. Omnibus Anatomes Studiosis, Omnibusq; Medicinæ, Chirurgiæq; Tyronibus, peritiles esse Judicamus.

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

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

Thomas Lichfield, Chir. & ejusdem Societatis Guardianus.

Thomas Page, Chir.

William Layfield, Chir.

Roger Knowles, Chir.

Ejusdem Societatis Chirurgorum Londinensium Gubernatores.

William R.

WILLIAM 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 soever,
within our Kingdom and Dominions, Greeting, Whereas it hath
been manifested unto Us, that Our Trusty and Well-beloved
JOHN BROWNE, Esq; one of Our Chyrurgeons in Or-
dinary, hath 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 expresse Our Approbation thereof, and give them all due and
ample Encouragement for the future, We do hereby signifie 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 im-
port, Buy, Vend, Utter or Distribute any Copies, or Exam-
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of Fifteen Years ensuing the Date of this Our Licence and
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JOHN BROWNE, his Heirs, Executors, or Assigns, 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 con-
cern, are to take particular Notice, That due Obedience be
given to this our Royal Command. Given at Our Court at
Kensington the 25th. Day of October, 1696. in the
Eighth Year of Our Reign.

By His MAJESTY's Command,

WILL. TRUMBULL.

To the R^t. 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
Council.

MY LORD,

AS I 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 successfully 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 Lordships* 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 sagacious Men, than their Neighbours, by cavilling and snarling 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 Lordships 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; since scarce any thing I am able to say 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 safety of your *Country* and his *Service*, has openly justified 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 *Wise* and so *Great a King*.

It would be injurious to the publick *Good*, to detain *Your Lordship* any longer from Your weighty Business and important affairs; if what I have writ and exposed to publick View, may afford *Your Lordship* any Diversion at Your leisure 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 Opportunity of testifying how much I am,

MY LORD,

Your Lordships

Most Faithful, and most Obedient Servant,

JOHN BROWNE.

THE PREFACE.

Kind Reader,

I 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 since 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 Ayr 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, so shall I not study the *Gratification* or *Itch* of any *Adversary* whatsoever. 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 so *severe*, that even the *Softest Ayr*s are unpleasant to some sorts of People, and very *harsh* and *untunable* to the Ears of others. And since I am well satisfied, that it has been my Misfortune to meet with some Enemies of the *Plaister-box*, who with no small Confidence 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 since 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 carry 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 *Intrinsic Value* in it, or not.

Having brought my self thus far into the *Preface*, my next Design 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 sufficient to water and bedew all its parts with Warmth and Life throughout all the *Stages* of Life: That *Man*, whom the *Great Jehovah* 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 Blessings he could wish for, and what his Soul could desire: Yet this is the same *Man*, who (by his Fall) hath made himself the true *Son of Sorrow*, the *Patron* of *Diseases*, 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*, singing pleasant 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 *Embroidery* 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 caref's'd with these *Mundane Blessings*, 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 seen *Young*, 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 sent 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 sudden 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 since *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 at length of Time are seen to arrive at some Mastery in the Art of *Dissection*.

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 *Observations* 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 Diseases have been obscure, or the Cure thereof difficult.

And whereas *Quacks* and *Emperical Pretenders* do generally boast, 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 said of *Quacks* in *Anatomy*, when we can see bold *Pretenders*, who scarce 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 to prosecute our intended Design: 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 since 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; so 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 these 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 same; so in either, our own Countrymen have not come short of any: And tho' they have it as a Proverb beyond Sea, that we English-men 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 elsewhere, and which have given as great Light into Medicine and Anatomy, as any other Country or Nation whatsoever.

And tho' in former Ages, for Anatomy, Baubine, Valverdu, Laurentius, Vesalius, Veslingius, Placentinus, Spigelius, Riolan, Falloppius, Columbus, Remilinus, Bartholine, Wallaus, Cabrolus, and the like, were all esteem'd Great Masters of the Knife, and Most Exquisite Anatomists; so, since their time, the Study both of Medicine and Anatomy hath been much more cultivated, and brought to much greater perfection, by the curious Endeavours and industrious Labours of Borellus, Swammerdam, Steno, Bilsius, Regnerus de Graaf, Diemberbroeck, 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 Mayerne, 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 *Formatu Factu*? Of 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 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 blossom 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. Crown; and now Dr. Browne and Dr. Tyson, both which have much increas'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 Satisfaction 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 Glisson, with several others, are allow'd to out-do any that have writ on the same 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 *No-tions*, and natural *Conjeatures*; how the *Nerves* and *Arteries* do furnish the *Muscles* with *Spirits* and *Blood*; and how the *Veins* and *Lympha-ducts* do send 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 so subject to rend, that it is a matter of no small difficulty to trace them to their terminations and insertions. 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 insertions, altho' oft-times attempted, and carefully prosecuted, 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 so, 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 suppos'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 seem 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 consist of an infinite number of very minute *Vessels*, 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 sort 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*, since 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 spur on others, in making a farther progress in the tracing them out towards their Insertions and Terminations. I shall only touch upon some further Annotations relating to the *Nerves*, *Veins*, *Arteries*, and *Tendinous Fibres* mention'd in our following Discourse.

I begin with the Covering of the Brain, which is no otherwise than a contexture and co-union 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-

so 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 Ramifications, 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 Subtility.

And whereas we readily see that the greatest part of the *Nerves* do end in carnous or fleshy bodies, which are cover'd over with fine Membranes, which said bodies we commonly call *Muscles*, so must we grant, that these *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 loose, 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 of 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 resemble two Strings drawing this obliquangular Parallelogram to its opposite sides. And whereas the *Tendons* of *Muscles* are nothing more than the connexions and meetings of simple *Fibres*, which we commonly call *Tendinous Fibres*, so the Interspaces made in the Belly of the *Muscles* are all of them fill'd with *Arteries* and *Veins*; and hence ariseth 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 occasion'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, so 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 dispers'd throughout these fleshy parts, altho' they allow it that reddish colour it plainly seems to bear, yet by frequent injecting into the said Vessels, as I said before, and repeating the same, you will evidently discover 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 sometimes seen to reach the *Tendinous Fibres*, and the *Tendons* themselves; yea, many times they are found to be inserted 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 whatsoever, they commonly are seen 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 minute, 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 said *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 seen both to swell and shorten it at the same time. And then again, if we consider 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 swell'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 occasion 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 raising 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 swell by your best Tryals of Skill you can make. Next, that the Blood must have also its free course through the *Arteries* and *Veins* belonging to the *Muscles*; for since the *Tendinous Fibres* cannot be dilated without pinching or streightning the *Arteries* and *Veins*, and these cannot be streightned without 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 said *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 scarce 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 observ'd amongst these Antagonistical *Muscles*, that when one is shortned the other is extended;

tended, 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 express'd by Figures; with an *Excellent*, and *Philosophical*, and *Mathematical* account of *Muscular Motion*, 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 Slippes, 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 Reflection*.

From my House, at the Golden
Key near the Mews, at Cha-
ring-cross, July 12. 1698.

Vale.

To

To my very much Esteemed Friend,
Mr. JOHN BROWNE,
Sworn CHYRURGION to His MAJESTY,
On his MYOGRAPHIA NOVA.

SIR,

ANATOMY, 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 Knife 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 considers 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 imperfect Imitations of Living Nature, accomplished by Weights and Screws, and Wheels, or by Quicksilver, and the subtile Vapours of Inanimate Spirits.

But the most exquisite Art cannot frame such Instruments, and infuse those internal Powers into them which are necessary for Animal Actions: Nor is Nature (which is only Matter and Motion) able, without the Influence and Direction of a living Spirit, to excite their spontaneous Motions: Neither could such a Spirit be originally made, but by the Hand of God, who in the beginning, made the Seed of all Bruits of an Ætherial and Fiery Matter, and the Soul of Man of a Supracælestial Essence.

Now

Now Anatomy is able to shew 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 first Seed.

So that your Anatomical Administrations, are more Theological than every one imagines; and do elegantly display the Wisdom and Art of the Divine 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 delineated by you) do empower and instruct us to speak and sing Hallelujahs.

And they induce me to esteem and praise this your Musculary Tract, wherein, by imprinting the Name upon, and adding the Use 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 understand how they Move and Act, will be encouraged 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 likewise the Pontian Fox, who lives by his Wit, when he sees 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 seem to confirm the Opinion, that the Supream Faculty of the Humane Soul; and that which distinguisheth Man and Brute, is a Mind (a Power above that of Rational) capable of Supernatural, and Heavenly Contemplation, &c.

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 lose that Dominion which God hath given him, over all other Animals: His Strength would not defend him from the Sting of Punees, nor his Wisdom guard him from the Insults of an Ape, or the Kicks of an Ass: The wild Beasts would hunt him, and make him their Game, so that he would in the next Generation, cease 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 Studios; 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.

S I R,

I Have at last Answer'd your Desires in this Impression, tho' 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 Uses 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 sorts 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 Tab. 36, 37.
 the Formation of the Lumbricales and Perforantes in the Hand (describ'd Tab. 22, and 24.) was requisite in the fine Stops of the Organ, and other musical Instruments in the Service of the Great Creator, as the Muscles of the * Tongue and Larynx are subservient to those Hymns and Praises we duly offer to him; whereas the Beasts * In Tab. 8, 9, 10.
 (who were not designed for that Harmony) have only one particular Note to call to their Kind, or be distinguish'd by. It was the Consideration of this, that made Galen so sensible of the admirable Oeconomy of the Body in his *Tract de Usu partium*; and Mr. Hobbs confesses the same (Lib. de Homine Cap. 1.) where representing Epicurus's Opinion, about the Autocthonous 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 Fœtus, 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 ordinatasq; ad sua quasq; Officia viderint, ipsi profecto sine mente esse censendi sunt.*

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
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by Microscopes of viewing more thoroughly the curious Formation of the Parts, sets us in a much better Light, and raises our Admiration higher. The Consideration hereof may afford excellent and convincing Arguments against the growing Atheism of our Age, and may prevail more than those of a Metaphysical Nature on the Sceptics or Half-witted Philosophers amongst us; and I doubt not, but by a Mecænas that may encourage here a Set of ingenious Anatomists, the learned Mr. Boyle's noble Design in his Lectures might be compleated. I confess, I have sometimes thought of Publishing 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 promised about the Uses and Distempers of the parts of the Eye) and I question not but the Argument, with the fore-mentioned Assistance, might be so managed as to make Atheism as ridiculous as those excellent Prelates and others of our times have done Superstition and Idolatry. I could wish in Order hereunto, that Anatomical Studies were encouraged and brought to the greatest Perfection, and the Description and Uses of all the parts accurately set forth; and as you have taken a great deal of Pains in this Treatise, so 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 Muscles, and that their admirable Series Fibrarum (as they serve to so many several 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 Physicians 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,

I 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 Young Students in Physick and Surgery, but for refreshing the Memories of others more vers'd 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 bold 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 Act 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, &c. 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 II,
Fellow of the College of Physicians of London, and
of the Royal Society.

T O

Mr. JOHN BROWNE;

Sworn CHIRURGEON to His Majesty.

On His Myographia Nova.

SIR,

ON the coming abroad of your last Edition of the Muscles, I endeavour'd to shew how Surprising, Incredible, and how Indefinite the Powers of these Machines are. That even our daily 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 numbering of those Mechanical Powers is a great Step towards a farther discovery of their Energy and Operations. '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 deservedly astonished at such incomprehensible, tho' 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 observe 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 easily seen by all the World, whether Phylosophers, Physicians, or People of a lower Form and Degree in Understanding; but so soon as we come to enquire, how a Contracted Muscle is in that State, and so as to draw some hundred weights along with it, how the Power that propels the Blood drives round a Body in bulk, and Resistances in Motion, equal to some three hundred weight; then we find our men of Learning 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
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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 his Essay of Muscular Motion, because you are very conscious, that whatsoever has 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 upon 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 Sicknefs generally proceed from them, you may the more easily perform your Design you have to shew, from Your and other men of Practice Observations how they have been hurt, 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 wisely 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 penn'd up, how they have been resolv'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 Consistence, and is made more nourishing; how 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 Glutæi almost perfectly extirpated by a Cannon-Shot, and yet to recover in a very little time, considering the Hurt. 'Tis true, this is all done without either assigning the Causes of Muscular Motion, evincing the particular bignesses of parts of stagnating Matter in small and Capillary Branches of Arteries, and the Weakness 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 Gonorrhæa I gave you, which evidently proves, that this Issue of Matter, howsoever 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

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 self; 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 *à 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 Resistance, 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 Passage: Just so it should prove a very hard Task, to perswade the most of people of the wonderful and stupendous smalness of some Bodies, that tho' 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 insinuate 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 Microscopes; 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 these 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.

T O
Mr. JOHN BROWNE,
CHIRURGEON to His MAJESTY,
On His Myographia Nova.

SIR,

I 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 desiderata Rei Anatomicae*, an exact *Myology*. I would call that *Exact*, which besides, the explaining the Names of the *Muscles*, and their different Insertions, 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 sensible 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 translating into English, a *Gross Volume of Anatomy*, whereof I confess I never could understand, either the *Beauty* or *Usefulness*.

In the mean while, I am glad to learn, that you are about Re-printing your *Myology*, or *Treatise 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.

D*Arling of Nature, t' whom she does impart,
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 Esteemed Friend

Mr. John Browne,

Sworn Chirurgion to His MAJESTY:

ON HIS

Myographia Nova.

YOUR Undertaking's so sublime to me,
I cannot fathom its Divinity;
How God made Man, to us you have

(made known,
Each inward Motion by your Lines are shewn;
You teach us how to know our selves, 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, ravelly made,
Fill'd full with Use, for Art, as well as Trade;
Where the more noble Brain is plac'd above,
With Opticks to foresee th' effects o'rs Love:
How Reason ballances, and do's dispense,
What ere we gain of Motion or of Sense:
Whilst Nature's Magazine, (the noble Heart)
Sends forth its Crimson 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 pinch'd, make their Reflux again;
So he that Nature's Course observes and knows,
Will soon allow the Blood in Circles flows:
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;

How Life preserves its self, how our parts move,
How all our Actions own a Pow'r above;
How each concentrers to keep up our Pile,
And fills with Strength, by fresh repeated Chyle,
Each weary'd 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 act, 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

(Pains, }
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.

WH O loves true Worth, can never
 (grudge to pay
 A humble Tribute to your rich
 (Essay;

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 Poultry Coin
 Toth' Royal Aid, but as wise Anglers (bight)
 By yielding Baits, bring th' useful Fish to bite:
 So; these Pay Taxes, and secure 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 hath but Sence, may th' greatest Errors shun;
 For you each MUSCLE have explain'd to view,
 Their Forms, their Names, and various Uses too:
 The Little World can't think, or speak, or act,
 But as your curious Method doth direct.
 Vesalius, Riolan, Vellingius, and
 Laurentius, Bartholin, (who could command
 The Knife as well as any.) might hence Learn
 Chirurgick Truth, from Error to discern.
 To this learn'd Labour, Harbey's self would bow,
 And Crook, his own large Volume disallow,
 Were they alive to see it. —

The Regal Psalmodist might well exclaim,
 In Honour to the great Jehovah's Name,
 That (fragil) Man is wonderfully made;
 ('Tis fit he should, who is th' Almighty's Shade;) }
 Had he but seen this Work, 't might rais'd in
 A Sacred Rapture of a higher Strain; (Him,
 Enforc'd him in that Holy Extasie,
 To embrace thy Work, breath Blessings upon thee.
 I Wonder still the more, the more I Look
 (My Worthy Friend) on your Seraphick Book;
 A Treasure vast, and every Way so Good,
 So-High, yet plain, and eas'ly understood;
 That Elephants may swim, and Lambs may wade
 In its safe Ocean, and ne're be dismay'd.
 Who says the Stars want Influence? Since we know,
 At your bless'd Birth (your future Fame to shew)
 There did ascend bright Cor Leonis, and
 As Patrons of your happy Brain and Hand,
 The Pregnant Stilbon, and soft Venus Joyn,
 Your Horoscope t' ennoble by a Trine.
 My Muse is much too Barren to commend,
 Your Peerless Pains, (tho' I it well intend); }
 Nor, need you a Dull Minor Shepherd's Lays, }
 Since mighty PAN adorns you with his Bays,
 And sev'ral Senior Gods your Merits praise.
 The Muses Seats, Great Britains radiant Eyes,
 Unto your Skill offer just Sacrifice;
 To Honour you, what's wanting Less in Love,
 A Choire of Angels Court You from above,
 To bear You to Elizium, where you may
 Meet mightier Friends, than in this mortal Clay.

John Gadbury,
 Student in Physick and Astrology.

To His much Esteemed Friend,
MR. JOHN BROWNE,
Sworn Chyrurgeon in Ordinary

TO THE
King's Most Excellent Majesty,

Upon this last, and Compleat Edition of His Book.

T Was Wisely spoken by a Learned Tongue,
Mans Life is short, but liberal Art is long.
Who to the Top of Knowledge would ascend,
Must to a *single* 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 Offspring 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 Wise,
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:

Exert

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 spongy 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, rous its *purple Flood*.
Men vainly hope in Knowledge to Advance,
Who attribute the Works of *God* to *Chance*.
Each *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.

HAppy the Man, whom Meditation's Rays
Can warm, to sound the Grand Creator's Praise,
Like *Mennon's* Statue, from the teeming Morn,
Strange Life and sweet harmonious Strains are born.
Nature's so 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 *Audious Reason* may adore,
Ev'n here the sacred 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 praise the Glorious *Architect* above.
Nor is the *Microcosmos* silent here,
But, like her Great *Example*, every where
Bespeaks 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

Richly enshrin'd, like *Eastern* Potentates,
In *Crimson* 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 *Affluat*, and *Cherish*, and *Command*:
All Parts and Organs, tho' so rich, so 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*, *Resist*, *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 *BROWN*E alone most evidently shews,
In lasting Brass and everlasting Prose.

Joshua Barnes, B. D.

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

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This

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

Oblíquus Descendens,
 Obliquus Ascendens.
 Rectus,
 Pyramidalis,
 Transversus,
 Cremasteres,
 Dartos,
 Musculi Clitoridis,
 Directores,
 Acceleratores Urinæ,
 Frontalis,
 Corrugator,
 Occipitalis,
 Orbicularis Clausor,
 Elevator Palpabræ,
 Clausor Oculi Superior,
 Clausor 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,
 Clausor Nasi Externus,
 Clausor Nasi Internus,
 Nasi Clausor 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,
 Coracohyoideus,
 Sternohyoideus,
 Sternothyroideus,
 Hyothyroideus,
 Styloceratohyoideus,
 Pterygopalatinus,
 Sphenopalatinus,
 Mylohyoideus,
 Geniohyoideus,
 Myloglossus,
 Ceratoglossus,
 Genioglossus,
 Hypsioglossus, or Basiglossus,
 Styloglossus,
 Lingualis,
 Crycothyroideus Anticus,
 Oesophagæus, or Sphincter Gulæ,
 Stylopharyngæus,
 Cephalopharyngæus,
 Sphenopharyngæus,
 Crycoarytenoides Posticus,
 Crycoarytenoides Lateralis,
 Arytenoides,
 Thyroarytenoides,
 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 Vesicae,
Detrusor Urinae,
Diaphragma,
Cor, cum Vasis suis, &c.

Here let the Body be turned upon
the Face.

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

If you intend to take off the whole
Arm with the Scapula, the Dis-
section of these following Mus-
cles will with more Ease be per-
formed.

Deltoides,
Biceps,
Octavus Humeri, or Teres Minor,
Brachialis Internus,
Gemellus Major,
Gemellus Minor,
Anconeus,
Palmaris,
Caro Musculosa Quadrata,
Flexor Carpi Interior, or Ulnaris,
Flexor Carpi Exterior, or Radialis,
Flexor secundi 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 ejusdem secundus,
Flexor secundi Internodii Pollicis,

Flexor } Primus,
 } Secundus,
 } Tertius,
 } Quartus,

Minimi digiti abductor,
Pollicis Abductor,
Pollicis Adductor,
Interossei Manus,
Extensor Carpi Exterior, or Bicornis,
Extensor Carpi Interior, or Ulnaris,
Extensor secundi & tertii Internodii di-
gitorum,
Supinator Radii Longus,
Primi Internodii Extensores,
Extensor Ossis tertii Pollicis,
Abductor Indicis,
Supinator Radii brevis.

Here you return to the Body its
self as it lies.

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 Dissection 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,
Membranosus,
Sartorius,
Gracilis,
Rectus,
Vastus Externus,
Vastus Internus,

Biceps,
Seminervosus,
Seminembranosus,
Triceps,
Lividus,
Gasterocnemius Externus,
Plantaris,
Gasterocnemius Internus, or Solens,
Suppopliteus,
Flexor tertii Internodii, or Perforans,
Tibiaeus Posticus,
Flexor Pollicis,
Flexor secundi Internodii Pollicis,
Flexor secundi Internodii, or Perforatus,
Abductor Pollicis,
Adductor Pollicis,
Abductor Minimi Digiti,
Transversalis Placentini,
Tibiaeus Anticus,
Peronæus primus,
Peronæus secundus,
Extensor Pollicis,
Extensor tertii Internodii Digitorum,
Extensor secundi Internodii Digitorum,
Interossei Pedis.

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Concern'd in this

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G. Falloppius,

P. Forestus,

Galen,

Reg. De Graaf,

And. Guainerius,

Hippocrates,

Fab. Hildanus,

Jac. Hollerius,

A. Laurentius,

A. Lusitanus,

P. Lycosthenes,

J. Oetheus,

J. C. Placentinus,

P. Pigray,

A. Paræus,

F. Platerus,

J. Riolanus,

M. Rulandus,

St. Riverius,

D. Sennertus,

Adr. Spigelius,

C. Scarborough,

N. Steno,

J. Swammerdamus,

J. Schenkus,

Jac. Silvius,

J. Valverdu,

A. Vesalius,

J. Veslingius,

Vidus Vidii,

Du Verney,

F. Valeriola,

Valescus,

T. Willisius,

G. Wierus,

R. Wiseman.

E R R A T A.

Folio 22. line 26. read plucking him, f. 26. l. 14. r. became, f. 34. l. 23. r. motions, f. 53. l. 1. r. Fugate,
f. 38. l. 4. r. Plausima dyodes, f. 66. l. 24. r. eating, fol. 73. l. 6. r. petroses, f. 77. l. 23. r. appetite, f. 81.
f. 14. r. oppositely, f. 16. l. 19. r. when, f. 84. l. 10. r. Lobes, f. 99. l. 23. r. Forcipes, f. 102. l. 6. r. Præne,
f. 16. l. 24. r. thickning, f. 93. l. 4. r. reaching, f. 103. l. 24. r. of one, f. 117. l. 15. r. distance, f. 16. l. 20. r. facile,
f. 120. l. 13. r. Inferiores, f. 95. l. 22. r. opening it again, f. 127. the second Story is left out by mistake, f. 151. l. 20.
r. Extensum.

A
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.*

WHEREIN

*A General View being first taken of the Frame of the Humane Body,
the Mechanism of Vital, and other Muscular Motions, is Exa-
min'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,

I 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 self. I might, Sir, very justly excuse my self to you, having shew'd your self 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 *Subject* it self is very abstruse and difficult.

Motion, the Life of *Bodies*, is as unconceivable as the Origin of *Matter* in which it resides: 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 seem easily answer'd, That *Bodies* are the cause of their own *motion*, since 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 *Phænomena*, 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 selves, I will take a strict and short view of the whole frame of the *Humane Body*, to find how its wonderful Make is curiously contrived, to perform the *Functions* design'd by *Nature* for its own preservation. Our *Machine* is an unimitable piece of *Architecture*; it is supported, as *Buildings* are with *Pillars*, *Architraves*, and *Rafters*, by solid and durable *Bones* wonderfully joyned together, like *Joyners Work*, with *Tenons* and *Mortaises*, 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 joyned ends of the *Bones* lies a *Lymphatic* or *Oily Juice*, which, like *Grease* 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-vessels*: These *Muscles*, like so many distinct *Ropes*, serve to pull and move the *Bones*, and the rest 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 *Fibres* have their *syftaltic* or imperceptible contraction.

Within this noble *Fabrick* we find three *Apartments*, the *Belly*, *Breast*, 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*, *Lacteal Vessels*, *Pecquet's Receptacle of the Chyle*, the *Liver*, *Pancreas*, *Spleen*, *Atrabiliary Glands*, *Kidneys*, *Bladder*, *Parts of Generation*, the *Caul*, the *Vena Porta*, and a great many *Lymphatic Glands*. The *Gullet*, *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 *Gullet*, and digests it into *Chyle*; the *Chyle* passes into the *Guts*, where it meets with two *Liquors* to dissolve 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 several 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 send it to its Cistern the *Bladder*. The *Liver* cleanses the *Blood* of *Gall*, and discharges it into the *Guts*, to help digestion: 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* send their

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 sends it by the Pulmonary Artery into the Lungs, where being rarified by the Air forced into them by Respiration, it passeth 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 sends 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 Diseases, or by any great Wounds, this *Circulation* is interrupted, *Death* must necessarily ensue.

In the uppermost Room of all is lodged that Marrowy and soft 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*, sticks in several places to the inside of the Skull; but the thinner cleaves every where very closely to the outside of the *Brain*. The *Brain* it self 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 *Cerebellum*, or little Brain: The Substance of both is much alike, as for its Use and Contexture, for the outside of both is *Glandulous*, and of an Ash-colour: It serves to strain from the Blood that thin *airy Fluid* call'd *Animal Spirits*. The Pith or inside of both is very white, and something harder than the first, it is nothing else but the Origin of all the Nerves that suck 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 some Twig of a Nerve from one or other of these 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 these Spirits cause Sense and Motion where they arrive, for without them we neither could feel nor move any part of our Body; as is visible in *Palsies* and *Apoplexies*. There are in the Brain several other Parts they give

Names

Names to, but because the Use of them is incertain, they shall be nameless: for, to say that the *Soul* resides 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 *Physical 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 discharg'd, 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 sneeze, will ease the *Head*, not by discharging 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 stopp'd up by the *Olfactory Nerve*, but because this *Snuff* 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* suffers 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 *Fabric* of the whole *Body* being made of *Bones*, *Gristles*, *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 said 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 *Action* or *Motion* of a *Finger*, or of any other Part whatsoever, 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 *Disease* without a general *Idea* of the *Source* of all *Diseases*.

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 *Watch* 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 *Diseases*, 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 solid parts, so they mutually receive all their motion from them: Just as a *Man* that swings himself upon a slack *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 *Punctum Saliens*, or the little *Stamina* of the *Heart*, cannot move it self, but it must receive its first motion from the *Fluids* contain'd in its Substance: These *Fluids* receive their first motion from the vivifying *Sparkles* or ferment of *Man's Seed*, convey'd to them in *Coitu*, 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



This brings the Lower Jaw upwards.

This brings the Forehead upwards.

This brings the Lower Jaw sideways.
This contracts the Neck

This attolls the Arm

This brings the Arm forwards

This extends the Cubit
This extends the 3^d Joint
This extends the Cubit
This extends the 3^d Joint
This extends the Cubit
This extends the 3^d Joint

This protracts the belly
This protracts the belly
This protracts the belly

This lift up the arm.
This bonds the arm.

This contracts the Thumb.
These Contract the Carpus.

This extends the Cubit.
This brings the Arm forwards.
This brings the arm Outwards.
This brings the Belly forwards.
This brings the Scapula forwards.

This brings the Bolly forwards.

This bring the Leg inwards.

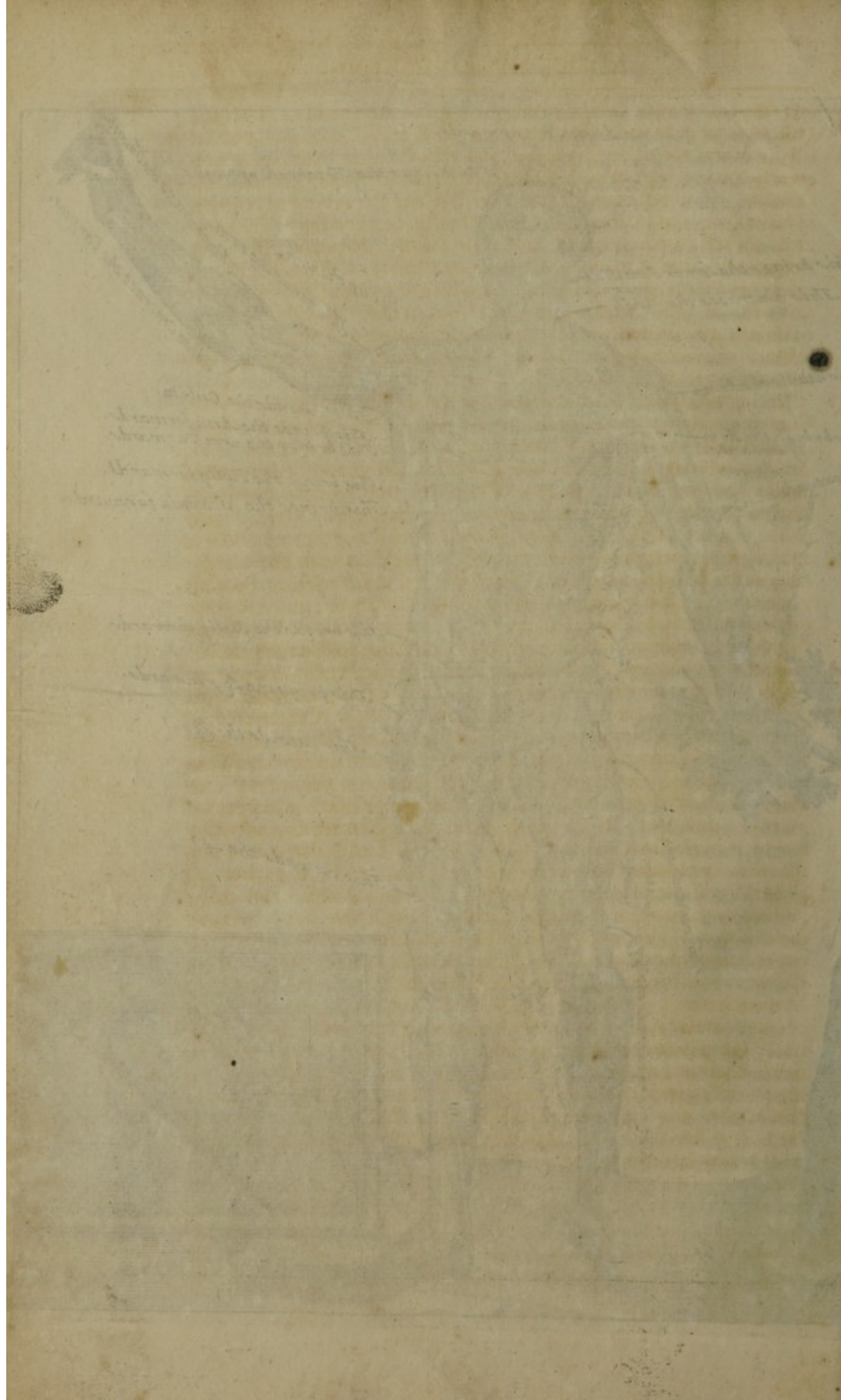
This extends the Leg.

This extends the Leg.

This extend the Leg
both these Extends the Legg.

This bring the Leg inwards.
This bring the thigh inwards.





other *Organs*, gather strength enough to move one another. Thus the little *Muscular Filaments* of the *Heart* being first 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 first, 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 first was, into the *Arteries*; and other small rarified 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 *Fœtus* 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*, *Gullet*, *Iris*, *Sphincters*, 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 seeing a Boat in a calm day brought up against the Current of the *Thames* by the Tide, without knowing what forces the Tide it self 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 flow 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.

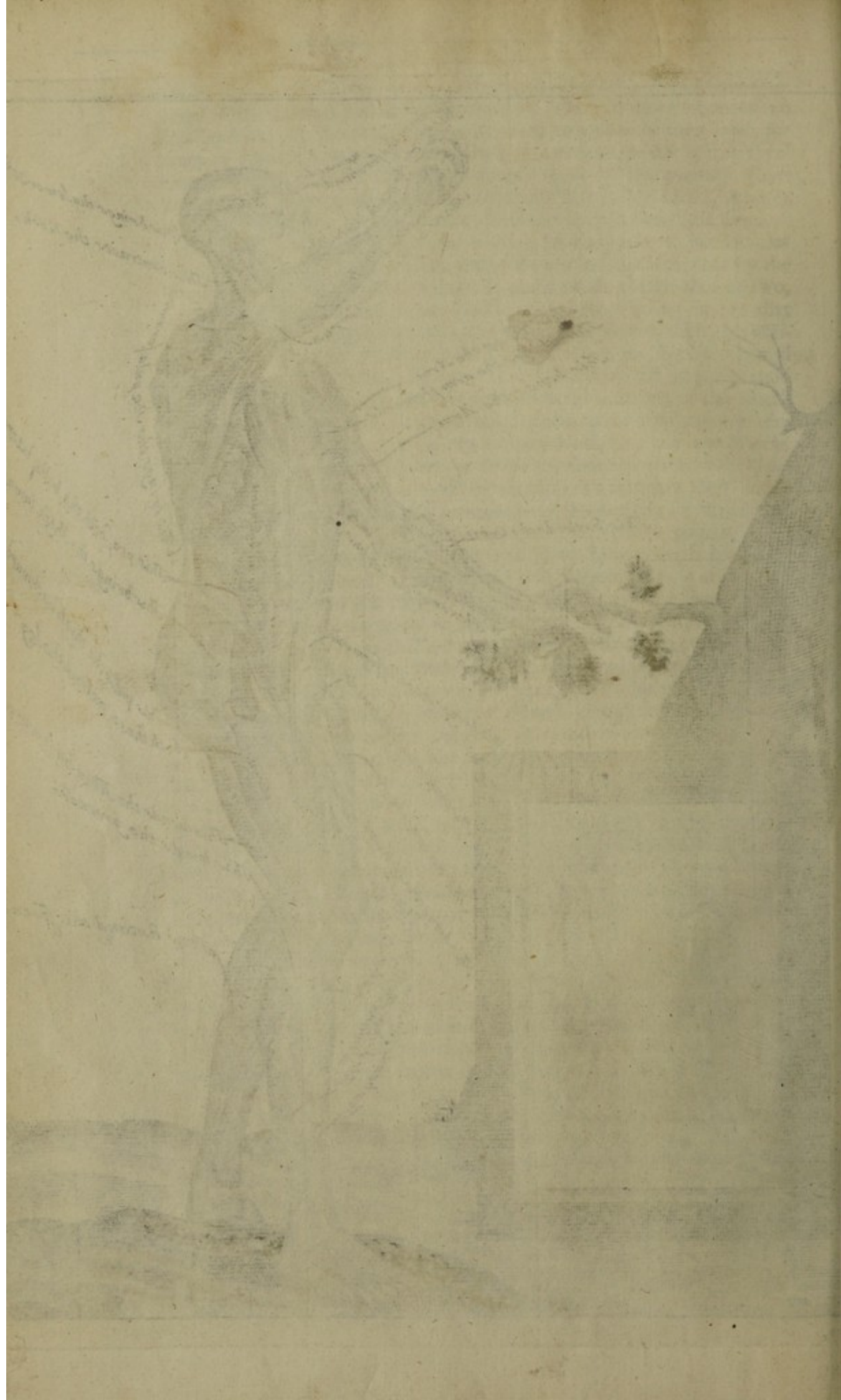
We cannot conceive that the *Blood* and *Spirits* do move the *Muscle* by the rapidity of their *Circulation*, or by the quantity of *Motion* they both receive from the *Heart* and *Arteries*; and yet all the *motion* not only of the *Blood*, but likewise of the *Spirits*, is immediately derived from 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 passage 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, *Muscles* 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 Masseters*, 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 lift up a heavy Chair in one Hand, with a Man sitting 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 raise, 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 raise the weight of Threescore 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 *Masseters* 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 *Muscle*; 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 *Masseters* is not the thousandth part of the bulk of the whole Body, and consequently does not receive the thousandth part of the *Blood* and *Spirits*; from whence it evidently follows, that the motion of the *Masseters* 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*; since the motion of the *Masseters* exceeds a thousand times the degree of motion they can receive from their proportion of *Blood* and *Spirits* sent 'em by the *Heart* and *Brain*; and since the degree of motion in the Heart of the Seaman, that lifted the Brass 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 *Muscles* 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 must necessarily suppose, that the Nature of the *Blood* and *Spirits* is such, that when they meet in the body of the *Muscle*, 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 *Muscle*, and of the nature of the *Animal Spirits*.





I need not insist long upon the *Structure* of a *Muscle*, it being very well known that it is a *fleshy 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 *Membrane*, closely interwoven towards the Head and Tendon, and slack 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 *texture* 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 *Interstices* 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 seen any *Blood*; but when I cut it across, there gushes immediately out of every *Fibre* a great quantity. So that I may say, that the *Cavity* of every *Fibre* of a *Muscle* 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 cause why Bones are bent in the *Rickets*, since this cannot be, unless the *Muscle* began and ended in the same Bone.

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 *fluid Substance* that passes through the *Nerves*, tho' we see 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 *Sulphur*, it must be seen in the *Nerves*, as the *Blood* is in the *Arteries*, or *Lympha* in the *Lympheducts*; 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 say, 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 sulphureous part of the *Blood* in the lank Belly of the *Muscle*, flashed, which he calls *Explosion*, like Gunpowder, which is made of *Nitre*, *Sulphur*, and *Charcoal*: by this *Explosion* the *Muscle* is contracted or shortened, which contraction is *Muscular motion*. With respect 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 vast 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 dissolution of *Nitre* in *Water*, and all Preparations whatsoever of it, taken inwardly, constantly do. Besides, granted the *Animal Spirits* were *Nitrous*, how can the Particles of *Nitre*, meeting the *Sulphureous* part of the *Blood* in the *Muscle*, flash, without some sparkles of Fire fit to kindle for the *Explosion*; for Gunpowder, tho' it is made of this *Salt-petre* and *Sulphur*, never blows it self up without a priming or foreign Fire to impart to it its first motion or flame.

Now, Sir, since 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, seems to me to suit 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 swooning in hot places, with breaking Wind backwards, with the filtration of the *Spirits* in the Brain, with their invisibility 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 *Treatise de Antris Lethiferis*, and have proved in the same Book, that the body of the *Air* not only is breathed into the Lungs, but that likewise it passes farther from

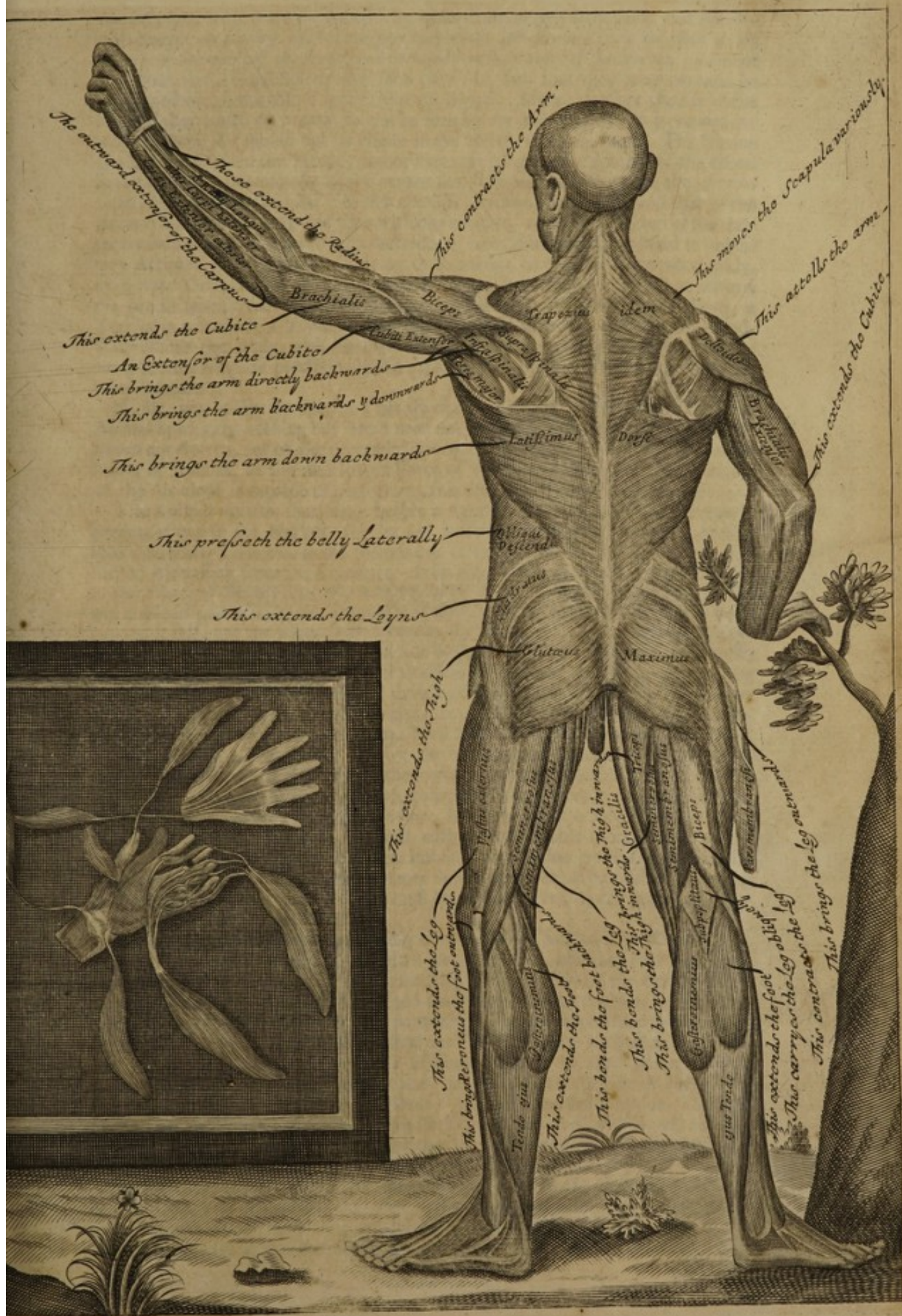
Dissert. Medico-phys. p. 72.

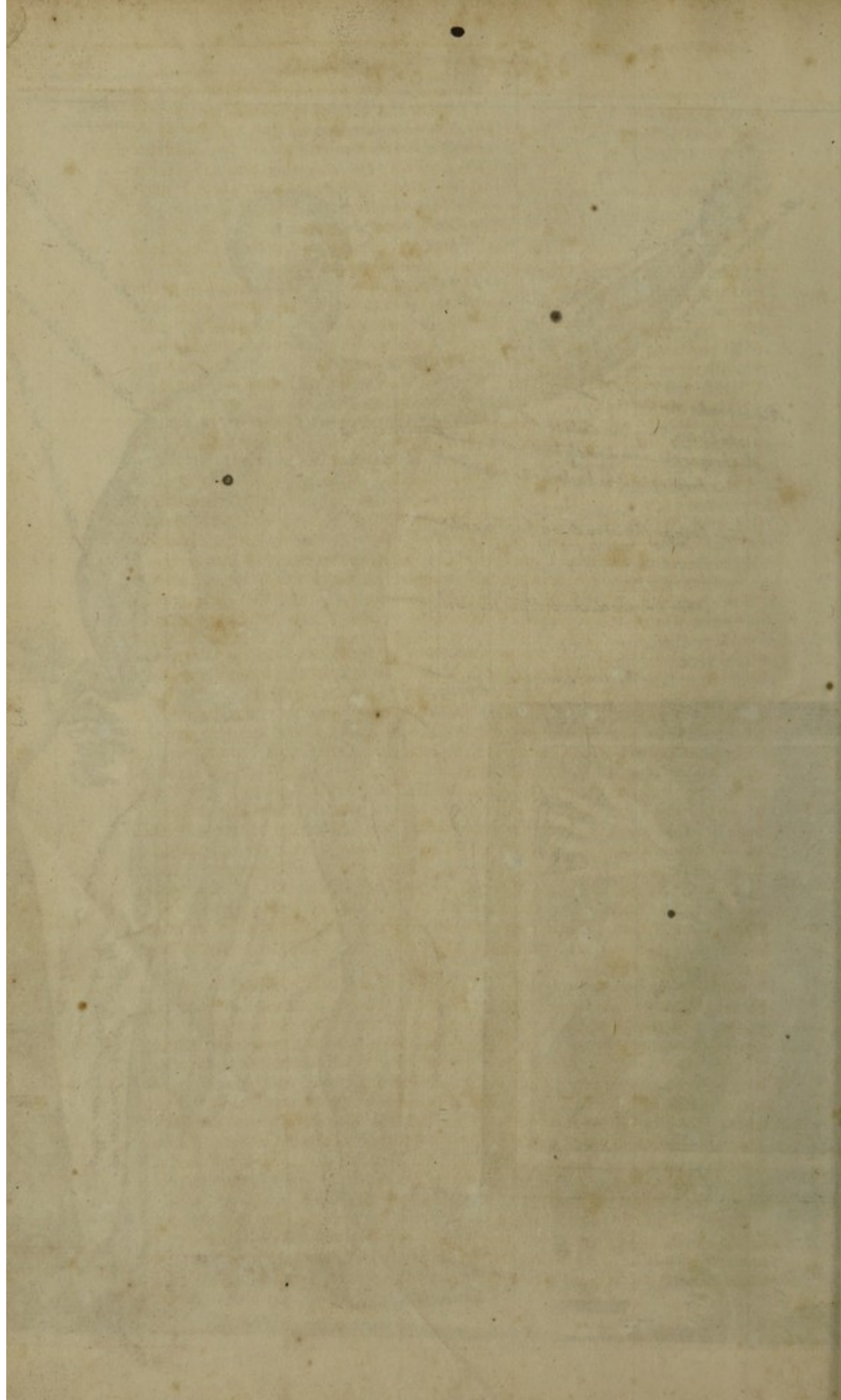
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the *Bronchia*, and their appending *Bladders*, into the *mass* of *Blood*: this is evident, because if the *Lungs* of a dead *Animal* be well clear'd from the Clods of *Blood* with an injection through the *Pulmonary Artery*, we may blow the *Air* from the *Windpipe* 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 same *Pores* of the *Lungs* which the thick steams of the *Blood*, which come out in *Expiration*, pass through; and through which gross *Damps*, *Pestilential Vapours*, and, as they say, the *Nitre* 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 pressed 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 seal 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 same in our *Body*, for both Reasons: First, because when it has passed out of the *Lungs* into the *Heart*, and into hollow *Vessels*, it is in a manner out of the reach of the pressure of the ambient *Air*, and consequently must dilate it self 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 self in our *Bodies* without expanding and vivifying at the same 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 Elasticity 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 rarifie sufficiently that quota of *Blood* which the *Lungs* then contain, and the *Air* that is to come in by the next *Inspiration* will rarifie 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 likewise necessary that the same *Air* should circulate with the *Blood* through all the *Vessels* and *Parts* of the *body*, otherwise it would coagulate, and would be too thick to continue its circulation; for the *Air* keeps the sulphureous parts asunder, 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 see in Butchers *Meat* newly kill'd; it is it that fills the *Stomach*, *Guts*, and all the hollow places of our *Body*. *Air* is, in short, 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 see 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 serve 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 *Sponge* 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 exactly the disproportion between the grossness of the *Parts* 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 subtile enough, to make its way thro' them, besides the thin *Air* which they





are supplied 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 say, that the *Animal Spirits* are such 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 seen 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 hastned 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 natural Motion.

If, Sir, you will grant me, as I hardly conceive how it can be denied, 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 *Vertue* of a supposed *Nitre*, to explain the Power of Muscles, or the multiplied 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 slack 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 self, 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 possible 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 muscles 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 rarefy the blood, and distend the muscular *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 masseters will raise in the Teeth a hundred pound

weight? However the matter of Fact is undoubtedly true; and we need not be so much surpris'd at it, when we see Weights infinitely more considerable rais'd every day by the Spring of the Air: Is it not with this Rarefaction, that Gun-powder blows up huge Rocks and Fortresses? That Cannons shatter Walls regularly fortified? That great Spouts are rais'd in Rivers, and in the main Sea? That a bladder half full of Air put into hot Water, bursts? That a bladder quarter full of Air, put into the Air Pump, raises a Weight ten thousand times heavier than the Air that swells it? What wonder therefore is it, that two large, tho' short *muscles*, as the *masseters* are, made up each of above two thousand little *fistulous* Cords knit fast together, and each Cord swelled and contracted by rarified blood and spirits, and acting all in consort at once, should raise a Weight of a hundred pound. Since, if I take 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 tie to it just near the Ground, any weight, that the Rope can raise without-breaking, then wet all the Rope with Water; in a little time the Rope impregnated with the water, will so contract it self, as to raise above Ground this weight, be it ever so heavy. If therefore common Water, without Rarification, or any other visible Motion, only that of *Fluid*, soaked 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 *Involuntary* 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 asserted; 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, sixth, 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 rarified 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 pleas'd to make Apology for what I told you must be deficient in it, I am,

S I R,

Your very Obedient Friend and Servant,

Bernard Connor.

London, *Brown-low-street*,
July 16th. 1698.

I Have thought here convenient, to set before this Treatise of Muscles, the Honoured Dr. Connor's Philosophical Account of the Mechanism of Muscular Motion, for the Curiosity and Satisfaction of such, as are not only desirous to know how 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 Disquisitions, 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.

<i>Obliquus Descendens,</i>	}	<i>Cremasteres,</i>	}
<i>Obliquus Ascendens,</i>		<i>Dartos,</i>	
<i>Rectus,</i>		<i>Musculi Clitoridis,</i>	
<i>Pyramidalis,</i>		<i>Directores,</i>	
<i>Transversus,</i>		<i>Acceleratores,</i>	
			<i>Penis.</i>

Obliquus Descendens:

O R,

The Oblique Descending Muscle.

NOTHING but an Almighty Contrivance could have Framed and Interwoven so Artificial, and so exquisitely 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

This compresseth the Belly laterally.

D

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 annex to the *Right Muscles*, serving as Braces to keep up these their *Triangular Coverings*; at the bottom or Basis of which, the *Pyramidals* are seen to arise, who in their ascent, making one long *Tendon*, inserting its self into the *Navel*, or sometimes seen 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.

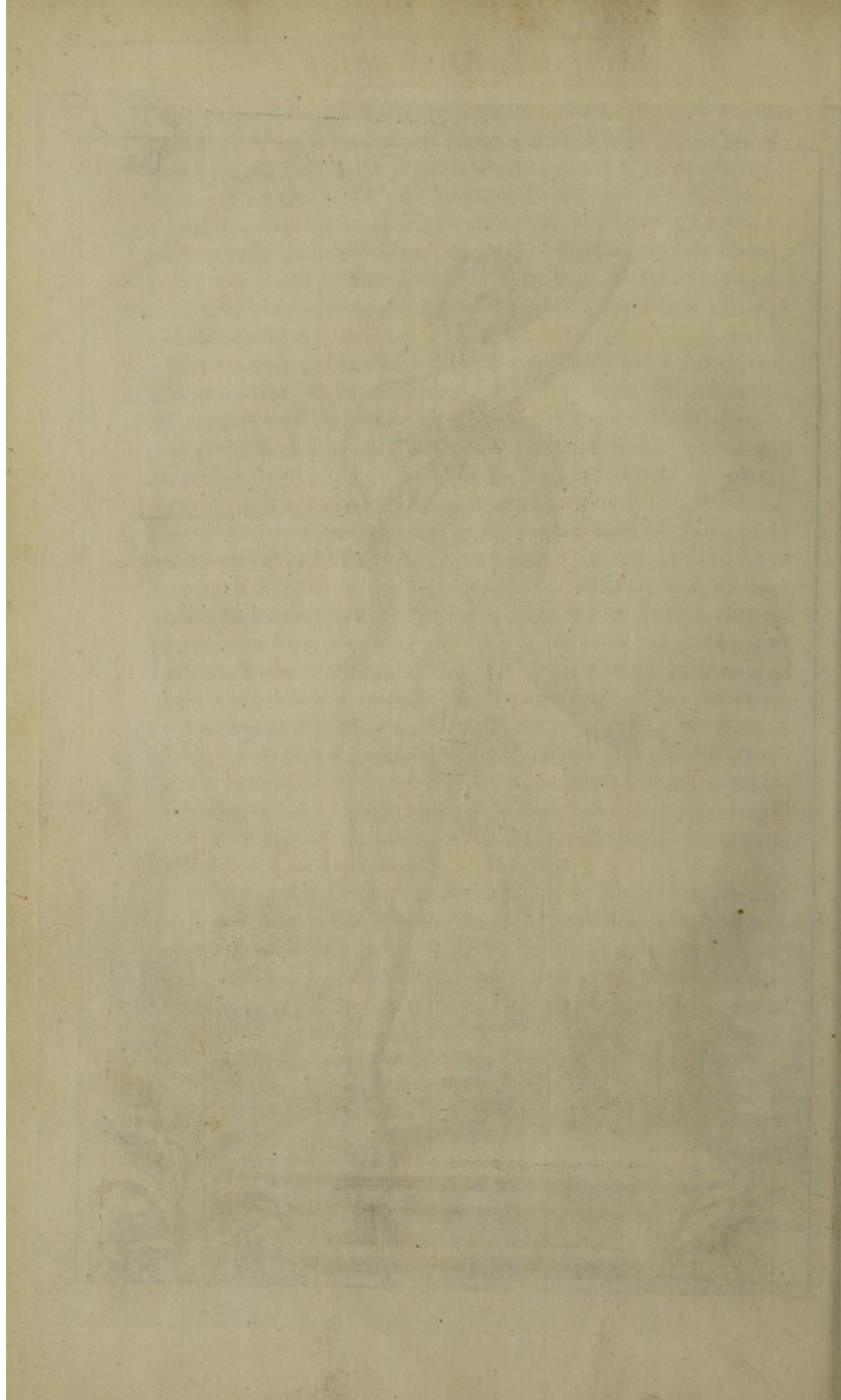
And as most of the parts of the Lower Belly are floating, loose, and relaxt, so also are they spongy and greasy, their Texture being loose, and they being bedewed with an infinite number of *Vessels*, are many times seen to run into putrefaction; for when the Aire once enters their substances, they are soon seen to condense 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 *Peritoneum* 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 *Peritoneum*, do so soften and extend it, that they readily
make

Prælectio prima

TAB. I.





make it give way to any impulse whatever, either hapning by 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 leen 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 obliquely downwards, being partly fleshy and partly *Tendinous*, and arising from the 6th. 7th. 8th. and 9th. *Ribs* indented, or indenting themselves into the carnous *Dentiform 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 fleshy in its Origin

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 *Latissimus 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*.

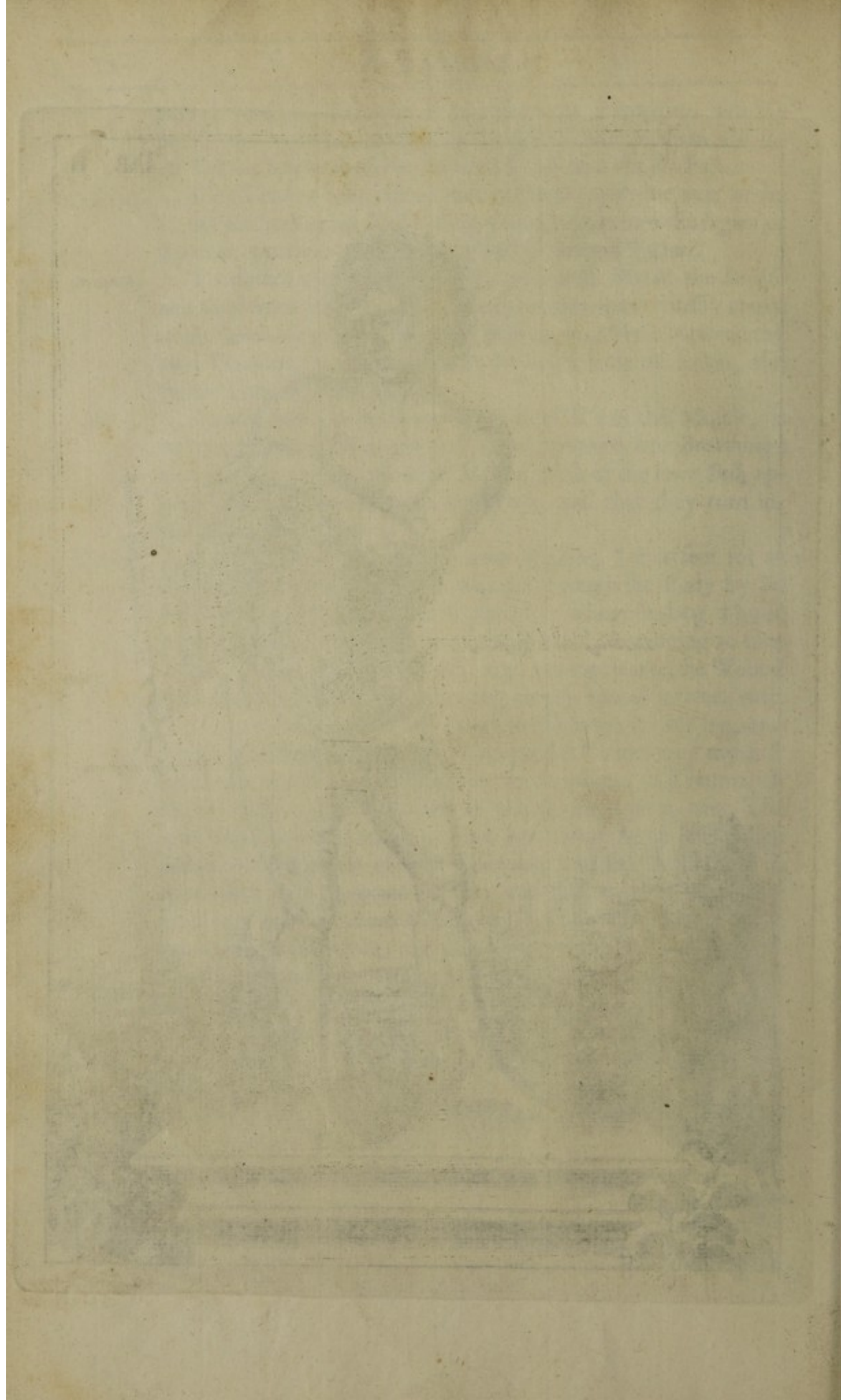
Use. *Columbus* and *Laurentius* write the chief Use of this Muscle, is to contract the *Trunk* of the Body, and promote free Breathing; and that contrary to all other Muscles, these of the lower Belly appear crooked when they do not work, and that they turn inwards when they do.

History. In the Year 1684, coming from *Windsor*, I was sent for to dress 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 sticht it up, leaving empty Spaces between each Stitch for the Blood, or any *Ichor* to discharge its self by, and with convenient *Boultsters* and *Compresses* I concluded my first Dressings, 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 suspecting his Recovery; yet by Gods Blessings, and my Care of him, I perfectly cured him, and he is very well, and in perfect 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





Obliquus Ascendens, or the Oblique Ascendent Muscle.

THIS is planted under the former, with Fibres obliquely ascending from the *Appendix* of the *Os Ileon*, it having a three-fold Origination, first fleshy under the 11th. and 12th. Ribs, whose advantageous Situation conduceth much towards the closing of the *Trunk*, by its Contraction in Expiration, whence ariseth 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 processes* of the *Loyns*; the third being fleshy, and arising from the *Appendix* of the *Os Ileon*, and inserting its self with a Membranous expansion into the *Linea Alba*, receives a perforation by the *Cremaster Muscles*, and *Spermatick Vessels*, somewhat above the former, as is frequently shewn by Dissection.

This helps the former in Compression.

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

Observat.

Again, when the several *Abdominal Muscles* do variously contract themselves inwards, they are allowed to press down the Excrement, and send 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 *Diaphragm* leaves off, these *Abdominal Muscles* begin, by loosning 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.

Annotat.

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 side, reaching even to his *Spurious Ribs*, without any apparent Intemperiety, save 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

History.

matter flew out plentifully, and the Symptoms abated, and the Patient happily dismiss'd 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 for-
wards.

Observat.

THIS 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 *Ensiform Cartilage*, is inserted into the sides of the *Sternum*, where the last true *Ribs* have their *Cartilages*: Its Insertions are various, it sometimes 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 say they help towards the bringing the *Trunk* inwards, and that by their double Contractions, they bring the *Breast* to the *Os Pubis*, and the *Os Pubis* to the *Breast*.

Annotat.

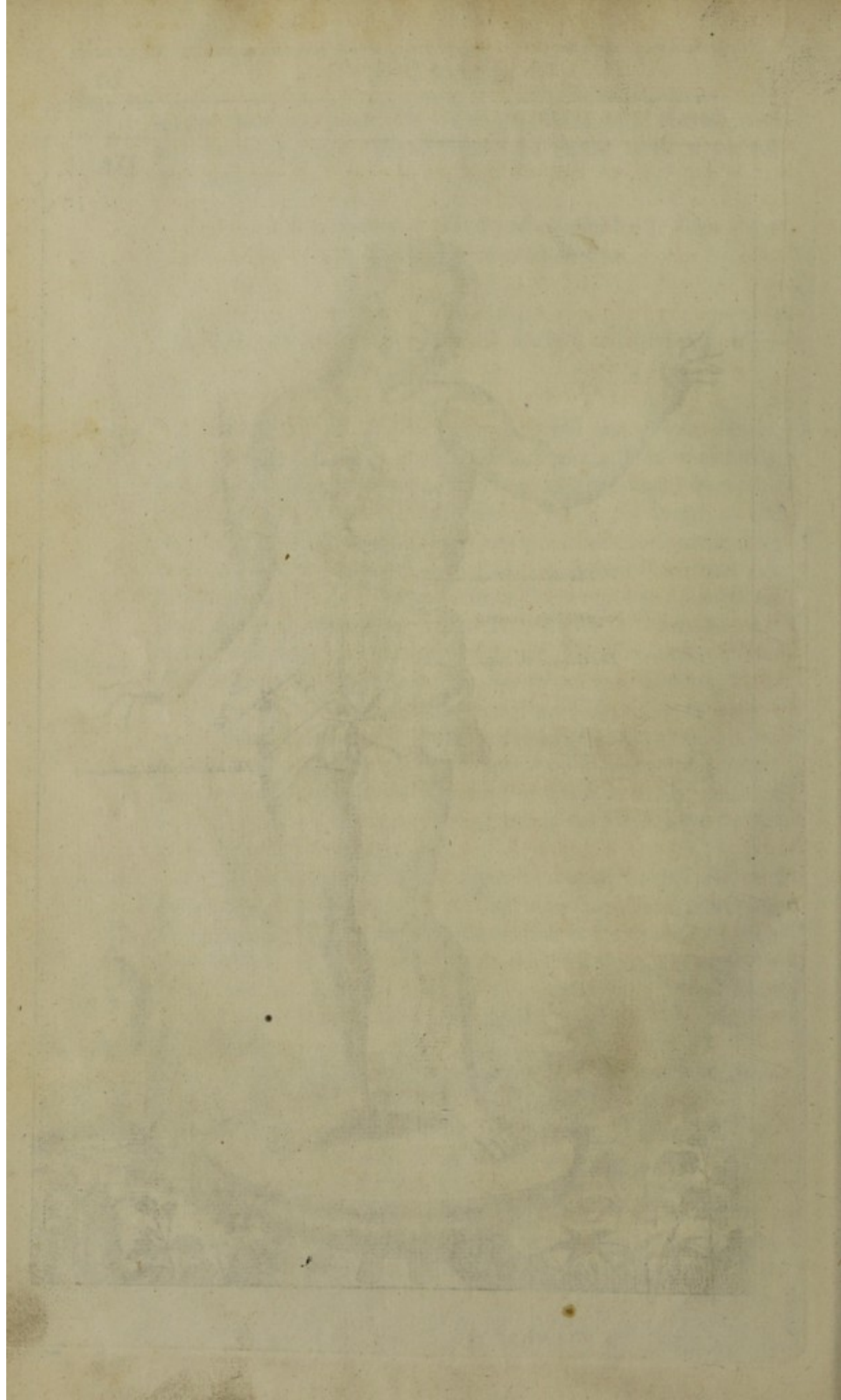
Again, as they take their Originations from the *Os Pubis*, and the *Sternum*, and insert themselves into the *Linea Alba*, marching all along lengthways, through the middle of the *Abdomen*, by their Contractions they are said to bring their Insertions inwards, by which motion, they are allowed also 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^r





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*, happening 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.

THIS Pair takes their Names from their Situations lodging under the former, and are penetrated above with the *Cremasteres*, and are allowed a three-fold Origination; first, Fleishy, 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 Ileum*, 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 assist each others Motion in compressing the *Belly*.

This brings the *Belly* downwards.

Bartholine writes, That this was made for compressing the *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.

Observat.

This *Muscle* also being perforated above the *Oblique Ascending Muscle*, through which the *Cremasters* and *Spermatick Vessels* do pass, and the Perforations of the *Oblique Descending*, and *Oblique Ascending Muscles* of the *Abdomen* being thus framed and planted one above another, not in straight, but in Bevil Lines, running and crossing 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

Annotat.

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.

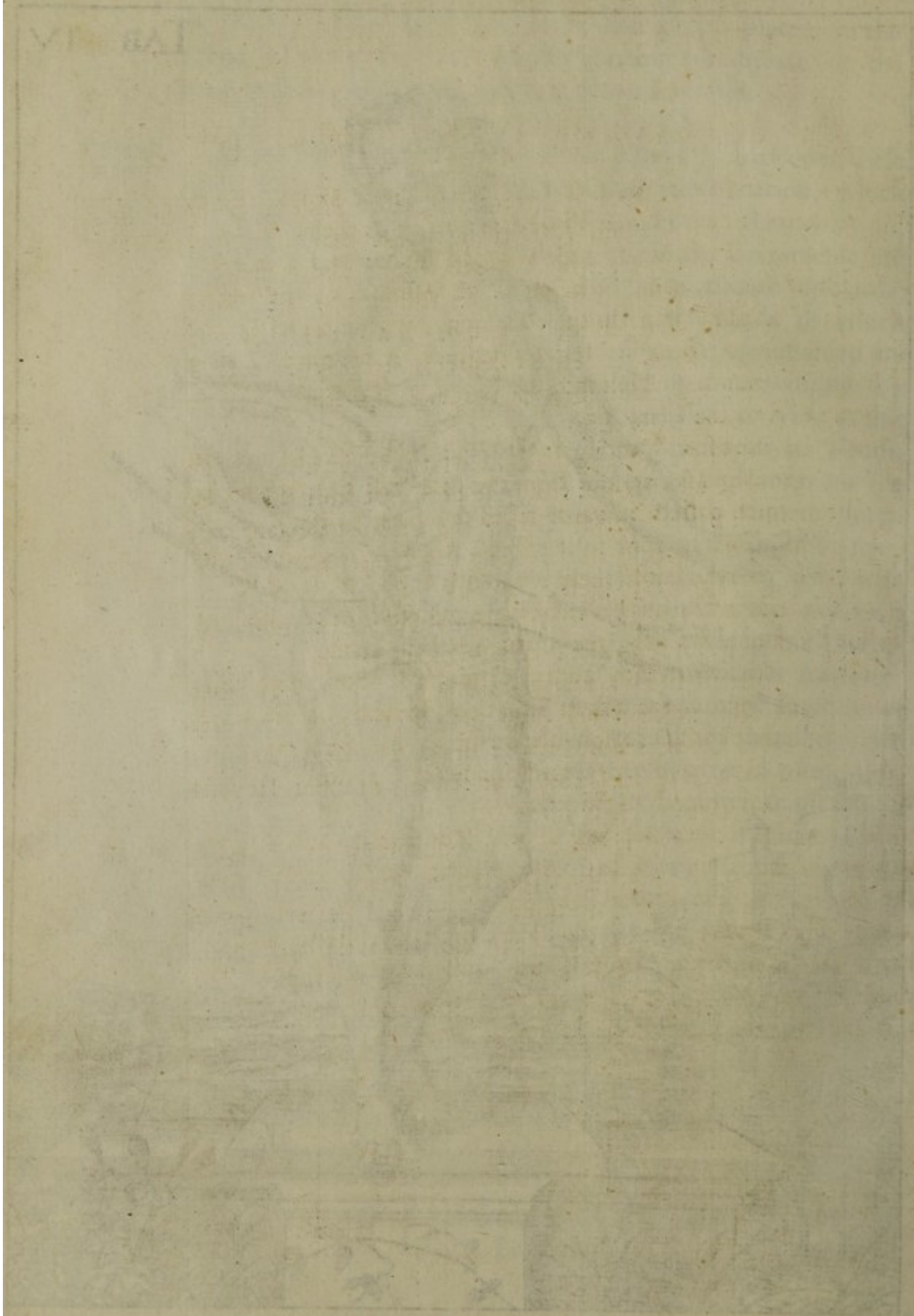
As for the usual Accidents which generally happen in these parts, I find none more dangerous than Mortification, which is evermore accompanied with Pain, Fever, Strangulation, and sometimes the Iliacal Passion, where the Excrements are often forced against their own weight to mount upwards; and seen to come towards the mouth; the Cause 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 Tendi-nous Frame, fails not to shut up the Gut, and augment the Inflammation by a reciprocal Action, which causeth 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 easily follow from the Loss of their Motion, from whence can ensue nothing but Divul-sion, Pain, and Loss of Life. There's yet another Lividity, which many times is seen to arise from too hard Pressure of these *Abdominal Muscles*, frequently caused by handling the Belly too much, and too hard, and rough, as is often seen done, in endeavouring to bring the Stone down to the Neck of the Bladder, which unprofitable, as well as unnecessary 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 seen to arise an immediate Mortification, and Change of Colour. The Chyrurgeon therefore being here cautioned of these bad Symptomes, should make it his Business, as much as in him lay, to prevent them; or wherever he be sent 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. both in and out of its place, with the Peritonæum.

Pyramidalis



VI. 61



Pyramidalis, or the Pyramidal Muscles.

FALLOPPIUS, the first Inventor of these *Muscles*, gives them these two Names, *Pyramidalis* from its make, it being 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 self by degrees, it becomes a long Tendon, Implanting its self into the *Navel*, or sometimes above, or beneath it to the *Linea Alba*.

This presseth the *Belly* downwards.

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 Inventor of them says they were design'd for compressing the *Bladder*, and promoting the discharge of the *Urine*.

Use.

Columbus writes that they assist in raising 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 fleshy Expansions, defending them from Cold, and outward Injuries, in Arching some of them, and running others into right Lines, and allowing these a *Pyramidal Figure*.

Annotat.

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.

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

This keeps up the *Testicles*.

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 fleshy 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 fibrous, whilst its inward (which respects the *Testicle* and its *Vessels*) is light, and bedewed with a waterish Moisture, as *De Graaf* writes, and is strongly annexed to the lower parts of the *Testicles*.

Use.

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 fall 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 Cabrolus, 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 publicly dissected in the Schools, shew'd a Body with one *Testicle*.

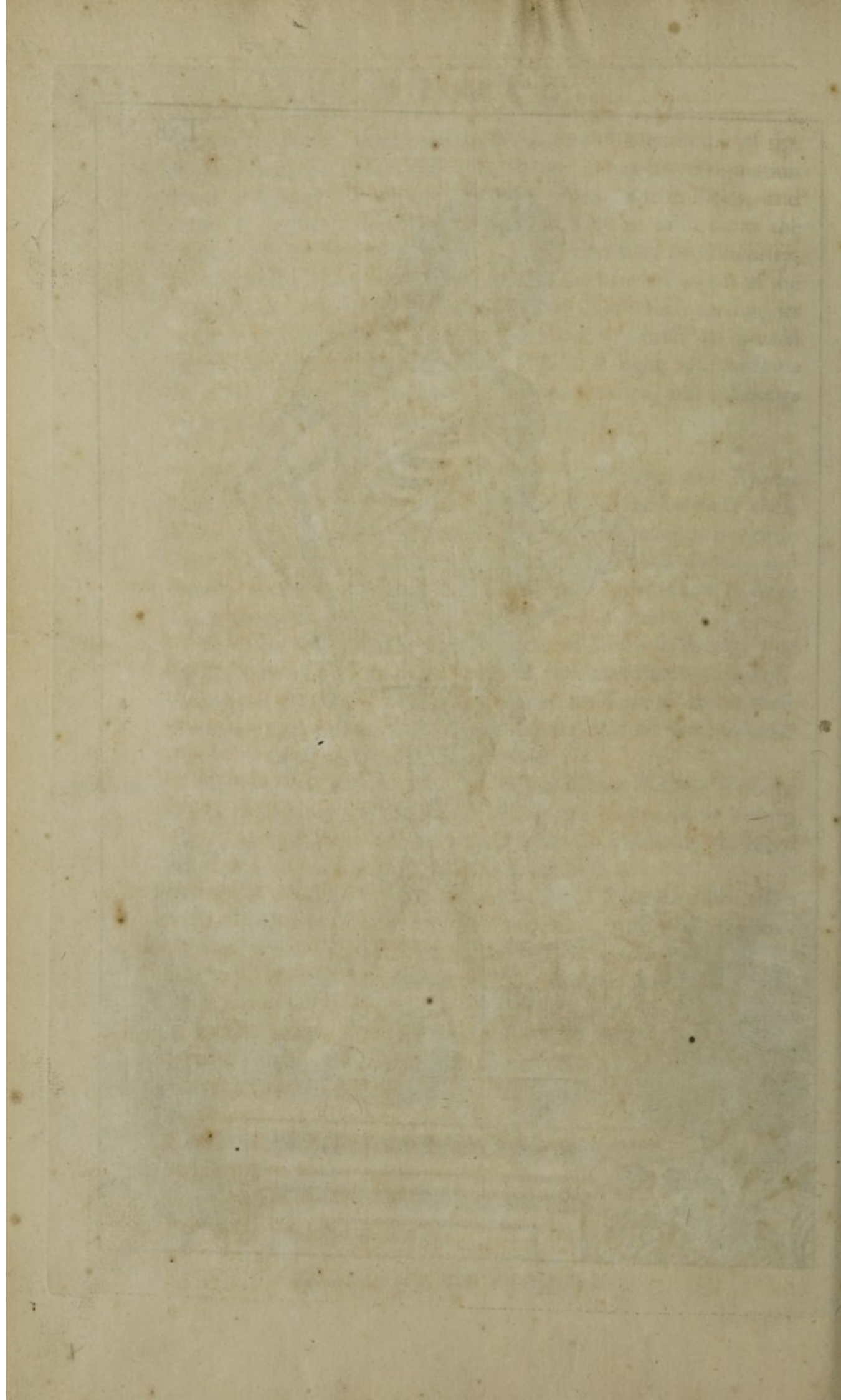
De Graaf writes, in his Book *de Org. Vir.* That he dissected a Man with one Stone, without any *Cicatrice* in the *Inguen* or *Scrotum*; and tho' his Wife had four Children by him, yet being askt whether her Husband had ever two Stones, she told him he never had more than one.

Some, on the contrary, have had three Stones, 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. *Fernelius* 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





Dartos, or Corium.

IT hath this Name of *Dartos* by *Celsus*, ἀ δέρας *Corium*, or rather ἀ δέρας δέρας, 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 Carnosa*, it being a *Muscular Membrane*, furnish'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.

This contracts the *Scrotum*.

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.

Annotat.

This its second Coat, helps the first in making its Contractions, 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.

Observat.

Obs. 57: *Fabrit. Hildan*. We read of one about 40 Years of 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 left 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

History.

arise in the left side of his *Scrotum*: He coming to *Basile* in very great pain, soon after, it broke, whence issued 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 irresembling a *Pumice-stone*, dipt in the water; yet this Man received so good a Cure, that he could retain his Urine (notwithstanding his former Ulcers) with out any involuntary throwing out of the same.

This is not to be shewn by any Figure.

Musculi Clitoridis, or the Muscles of a Glandiform Corpuscle.

This extends
the *Clitoris*.

THE *Clitoris* comes from an obscene Word, κλειτοριάζειν *Ericare*, 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 *Commis sure* of the *Shank 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 Muliebri*, 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 these, 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 *Fætus*, 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 *Clitoris* 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 *Gooses 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 *Diemberbroeck* says, he once saw 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* assign'd this, do arise out of the Bones of the *Coxendix*, which passing over its *Cruva*, 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 distending the Body of the *Clitoris*. *Regnerus de Graaf* allows it a second Pair of *Muscles* arising backwards from the *Sphincter 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*.

Diemberbroeck writes, in *Fol. 152, Anat. Lib. 1.* that he saw a Man at *Anjou* 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 whose 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*, *Præpuce*, and *Frænum* joyn'd to it, as is usual in Man; save that it was wholly imperforated, under the *Urinary Passage*; and the *Vagina Uteri* shew its self as in other Women, and in either Lip of her *Matrix*, was a *Testicle* contained.

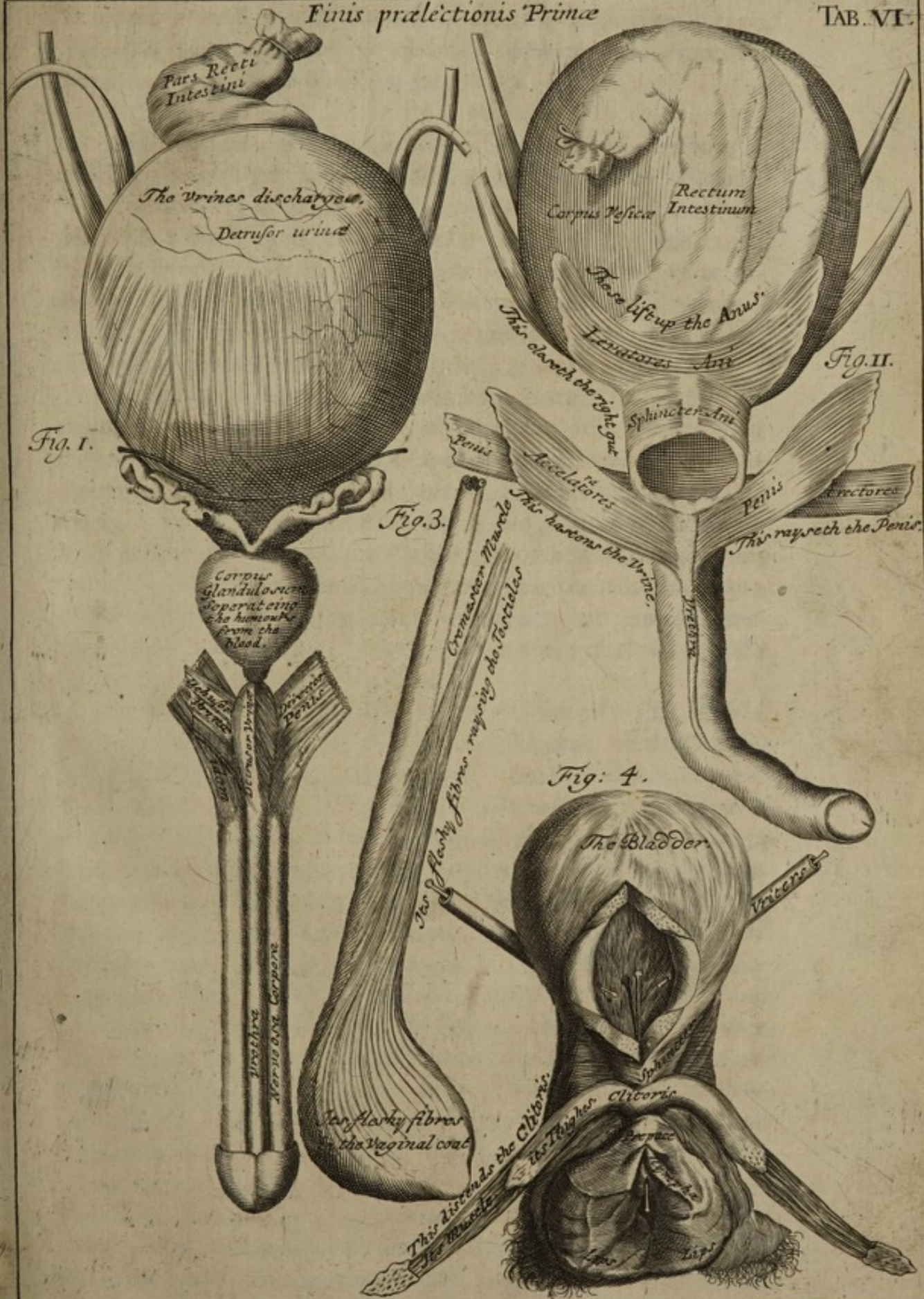
And in the Year 1668, he writes, he saw an *English Hermaphrodite* of twenty two Years of Age, who, among many other Shows, came to *Utrecht*, whose *Prolocutor* or *Informer*, pro-

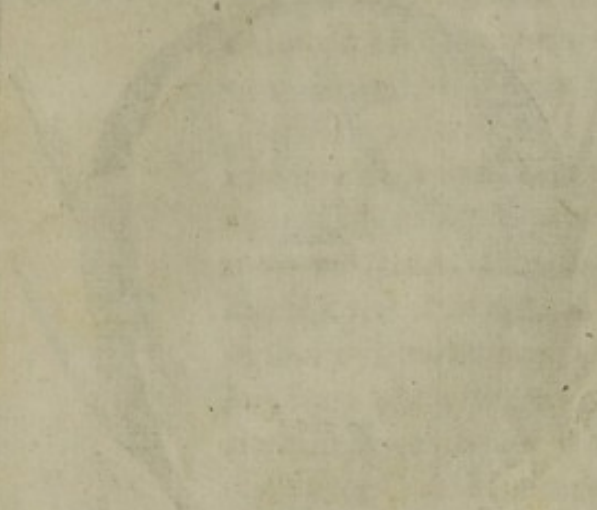
claimed that he was born a *Girl*, and in the 5th. and 6th. Years of his Age, his *Genitals* began to change, and in the iith. year thereof, the *Penis* shew its self, and was afterwards seen to swell near half the Length of the Little Finger, without any apparent Perforation in the *Glans*, altho' it was not much unlike it in Shew: This *Penis* upon her lecherous Thoughts, was seen 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 say: 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 thickneses we have here shewn them to be described by Authors.

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

Director Penis, or Collateralis, or the Yards Erector or Collateral Promoter.

THE *Penis* hath its Name à *Pendendo*, and sometimes it is called *Mentula*; it oft-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 *Aegyptians*, *Riolan* in his *Anthropolog.* Lib. 11th. Chap. 3. has shewn. Its planted in the lower Belly, as the fittest place, for exercising its faculties; and as to its largeness, 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 *Erectores Penis*, they taking their Originations from





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from the *Appendix* of the *Coxendix* under the beginning of their Nervous Bodies, in whose thick Membrane their Fibres do seem 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 seen 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 Extension is from Contraction: Nor indeed, can these *Muscles* any wise raise the *Penis*, considering their Situation; for whereas their Origination is firmly affixt to the Bones of the *Coxendix*, as I formerly said, 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 depressed, 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 sorts 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 arising from the *Os Sacrum*, and as many Nerves and Arteries coming from the *Hypogastricks*, which every way sending 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 necessary 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 those Arteries of the Deceas'd which lead to these nervous

Bodies, whereby you may easily see the *Penis* become distended: Again, as *de Graaf* ingenuously observes, whenever you tie 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 said, rather than raise it; this may serve 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 compressed, 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 such things as can augment the Animal Spirits; secondly, by advising that which can allow an Encrease to the Quantity of Blood; and lastly, by strengthening the *Muscles*, by whose Constriction the Blood is allowed to be detained in these the nervous Bodies.

Histories.

Obs. 19. *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* shew its self 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 *Bladder*, because he had none, but in the Fissure, and the Urine discharged its self by its Orifices, and dropt out continually;
above

Above this Excrefcence was planted the *Navel*, fram'd with four forts of Veffels, &c. that which in his cafe was moft material, he had no *Bladder* nor *Penis*, &c.

Diemerbroeck tells us, Fol. 154. Lib. 1. Anat. of one whose *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 obfcur'd *Penis* fwelling in Letchery, made its way out of its narrow paffage, whereby we may plainly fee that thefe Men were not Women from the firft, altho' judged fo by filly ignorant *Midwives*. Hiftories.

In *Obf. Schol. Med. Obf. 1. Felix Platerus* tells us of a *Priest*, who pift out about 2000 Stones in the fpace of two Years; it being very wonderful, that Nature fhould be more careful in raifing a *Querry* of ftones in fome Bodies, to tear down or over turn the *Natural Fabrick*, than were ever defign'd others for raifing it.

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

Acceleratores Urinae, or the Urines Stimulators.

BESIDES the former, the *Virile Member* hath thefe two allowed it, which take their Names from their ufe made of them; they arifing from the *Sphincter Ani*, and being joyn'd together by their Infides, are feen 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.

*This haftens
the Urine.*

The ufe of thefe *Mufcles*, according to fome *Anatomifts*, as well as that of the former, is contrary to Sence and Reason; for thefe are rather feen to narrow, than dilate the *Urethra*, and therefore can by no means properly be call'd haftners, but rather delayers of the *Urines Exit*; for they sometimes have been feen to run over the middle of the *Urethra*, and ftrongly ty'd to one another with the extremities of their Fibres, whilft 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 muft confequently follow,

H in

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,

IN 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 famous 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 full 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 making too much use of it, by which the spongy Cells of the *Corpora Nervosa* 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,		Temporalis,
Corrugator,		Digastricus,
Occipitalis,		Masseter,
Orbicularis clausor,		Pterygoideus Externus,
Elevator Palpabræ,		Pterygoideus Internus,
Elevator	} Nasi Alarum,	Styloceratohyoideus,
Dilatator		Coracohyoideus,
Constrictor		Milohyoideus,
Zygomaticus,		Geniohyoideus,
Elevator	} Labii Superioris,	Sternohyoideus,
Depressor		Styloglossus,
Elevator	} Labii Inferioris,	Ceratoglossus,
Depressor		Genioglossus,
Sphincter Labiorum,		Myloglossus,
Buccinator,		Hypoglossus,
Quadratus,		Lingualis,
Elevator	} Auriculæ,	Mastoidens,
Depressor		
Abductor		
Adductor		

Frontalis, or the Frontal Muscle.

HAVING cleared the *Abdominal Muscles*, which of necessity required our first use of the Knife, we now arrive at those which in Dignity deserve our Inspection, 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*.

This draws the Fore-head upwards.

Annotat.

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.

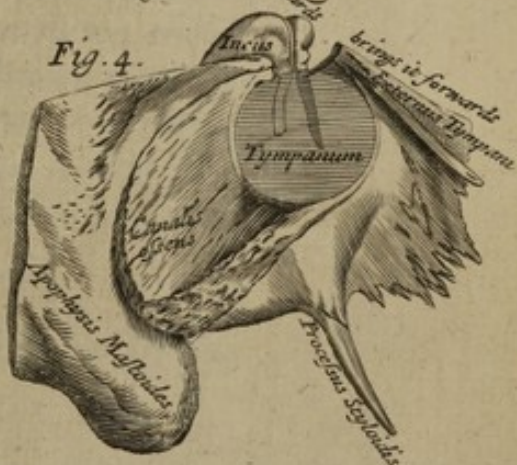
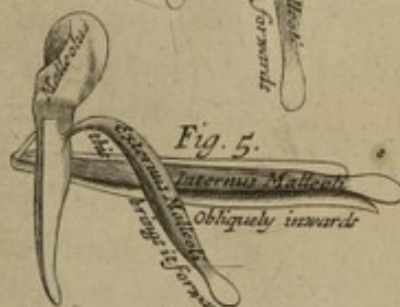
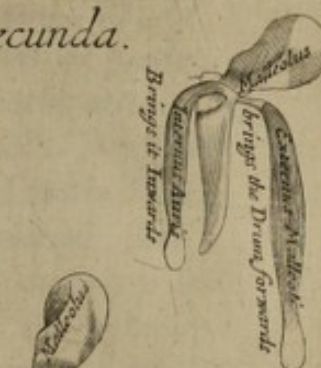
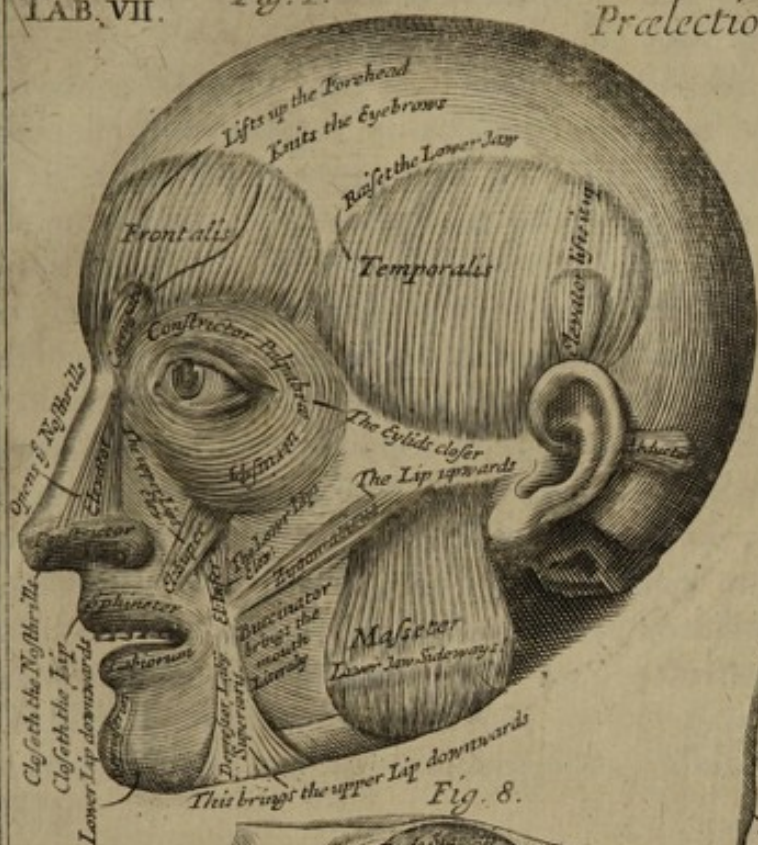
Bartholine writes, that in a Nasute Person, he observ'd the *Appendix* hereof to be Extended even to the Cartilages of the Nose.

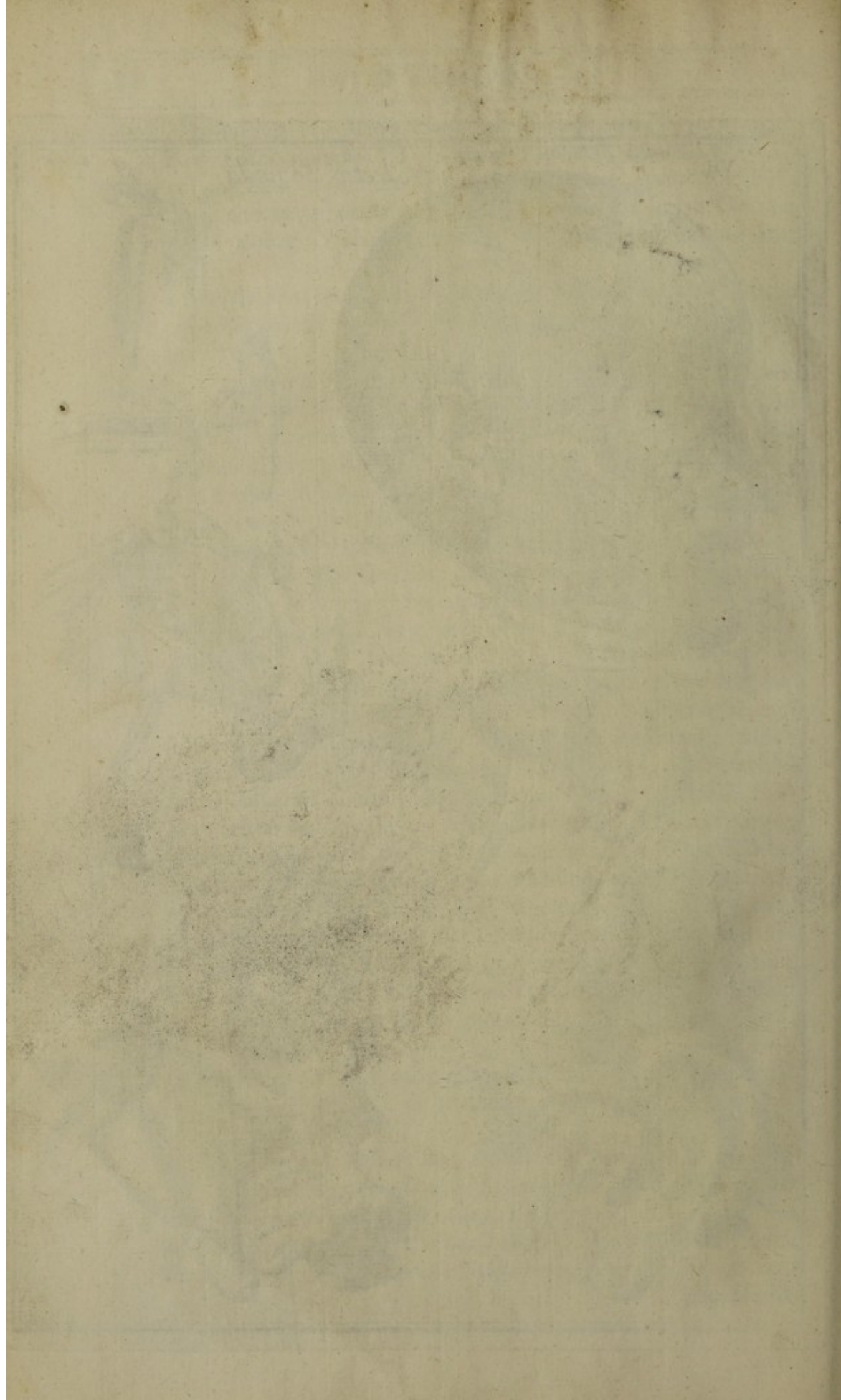
History.

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 left 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 bigness 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 several 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 *Observations* 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 plusspart des Authours, Il faut toujours faire un prognostic tres funeste dans Les plaïjes de Teste, qui sont avec Fracture du Cranê; Cependant, il est certain, qu'on a veu bien des fois ces sortes des plaïjes, Venir à Cicatrice quoy que Lu Dure & la Pie Mere, & Mesme la propre Substance du Cerveau eussent este considerablement





siderablement Offencies; C'est de quoy j'ay donne divers Exemples Memorables dans nos Journax de Medicine, Tom. prim. pag. 17. & 527. & Tom. 3^{me}. pag. 43. Cela fait Voir, que dans les simples Fractures du Cranè, quoy que d'aillures considerables, on peut attendre beaucoup de la Nature, Lors que son action est sont exue par L'Industrie d'un Artiste Experimenté; C'est de quoy L'Hospital de Londres Vient de me fourver une preuve qui me paroist 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-semaines auparavant, s'estoit fait une plaie contuse au Front, partie superieure & aucunement fenestre, avec deux Fractures si considerables au Coronal, que Mr. Browne avoit avec L'Elevatoir retiré 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 vomissement, ny Fiebre, ny Convulsion; la plaie estant d'aillures disposee 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. i. 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-

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 *Tables* belonging to that Bone, much of the bigness of a *Three-pence*; which Operation had so fortunately prevented the Accidents that might have ensued from the extravasated 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 hairy Scalp
backwards.

THIS Muscle takes its Name from its Use, or rather from *Con & Rugo*, which signifies to wrinkle; or, *Frontem Corrugare*, to knit the *Brows*. This Muscle and its Partner, as *Volcherus Coiter* writes, doth arise near the greater *Canthus*, or *Orbite* of the Eye, and seems 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.

THERE 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 fleshy 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 *Ears*: And hence it is, that they who have these Muscles 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 allowed to pull the hairy Scalp backwards.

I shall here add an Observation of a *Watermans Case*, who was my Patient in the Hospital also, that was there cured of a contused Wound, and a large Fracture on the right side 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 30th. of *June*, it was occasioned by a Splint from a Ship; upon the receiving of which, he both became dumb, senseless, and speechless for some time: The fourth day after this Mischiefe, he began to come to himself, and was sent 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 advised 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 loose, through which the aforesaid 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 whatsoever; and by applying over it a Syndon dipt in my *Balsom*, and now and then using *Catagmatick* Powders to remove his Fungus's, there came on a new *Callos* 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 Physicians 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-

History.

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 soon 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
the Eye.

THIS Muscle hath its Name from its Orbicular Set of Fibres, which do Circularly Enclose the Eye-lids: Vesalius and Bartholine allow this a single Muscle, planted between the Membrana Carnosa, and the Pericrane, near the Roots of the Nose, 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 Insertion 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 self to be two Semicircular Muscles, 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 Nose, and passing thence the length of the upper Eye-lid, is Inserted 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 Insertion 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 Insertions allow'd them.

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

Elevator

Elevator Palpabræ, or the Eye-lids Elevator.

THIS is allow'd to arise sharp and fleshy from the upper Orbit of the Eye, near the Elevator^{*}, where the 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 Palpabræ, and by raising the same up, does open the Eye with it.

This opens
the upper
Eye-lid.

* of y
Ey & it
helps.

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 and grisly Substance, covered over with Skin, to keep 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 airy Particles, which occasions the various Appulses upon these its Fibres, which makes them the proper Instruments of smelling; and if we consider the Structure of the Nose 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 decent Figure: We begin with these Pair, which are seen to arise from the Top of the Bone of the Nose, 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 Δ , it marcheth downwards the length of the Bone, and is inserted broad and fleshy into the Nasi Alæ.

This dilates
the Nostrils.

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

Dilatator Nasi Alæ, or the Nostrils Dilater.

This dilates
the Nostrils.

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

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

Constrictor Nasi Alarum, or the Nostrils Closer.

This closeth
the Nostrils.

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 fleshy at the Root of the *Nares*, and is transversely 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 up-
wards.

THE *Lips*, as they are made of delicate soft and spongy Flesh, neatly covered over with a fine Skin, painted with an admirable Vermilion Blush, and as they are stufed 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 fleshy from the Jugal

Jugale process, and marching obliquely downwards and forwards through the Cheeks, is inserted into the side 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 Skin of the upper Lip, is implanted into the Lips, where they are joyned together, bringing them upwards and outwards. This brings the Lip upwards and outwards.

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

Depressor Labii Inferioris, or the lower Lips Depresser.

THIS ariseth fleshy, from the lowermost and outermost part of the lower Jaw, whence obliquely marching, it is broadly inserted into the middle of the Lips, and in its Operation, is said to bring it downwards and outwards: This brings the lower Lip 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 of the upper Jaw above the Gums, and in its ascent, is inserted into the Roots of the *Nasi Alae*, and upper parts of the upper Lip, forcing the upper Lip and *Alae* downwards; and by bringing them closer together in their Operations, doth advance our smelling of things grateful, or ingratel; and by reason of this Contrariety of Motion, this Muscle by some Anatomists is taken for two Pair of Muscles. This brings the upper Lip downwards.

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

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 arising fleshy 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 Sphincter Labiorum, or Orbicular, or Sphincter of the Lips.

This purseth 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 *Sphincter*.

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 center 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

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 distended on each side, by the opposite Muscles inserted in the Angles of the *Lips*, reducing as well themselves, as their *Sphincter*, the Orbicular Muscle, to a *Tonick* Motion, which gives the Mouth the Advantage of closing 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.

IT is called *Buccinator* from its use, in forcing the Breath outwards; and *Constrictor*, from its bringing the *Cheeks* inwards in Mastication: Its a Muscle assigned both to the *Lips* and other parts, and doth borrow its Origin from the *Gums* belonging 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 annex to the inner Coat of the Mouth, that they are scarce thence divisible, as *Diemerbroeck* writes): Thro' this Muscle passeth the *Ductus Salivaris 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 Salivari*.

This brings the Cheek and the Mouth to the side.

The Use of this Muscle, is, that by bringing the *Cheeks* inwards in Mastication, it forceth the solid Nutriment upon the *Teeth*, for its better Commintion; 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-

Observat.

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 Myodes.

This draws
the Cheeks
downwards

Annotat.

THIS 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 *Sternum*, 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 joynted 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 closeth the *Lips*; this also is allowed to assist 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.

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

Elevator Auriculæ, or the Ears Elevater.

This lifts up
the Ear.

IT's by the pleasing Sense of Hearing, that we make ourselves 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, conveyed by the Orbicular Motion of the Air naturally mounting upwards; so hath this fine *Auricular Structure* allowed it diverse Processes and Cavities, finely carv'd out one within another: Its seen also furnished 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 Passage*, 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 Inserted into the upper part of the *Ear*, bringing it upwards and forwards.

Lycosthenes tells us of a Boy, born on the 4th. of December 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 *Mouth* only given to his *Face*. History.

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 Fibrous, from the back part of the *Head*, near the *Mammillary Process*, and growing narrow in its Progress, is Inserted into the *Cartilage* which environs the *Ear*: Be careful in raising the *Cutis*, lest you take up this Muscle with it, and so loose him.

This brings the Ear backwards and downwards.

This Muscle by some is allowed a part of *Quadratus Buccae Detrahens*, and by *Du Verney* is call'd *Triceps Auris*, from its three fold Origination allow'd it.

Annotat.

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.

History.

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

Adductor Auris, or the Ears Adducter.

This brings
the Ear for-
wards.

THIS is a common Muscle, being a part which *Spigelius* calls *Quadratus Buccae Detrahens*, 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 the Ear.

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

Abductor Auris, or the Ears Abductor.

This brings
the Ear back-
wards.

THIS is planted at the Occiput, and ariseth above the Mammillary Processes, from a Knot of Muscles belonging to the Occiput, with a narrow Origination, and being carry'd Transversely 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.

Bauhin. 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 sort 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.

This brings
the Nether
Jaw upwards.

MAN hath allow'd him a short Nether-Jaw to give his Face an Oval Figure, and provident Nature, lest the Muscles might be any wise 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 side 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 *Muscles*; among which, this, we now are describing, doth gain a preference from the rest, whose Course of Fibres being various, are as strangely put together to enlarge their strength. This pair invest'd with the *Pericrane*, do borrow their Originations from the Bones of the *Front*, *Temples*, and *Sinciput*, from whence they arise 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 rais'd into a Circular Form, both to secure, and give place to the lower part of the *Temporal Muscle*, which creeping under it, doth insert 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 Interposition of some screw'd Instrument, as is usually seen in those Persons violently troubled with the *Epilepsy*, 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*, useful in these Cases.

This *Muscle* is accounted the strongest *Muscle* 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 Convulsions.

Annotat.

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

History.

Observ. 8. *Fabrit. Hildan. Cent. 2.* you read that *Hippocrates* 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 *Nerves*; (to use *Hippocrates* own Words) If the right, the *Nerves* are di-

Observat.

Admonit.

stended in the left; 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 sound part, cannot but produce great Pain, if not Danger of Life: Besides, several *Veins* and *Arteries* do pass through the *Temporal Muscle*, which by a Transverse Incision being at any time made, may occasion large and dangerous fluxes of Blood: As he himself writes, he saw in a Girl of fourteen Years of Age, where you have the story thereof at large, as a Caution to all Young 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 Usu. Part. Cap. 3.* So if they be cut o'rethwart, great Pains usually succeed thereon, by reason these Parts are endu'd with no small Sense, they having a Nervous Origination, whence oft times Convulsions are seen 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, &c.

One *James Crawford* a Scotchman, 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 *Lamdoideal 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 first coming thither, 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

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 several of our most Eminent *Surgeons* of this Town, had been frequent Visitors 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 dressings began to divide, and at times wasted, and turn'd out in several pieces; upon tracing 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 side 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* and *Dilatation*, answering the *Systole* and *Diastrale* of the *Heart*; hence both the *Physitians*, as well as *Chyrurgeons* were surpris'd 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 self, much deprest by the repeated Blows on his right side, it throwing forth on the contrary side many

strange and unusual Productions; for upon scraping this Substance of the *Dura Mater*, with the blunt side of the Knife, we observed several *Foramina* or small Perforations made thro' it, from whence this Matter might issue, and be supplied from the Brain; besides, in one part of the *Dura Mater*, we observed a kind of *Pedunculus*, much resembling a *Stem*, or *Stalk* in the inside 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 bigness of a *Pullets Egg*, and may (if you please to allow it) properly be called two præternatural *Cerebella*, or Appendages of the Brain its self: The *Cranium* within side 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 several 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* closed up again. But this was not this poor Fellows Case only, for besides these, he had a very large Tumour on his left side upon his bastard Ribs, covering that side 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 unusual; 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 so corrosive 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 left 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 discharging 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 bordering 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 side, 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, yet Dr. *Briggs*, His Majesties Physician, and who was one of the Physicians of the said Hospital, when this Man was there under my Hands, will justify 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 Happiness of an Hospital 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 extraordinary Operation of Surgery, which I formerly saw performed 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 loosely joyned to the Ambient Bones, by reason of a *Caries* (occasioned, I suppose, by a Venereal 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 side: I was mightily surprized, to see the Patient undergo all this, with so little Concern; he having had no Symptoms, or any Inconveniency succeeded, save only, that he could not lye upon this side, 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 Pressure

“sure upon the Brain; and that consequently it was no Wonder, why this Man should live, having had neither of these two ill Symptoms after the Operation; it gave me likewise 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
Mouth.

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 *Mammiformis*: It is such 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 fleshy, 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 Nether Jaw upwards; 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 Manforius.

This brings
the Nether
Jaw sideways.

IT hath its first Name, from its Use made of it in Mastication, and *Lateralis* from its Situation: It is a Muscle that ariseth 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.

If

Tab. VIII.

*Musculi Uvulae vocati à D.D.
Crowne primum in lucem erutj
et publicè ostensi.*

Fig: 2.

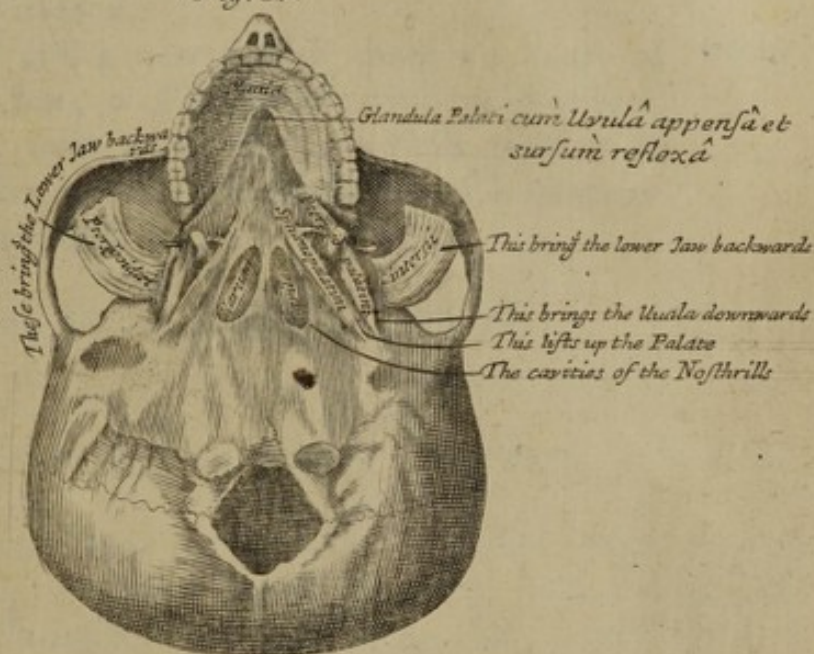


Fig: 1.

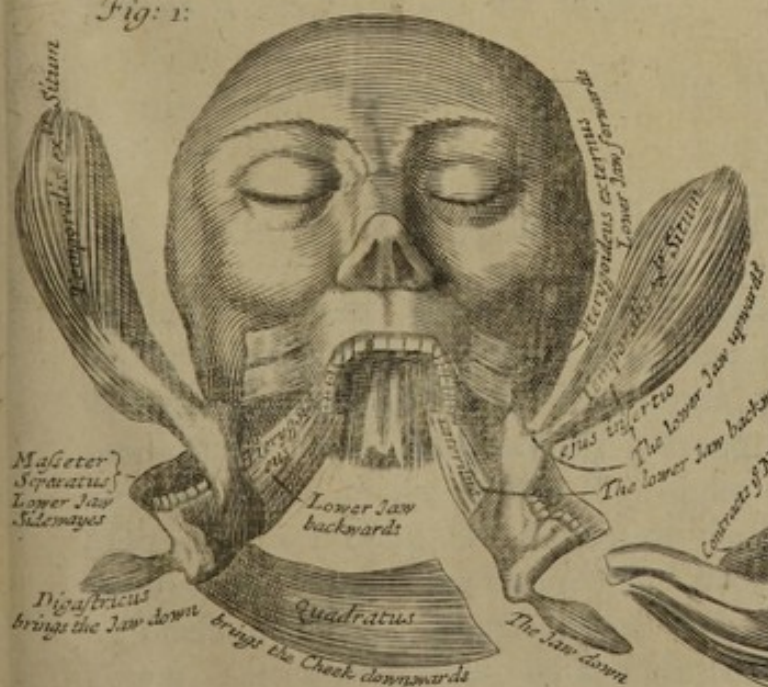
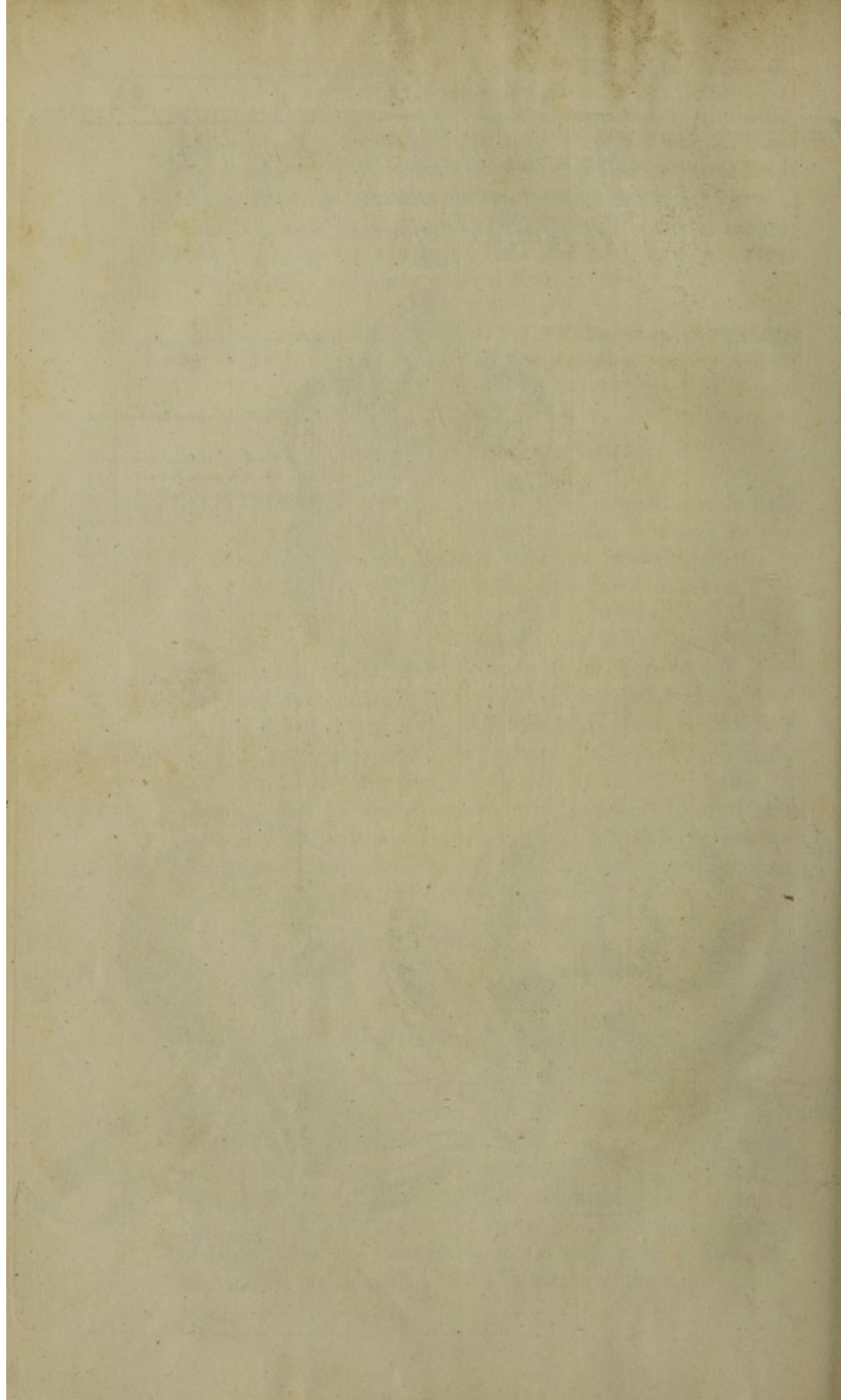


Fig: 3.





If you throw this *Muscle* from its Original, or Insertion, *Observat.*
Temporalis will appear to view.

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

Oetbens writes, he saw 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 *the Nether*
 outward part of the *Processus Aliformis*, or Wing like Process; *Jaw forwards*
 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 Ten-
 don 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 *it backwards.*
Processus Aliformis, or Wing like Process, partly nervous, and
 partly fleshy, and is inserted by a strong and broad Tendon
 into the inside 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 *Gullet*, be compleated in Dissection.

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

Motion of others, as Dr. Collins, and others do observe, in which the *Masseters*, 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; whilst 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*, whilst the *Temporal Muscles* closing them, as naturally do by their contrary successive Motion, stamp and lessen the Meat, whilst it is between the *Teeth*, and the *Pterygoidal 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 *Masseters* by reason of their Variety of Fibres, decussating each others in divers Angles, do assist each other in their Contractions, and helping the former, are allowed to bring the *Nether Jaw* both inwards and outwards, for the better lessning of our Nourishment in Mastication; the *Buccinators* and *Tongue* assisting them in keeping the Meat in its proper place.

Again, The Use 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*, *Synceipitis*, *Sphenoides*, and the *Os Temporalis*, and the *Masseter*, contracting its self 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 Allwise Grand Architect) doth pull down the lower Jaw, by the Assistance of the carnos Fibres, of the two Ventrers; one arising 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 Genæ* taking its Origin from the Spines of the Neck, and inserted all along the outside of the lower Mandible, doth pull the lower Mandible downwards: Whereupon these Antagonist Muscles to the *Temporalis*, and *Masseter*, the *Digastricus* and *Quadratus* do open the mouth for the Reception of Aliments, which is stamp

stamp between the Teeth, *tanquam Pistillis quibusdam alimentum contudentibus, conterentibusq;* by breaking the Aliment into small Pieces or Particles, by the often repeated quick motions of the *Temporal, Massorial, and Pterygoideal Muscles* joynly contracting themselves: But if these last Muscles, the *Pterygoidei Externi & Interni*, do act singly, their manner is different; the first arising out of *Aliform Process*, and are inserted into the inside of the lower Jaw, at its edge, opposite to the Insertion of the *Masseter*, and draws the lower Jaw backwards, when it acts singly; and the *Pterygoidei Externi & Interni*, taking their Origin from the external part of the *Pterygoid Process*, and *Os Sphenoides*, lodged in a concave part of the *Temples*, opposite to the *Os Jugale*, and taking its Progress backwards to the Insertion of the Neck of the *Processus Condiloides* of the lower Mandible: These *Aliform Muscles*, if they act joynly, they elevate the lower Jaw, and assist the *Temporal Muscle* and the *Masseter* in the raising the lower Jaw, in the Mastication 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 convulsive 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.

Styloceratohyoideus.

BEfore we discourse of the Tongue, we shall offer at somewhat of the *Os Hyoides*, which is given to it, as a Prop 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 arising fleshy and sharp, from the Root of the *Processus Styloides*, or Beak-like Process; and being small and round, and afterwards growing larger, is implanted into the *Ceraa*, or Horn of the *Os Hyoides* under the Chin, or that Bone plan-

This brings the *Os Hyoides* upwards and backwards.

ted at the Root of the *Tongue*, much resembling a Greek U, and therefore by some, called *Upsilodes*, and by others (tho' improperly) *Lamdoides*, from a Greek Λ , and is infallibly found 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.

Coracobyioideus.

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 fleshy, 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 compressed by it.

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

Mylobyioideus.

This brings
the *Os Hyoides*
directly up-
wards.

THIS hath its Name from the place it has between the lower Jaw, and the *Os Hyoides*, and arising 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 fullest, but it is not decyphered in my Book of *Muscles*.

Gene-

Geneiohyoideus.

IT's called thus from its arising under the *Chin*, and inserted into the Basis of the *Os Hyoides*; and by some *Anatomists* its called *Rectus Attollens*; it being a short, thick and fleshy Muscle, arising from the inner parts of the Nether Jaw or Chin, and marching downwards, is inserted into a proper Cavity at the Basis of the *Os Hyoides* internally, bringing it upwards and forwards, and doth assist the *Geneioglossi* in thrusting forth of the Tongue.

This brings
it upwards
and forwards.

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

Sternohyoideus.

IT is so called, it arising from the upper and inner part of the *Sternum*, broad and fleshy, as most *Anatomists* allow, under the Skin of the Neck, and carrying all along the same breadth and thickness, on the *Aspera Arteria*, and the *Thyroidal Cartilage* of the *Larynx*, it inserts its self into the Basis of the *Os Hyoides*, bringing it directly downwards, and somewhat backwards.

This brings
it downwards
& backwards.

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

Styloglossus.

THE Tongue hath its name à *Lingendo*, or licking; and altho' it is but small in Bulk, yet it is great in use, in that it affords us many advantageous uses as to our *Speech*, 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 arising sharp, small and fleshy,

This brings
the Tongue
upwards and
inwards.

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, fleshy and thick.

Use. If either of them move, they bring the *Tongue* directly to the right or left side; 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.

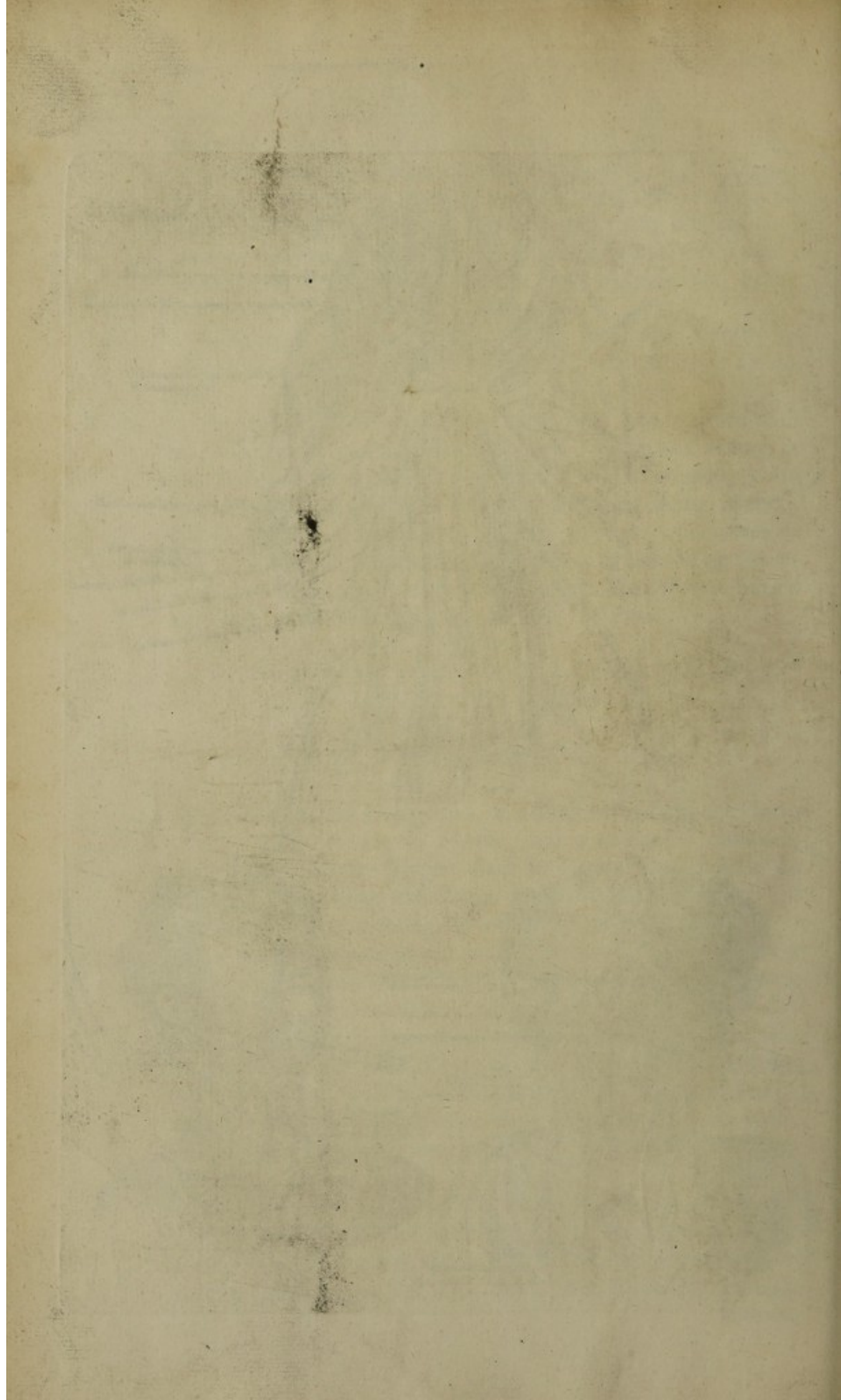
This brings
the *Tongue*
downwards &
arcs.

THIS is called *Ceratoglossus*, it arising fleshy 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.

History. In the lower part of the Mouth under the Tongue, there has been sometimes seen to grow another Tongue, as it were tyed to it; it not much differing from it, as to its 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 Cleft, dividing the right from the left 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 swelled suddenly up again; yet I so eradicated it on every part by my *Cutting Canterbury*, and the *Vi-triol 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.

IT's called *Geneioglossus*, it arising fleshy, with a narrow Beginning about the middle of the lower Jaw, or Chin; and then enlarging itself, 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 Basis.

This brings
the Tongue
forwards.

Obs. 28. *Fab. Hild. Cent. 1.* we read of a Girl falling on 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.

History.

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

Myloglossus.

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

This brings
the Tongue
upwards.

Annotat.

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 *Obs.* 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 sent for, after bleeding him, and other things there prescribed for him, his *Tongue* grew softer, and the Tumour disscult, and the *Tongue* brought to its former Habit.

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

Hypsglossus, or Basiglossus.

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 *Hypsgloides* from its Figure it bears with a Greek *U*, and *Basiglossus*, it arising from its Basis, and ending in the middle of the *Tongue*; this being generally allowed to bring the *Tongue* 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.*

Lingualis.

This moves the *Tongue* both in Constriction and Dilatation.

IT has its Name, it arising large and fleshy from the Basis of the *Os Hyoides*, and runs forward to the *Tip* of the *Tongue*, 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

The *Stylopharyngæus*, 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 inserted into the inside of the Glandulous Coat of the *Fauces*, do lift them up, and expands the Mouth of the Gullet; but the *Styloglossus* implanted into the Root of the Tongue, lifts it up towards the Palate; and the third *Styloideus* being inserted into the Horns of the *Os Hyoides*, elevates it, and the Root of the Tongue fastned to it; the Actions of the Swallowing Muscles with their Origins and Inseerions, being thus premised, Deglutitions and their main Uses is thus celebrated: The *Styloglossus* lifting up the Tip and Blade of the Tongue towards the Arch of the Palate, therewith throweth the Masticated Meat (embodied with Salival Liquor) upon the *Epiglottis*, pressing 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 *Oesophagus*, and at the same instant the *Pterygopharyngæus*, or as others *Sphænoparyngæus*, arising out of the *Aliform Processes* of the *Os Sphænoides*, 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 Gullet, and forthwith the *Musculi Oesophagei*, arising out of the sides of the *Bucklar Cartilage*, do encircle the *Oesophagus instar Vaginae*, whence they are called *Vaginales*, beset in the outside with oblong Fibres, contracting the *Oesophagus* longways, and more inwardly with Annular Fibres, streightning the Gullet in depth, circularly, and throw the Aliment into the left Orifice of the Ventricle, wherein by diverse Ferments, insinuating themselves into the Compage of the Aliment, and enlarging its Pores, doth colliquate and dissolve it, extracting an albescent Liquor, which we commonly call Chile, as Dr. Collins learnedly observes.

Mastoides.

This contracts the Neck.

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 interposition of strong *Ligaments*, whole Union is scarcely divilable; 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 *Sternum*, and partly out of the *Clavicle*, and obliquely ascending by the Neck, are inserted into the *Processus Mammiformes*, which being contracted, do draw the Head forwards, pulling the Chin towards the upper part of the *Sternum*. These in aged People 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 strictly 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.

Lea. III.

Lecture III.

Having these following *MUSCLES* belonging to it, viz.

<i>Hyothyroides,</i>	<i>Laxator Externus,</i>
<i>Sternothyroides,</i>	<i>Tensor Internus Tympani,</i>
<i>Crycothyroides,</i>	<i>Longus,</i>
<i>Cryoarytænoides Lateralis,</i>	<i>Scalenus,</i>
<i>Thyroarytænoides,</i>	<i>Serratus Major</i> } <i>Anticus,</i>
<i>Cryoarytænoides Posticus,</i>	<i>Serratus Minor</i> }
<i>Arytænoides,</i>	<i>Subclavius,</i>
<i>Stylopharyngæus,</i>	<i>Intercostales Externi,</i>
<i>Sphænoparyngæus,</i>	<i>Intercostales Interni,</i>
<i>Cephalopharyngæus,</i>	<i>Triangularis,</i>
<i>Oesophagæus,</i>	<i>Diaphragma,</i>
<i>Sphænopalatinus,</i>	<i>Cor,</i>
<i>Pterygopalatinus,</i>	<i>Detrusor Urinæ,</i>
<i>Obliquus Major cum Trochleâ,</i>	<i>Sphincter Vesicæ,</i>
<i>Obliquus Minor,</i>	<i>Sphincter Ani,</i>
<i>Elevator</i> }	<i>Levatores Ani.</i>
<i>Depressor</i> }	
<i>Abductor</i> }	
<i>Adductor</i> }	
<i>Oculi,</i>	

Hyothyroides.

THE *Larynx* is the Head of the *Wind-pipe*, and an Instrument made for Modulating of the Voice, it being an admirable Piece of *Art*, framed by the *Alwise Architect* for that Use, and a Compage framed out of several distinct parts, as *Membranes*, *Cartilages*, *Vessels* and *Muscles*: This among the rest, taking its Name from its Origin, it arising fleshy from the whole sides of the *Os Hyoides* at its Basis, and marching along with right Fibres, is inserted into the lowermost and lateral part of the *Buckler Cartilage*; and by raising it, does dilate its Cleft: Upon your raising this *Muscle* clear from its Origination and Insertion, you will with ease find out all the other *Muscles* belonging to the *Larynx*; and

This contracts the *Larynx*, and brings it upwards.

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 *Gullet*, 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 dressed 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 *Sternum*; 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 Cleft: This and its Partner working together, do draw down the *Larynx*,
by

Fig. 3.

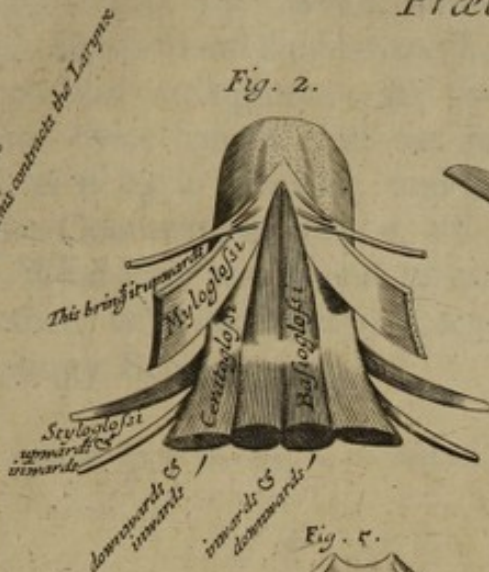


Fig. 2.

Fig. 1.

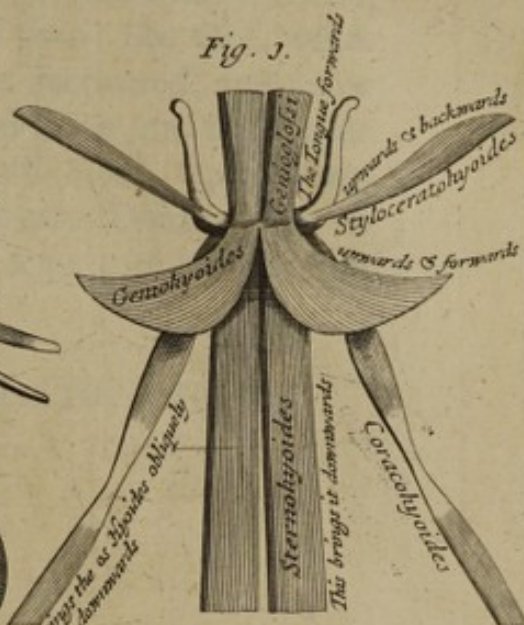


Fig. 5.

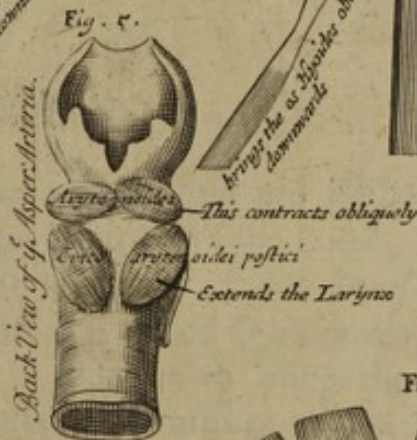


Fig. 4.

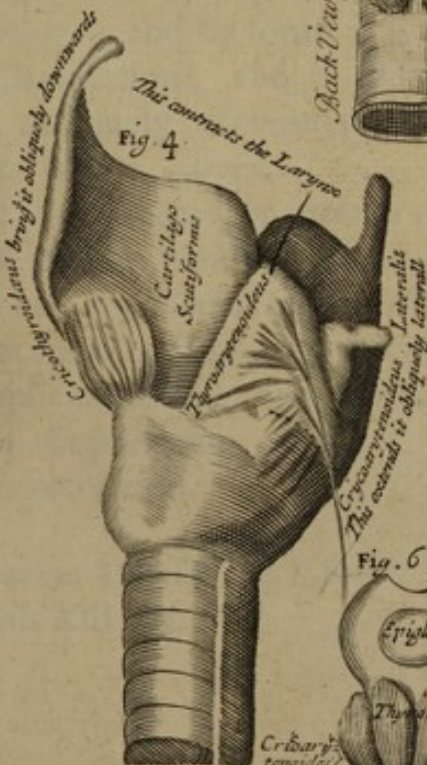


Fig. 7.

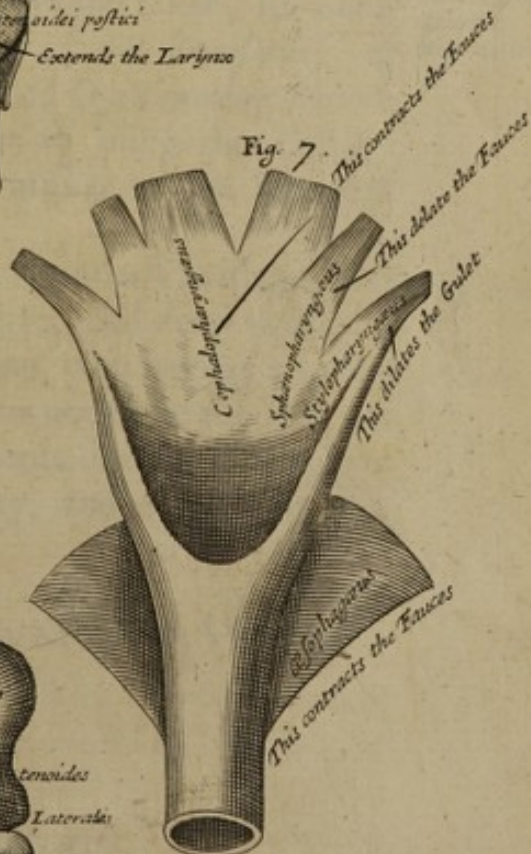
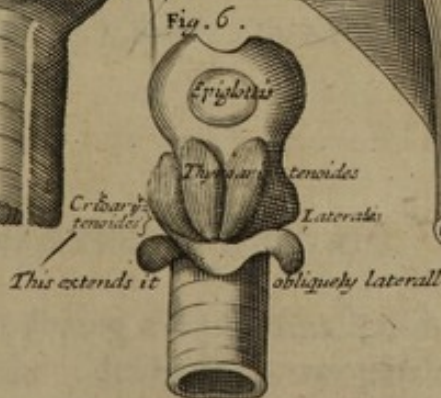
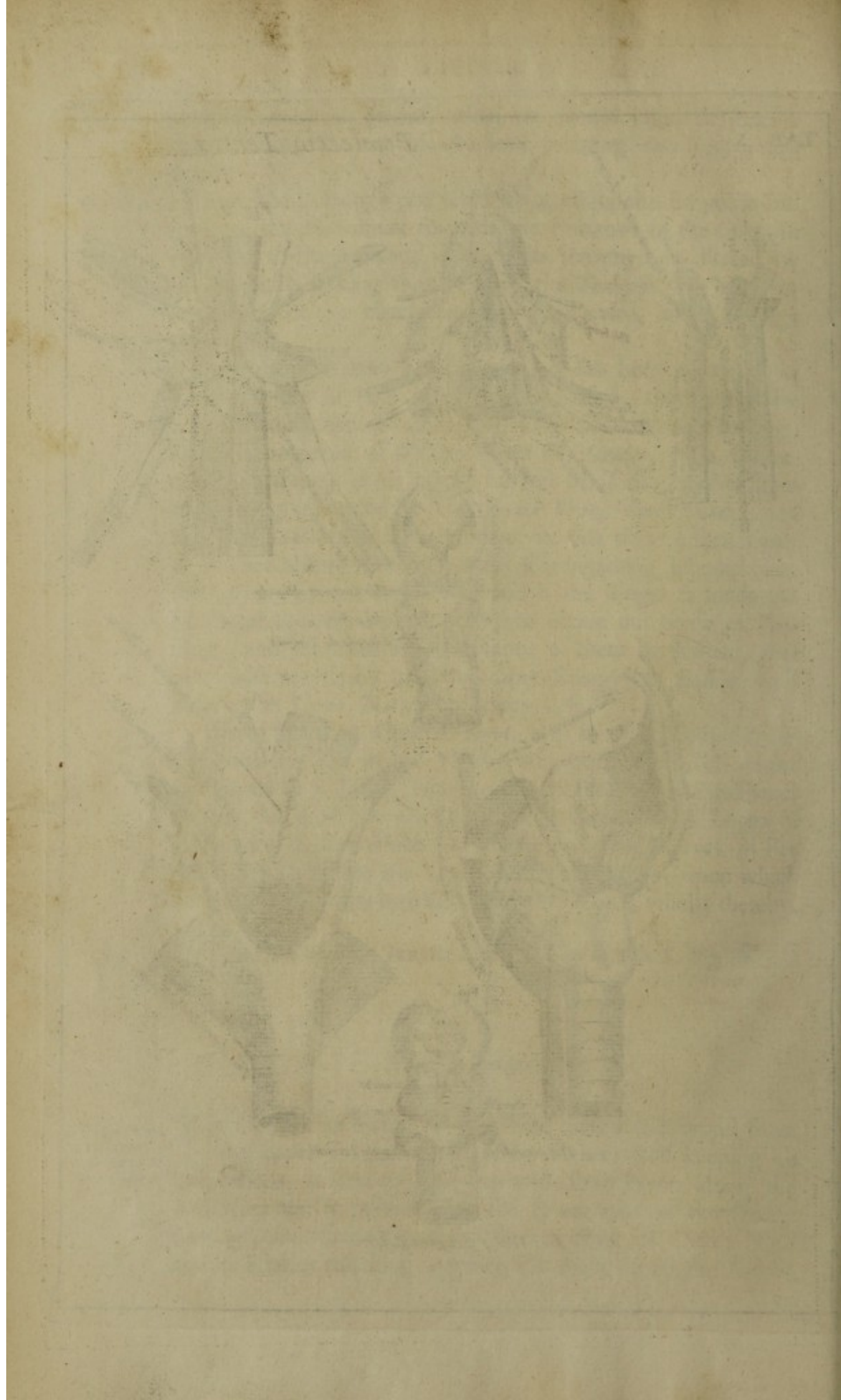


Fig. 6.



Fore View of *Aspera Arteria*



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

Columbus, lib. 1. cap. 13. *Anatom.* writes, that in many of his Dissections, he has found the humane *Larynx* wholly Osseal, which in Youth was cartilaginous; and *Coiter*, lib. Obs. 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 Osseal; and he writes of another, who had both his *Larynx* and his *Wind pipe* turned into spongy Bones.

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, upon its arising from the Forepart of the *Cricois*, or annular Cartilage, and ending at the sides of the *Scutiformis*, or Buckler Cartilage; and by some it is called *Crycothyroides 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*.

This brings the Cartilage obliquely downwards.

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

Its Use.

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.

History.

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

Crycoarytænoides Lateralis.

THIS hath its Name (being a short, small and fleshy Muscle) upon its rising at the sides of the lower part of the *Cricoid* or Annular Cartilage; and being in its oblique Ascent, is inserted to the outside of the *Arytænois*, or *Ewer-like* Cartilage

This extends it obliquely laterall.

laterally, not far off from the former, it opening the *Larynx*, by the oblique Deduction of its Cartilages.

History. *Joh. Baubine de Obs. Prop.* writes, that he opened a Boy, whose *Larynx* was wholly cut thro', and almost all his Gullet, 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 sent to the second 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.

Thyroaritenoides.

This Contracts it.

THIS hath its name from *Thyros*, or *Scrutiformis*, and *Arytenois Guttalis*, it being a fleshy and broad Muscle, and the largest of all the proper Muscles of the *Larynx*, and is transversely 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 Muscle is best found out, by dividing the *Buckler-like Cartilage*, from the Annular, and *Ewer-like Cartilages*, and subjacent Muscles, the Coats of them being carefully preserved, after which this will plainly shew its self.

That the Cartilages of the Wind-pipe in all, or in most Bodies should turn Osseal, is beyond my Belief, but that sometimes 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 dried up, and made excarneal, so as that some of their Diet is seen easily to fall into the Wind-pipe.

History.

Cl. Osvald. Gabelchover de Obs. suis, 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 fall into his Wind-pipe; he could swallow his Meat well enough with.

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

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

Crycoarytænoides Posticus.

IT's so named, upon its arising from the back part of the *Cricois*, or *Annular Cartilage*, and being implanted into the lower part of the *Aritænois*, or *Ewer-like Cartilage*: By *Casseri*, it is called *Par Cucullare*, it bordering upon the back part of the *Larynx*, it being much of a *Quadrangular Figure*, it arising fleshy from the back part of the *Cricois*, and marching obliquely upwards, filling its Cavity with its Fibres, is implanted in the lower part of the *Ewer-like Cartilage*, and by dividing the Cartilages, does open the *Larynx*. This extends the *Larynx*.

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

I knew one Mr. *Goodman*, a Schoolmaster in *Norfolk*, about 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 slowly 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 *Arglase*. Observat.

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

Arytænoides.

IT hath its Name, it being a very small and fleshy Muscle, arising with oblique fleshy Fibres from the *Arytænois*, 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 contracts it.

This obliquely moves the *Ewer-like Cartilage* to either side, and by constringing its Basis, does shut the *Glottis*.

Use. 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. *Mercellus Donatus*, *Hist. 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 self, which she hourly expected.

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

“ The Action of this Muscle solves that famous Question,
 “ whether Respiration be a voluntary or involuntary Motion,
 “ 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 asleep; 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 *Intercostal*
 “ 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 *Eye*, the *Tongue*, the *Larynx*, *Pharynx*,
 “ 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 *Cerebellum*:
 “ 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*
 “ Mus.

“ *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 *Arytænoides*, 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 *Arytænoides* 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 Heart’s own *Muscular Motion* being self-contraction.

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

Stylopharyngæus.

Nature hath made the *Gullet*, as a concave Body, and a
 Repository for entertaining our Nutriment, the only pro-
 per Conveyance for the carrying and dispatching of our Ali-
 ment 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 seen to march along at the backside 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 arising with a sharp and fleshy
 Beginning from the inward part of the *Styloidal*, or *Beak-like*
Process; and with its thin Body obliquely descending, it ex-
 pands its self 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 *Gullet*; others on the contrary affirming, that
 this is a *Constrictor*.

*This dilates
the Gullet.*

History. *Wierus* writes of one, who took a whole Egg, and got it into his Gullet, 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.

Sphenopharingæus.

This dilates
the Fauces.

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 Knife close inwards to the *Os Cuneiforme*; and when it is thus divided, you will meet with both their Originations, which you may raise with great ease.

History.

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 these Cases they should prescribe either *Vomits*, or *Diureticks*, they know not but hereby (whilst they by endeavouring to remove them from their place) they may drive them so 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 self works some strange Interposition of supplying them with Help, or *Nature*, (as sometimes is seen has thrown them out by convenient Passages without any Injuries to the parts, as has been seen 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

Mesa-

Mesaraic 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.

Cephalopharyngæus.

THIS Muscle arising from the *Cranium*, and the first *Vertebre* of the *Neck*, where they are joyned, gives it the 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 lifting it up, doth at the same time constringe the *Fauces* in deglutition.

This Contracts the Fauces.

Tho. à Vega Cap 3. Lib. 6. Loc. affect. writes, That by a Resolution of these Muscles, some have of a sudden grown sick, and dy'd.

Benedictus Bonacurtius a *Medico-Chirurgion*, writes, He Cured 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.

History.

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

Oesophagæus, or Sphincter Gule.

IT has its first Name from its Situation *Oesophagus*, or *Gullet*, and *Sphincter* from *σφιγγω*, *Stringo*, to girt close: This is a fleshy and broad Muscle, encircling the *Gullet*, it taking its Origination from each side of the *Buckler Cartilage*, and afterwards gives a soft fleshy covering to it; 'tis allow'd to contract its Cavity, and at the same time to send the Aliment forwards in its passage into the Stomack.

This Contracts the Fauces.

We read a very unusual Case in *Fol. 42. Fabric. Hildan. Observat.*
S 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 fragment 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 fourth day, found her Neck both inwards and outwards much swell'd and inflam'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.

Sphenopalatinus.

This attols
the *Palate*, &
brings it back-
wards.

MAN hath consigned to his upper Palace, a curious Portal, finely wrought within, for the more advantageous tuning of his Voice, and helping his Tongue in the articulating of Letters, as also for the more ready indulging his Palate, in eating 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. *Croom* named *Sphenopalatinus*, and *Pterygopalatinus*: This having its name upon its arising from the *Os Sphenoides*, or Wedge-like Bone, and inserting its self with a broad Tendon into the sides of the *Glandula Palati*, where it becoming a round fleshy 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 *Uvula* 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 seeing 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 Scissers; 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 such 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.

History.

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

Pterygopalatinus.

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

This brings
the *Uvala*
downwards.

Altho' in the last Description, we read of one dying suffocated, by having his *Uvala* 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 silver 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 seen 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 lost any of their Palate.

Annotat.

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

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

This brings
the Eye in-
wards.

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 seen 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 see it has three Names allowed 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 seated above the other, hath the same 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 assisted with this Pulley, does turn the Eye obliquely inwards, towards its inner Corner or *Canthus*.

Use.

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.

P. Borellus, 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 Dieu*; in Latine, *Laudatus sit Deus*; Anglice, God be Praised.

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

Obli-

Fig. I.



Fig. III.

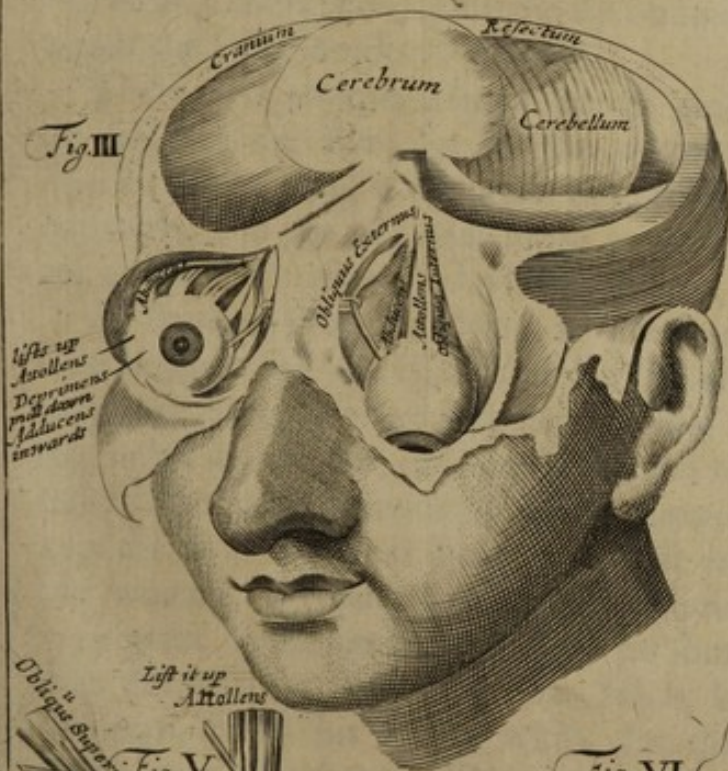
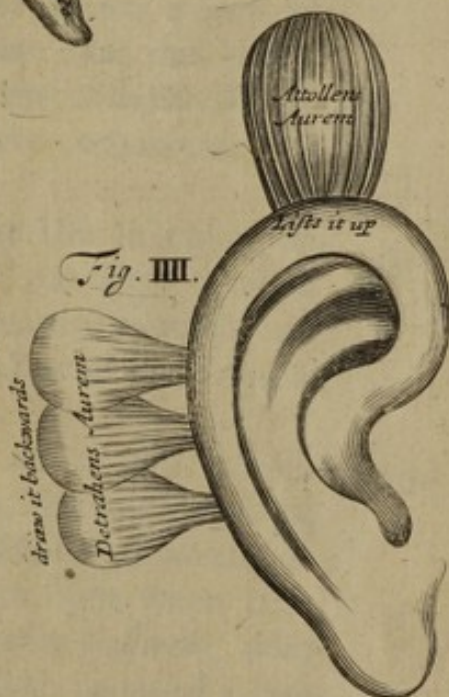


Fig. III.



Lift it up
Attollens

Fig. V.

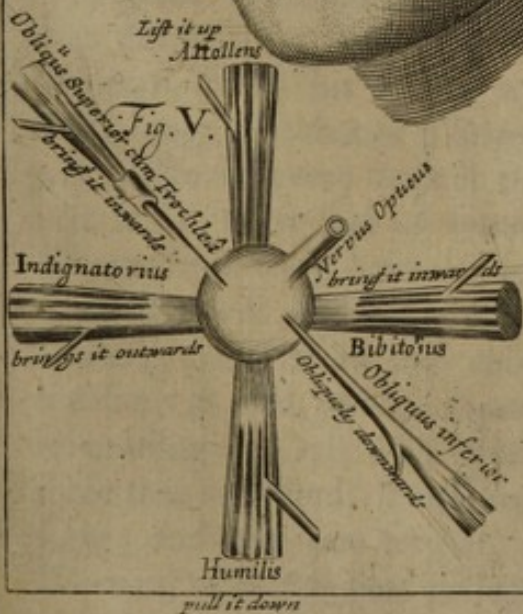
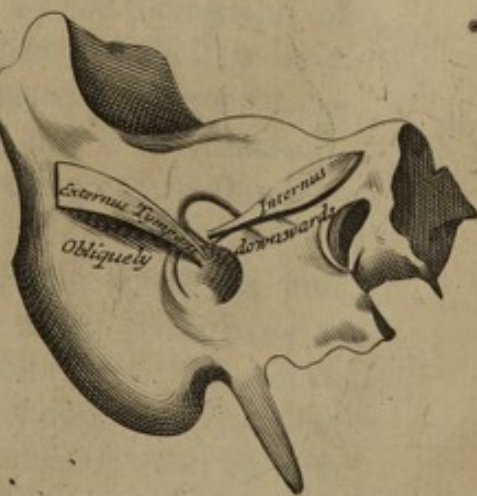
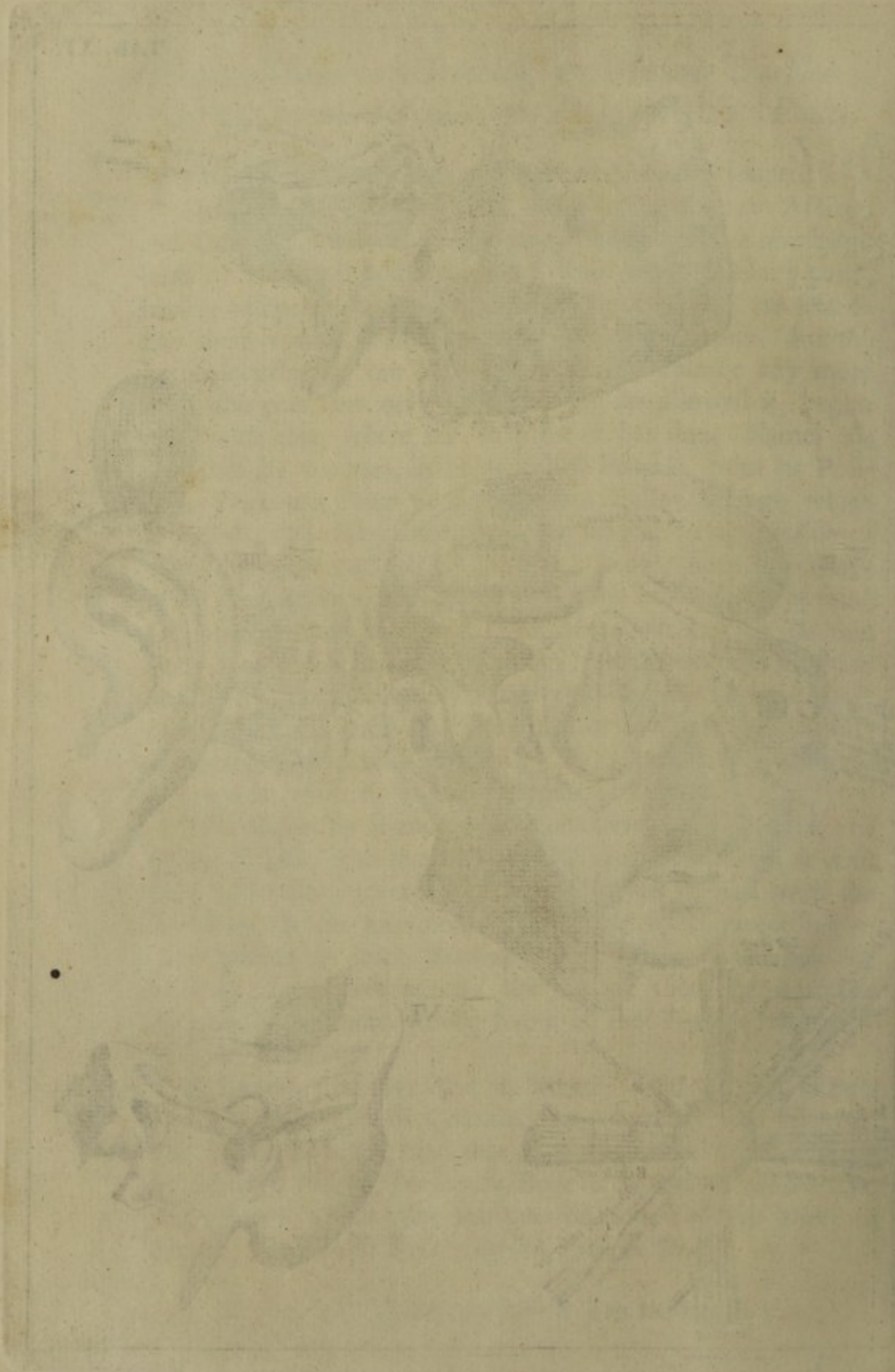


Fig. VI.





Obliquus Minor, or the Eyes lesser Oblique Muscle.

AS the former was the longest, so this appears as the shortest of the *Muscles* of the *Eye*; it ariseth from the lowermost Margent, or from a Chink in the lower part of the Orbit of the *Eye*, it being in its Origination, fleshy, small, and not altogether round, and being carryed obliquely all along upwards, towards the outward *Canthus* of the *Eye-lid*, is seen 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 lesser Angle.

This brings
the *Eye* ob-
liquely down-
wards.

These two oblique *Muscles* are of great Use in enlarging the sight 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.

Use.

P. Borellus, *Obs.* 91. *Cent.* 3. tells us of a Fish, whose 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 sight when near lost: The same is reported of the *Lamprey* by *Gasserello*, who kept this as a very great Secret, and with which he cured a Noble woman, a Relation of a great Commander, who set 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 said of some which were kept in standing Waters, that they have devoured Men.

History.

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

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

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

Elevator Oculi, or the Eyes Elevator.

This lifts
up the Eye.

THIS Muscle hath its Name from its Use, in raising the Eye upwards: it ariseth from the upper Orbit of the Eye, sharp 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 raise the Eye.

By some this is called *Superbus*, allowed as the Master of Disdain, and which it shews upon its turning upwards.

Histories.

Lusitanus, Curat. 32. Cent. 7. acquaints us of a Boy, who received a large Wound in his Head, lost the sight of both his Eyes; and tho' he was perfectly recovered of his Wound, yet he never recovered his sight.

Lycosthenes tells us in the year 308, that there was born a Monster 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 3. 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.

This brings
the Eye down-
wards.

THIS being less than the former, hath much the same Origination, it arising from the lower part of the same Orbit, 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 Disposition 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 of the Eye towards the Nose, it ariseth from the Orbit of the Eye, near the beginning of the Elevator, drawing the Eye inwards towards the Nose, and is inserted 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 bringing it towards the inward Angle.

This draws the Eye inwards.

That the Eye may perform its visive Action aright, there ought to be kept up a perfect Sympathy amongst its Muscles, so that in their Operations, they may sustain 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 distortion, it usually occasions that which we commonly call *Strabismus*, or Squinting, which may arise from an ill habit of the Muscles, especially of this particular Muscle.

Annotat.

Dr. Willis in Lib. de Aim. Brutor. cap. 15. de Vi. writes of a Young Man troubled with the Palsy, 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 distinguish any thing well with it.

History.

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 outwards from the Nose; it ariseth from the outward Angle of the Eye, and hath the same Insertion with the former; when these four work together, they are allow'd to bring the Eye inwards, and do form a Tonick motion.

This carries the Eye outwards.

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

History.

closely lookt into by some inquisitive People, they found 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 Drumb for-
wards.

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 impressi^on 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 reserve 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 filing, 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 observ'd in shewing the following Muscle.

History.

Fabr. Hildan. Obs. 39. Cent. 1. writes, Of a Girl troubled with an Impostume in her left 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 abhorring her Diet; with Watchings, and Pain

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 its Origination where the Petrose Process joyns it self with the Os Cuneiforme, or Wedge-like Bone, and branching its self 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 inserted into it, is said to draw it inwards and forwards, with the Membrane of the Dura Mater annexed to it, whereupon the Membrane becomes stified 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.

This brings it obliquely inwards.

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.

History.

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 Wind-pipe, in order to Respiration; and this Muscle 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 Gullet, and is joyned to all the sides of the Vertebres, ascending until he reacheth the first of them, where he meets with Scalenus, and

This Contracts the Neck.

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

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

History. 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 cursing, and wondred where he had been.

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

Scalenus, or Triangularis.

This Contracts the neck

IT's called *Scalenus*, from the Greek Word *σκαλινός*, or a Figure with three sides, this Muscle being made much of such a kind of Figure; it ariseth 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 assist 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.

History.

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 Muscle planted forwards.

Nature hath made the *Scapula* much like a Buckler, to guard the sides and back part of the Trunk, it being fram'd much of a *Triangular* Figure, thin and broad, hollowed inwards, and convex 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 also, and the Insertion of divers *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 *Vertebræ* of the Neck.

This brings the *Scapula* forwards and downwards.

This has its Name from its Figure and Make, as also from its Situation, it being planted in the side of the *Thorax*, with a singular, 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 unequal Extremities in the five True Ribs, and is implanted in two or three of the Bastard Ribs before they become Cartilagenous. *Spigelius* and *Veslingius* supposeth its Origination *è contra*, and some of its distinct Teeth, or Saw-like Indentions, being intermixt with the *Obliquus Descendens* of the lower Belly, do assist the said 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.

Its Use

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.

Annotat.

Some years since, I was sent for to the Right Honourable 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 sent 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

History.

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 fleshy from the upper Ribs, excepting the first of them, and arising as it were *Digitatim*, and being inserted fleshy at the *Corocoidal Process* of the *Scapula*, bringing it forward to the *Thorax*: 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 depressed, it cannot perform the same, without difficulty.

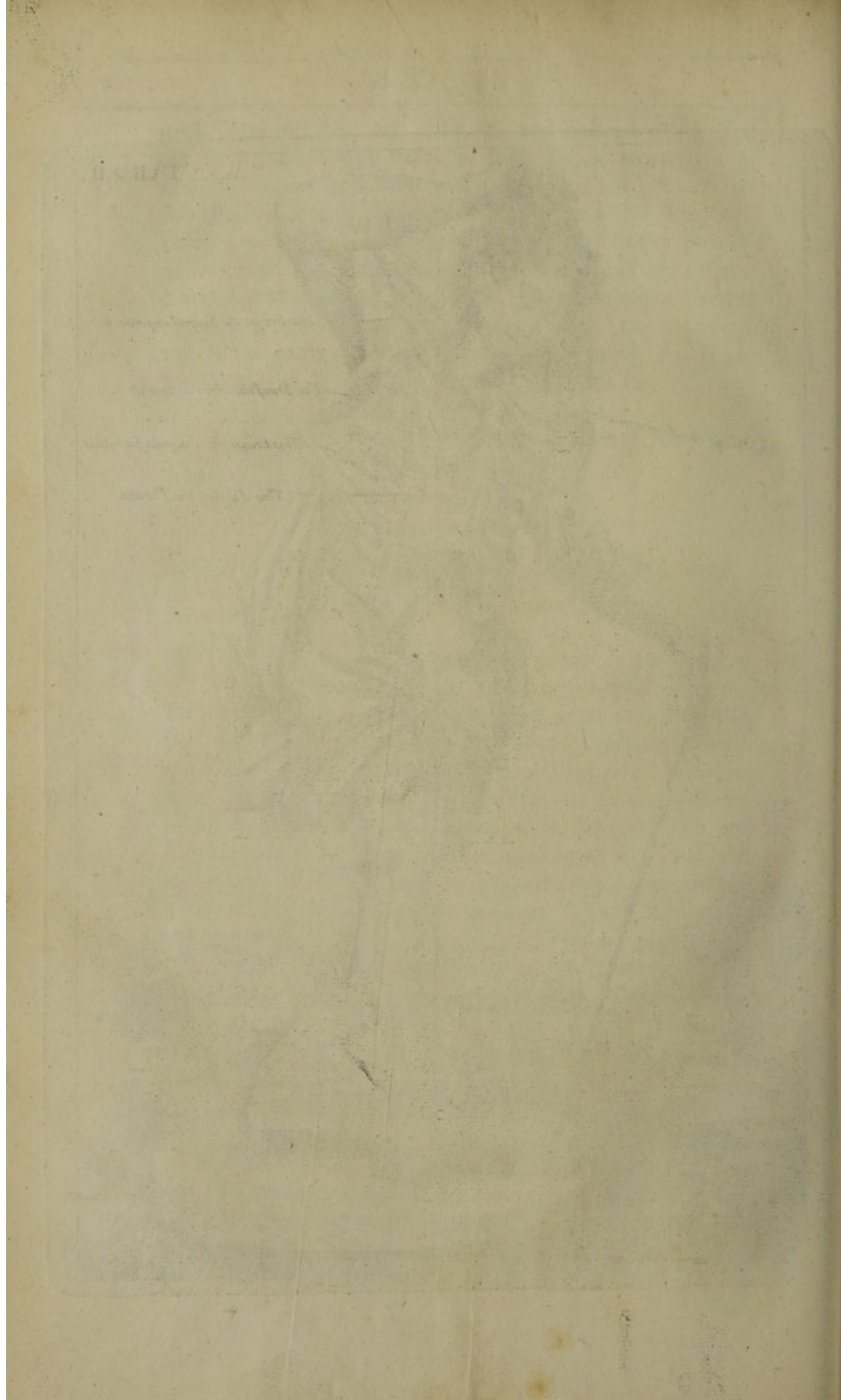
Observat.

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 Interposition of the *Cucullaris*, espousing the *Chine*, and by tying it to the *Ociput*, 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 *Fulcrum* 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 à 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 sunt tot Hypomochlia*, 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 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*.

History:

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 like a *Key* they Lock the *Scapula* to the *Sternum*, and by which they seem to shut up the *Trunk*; and whereas the *Sternum* 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

This brings the *Clavicle* downwards.

the true Ribs are annexed; so the *Clavicles* are made crooked, and formed both of Convex and Concave Rulings, for the better Originations and Insertions of *Muscles*, &c. amongst which this is one, which riseth 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 *Sternum*; 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 *Sternum*, 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.

History. 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 carried to the next pretender to Chirurgery, who seeing his Face swelled, and his *Nose* bloody, concluded it to be fractured, and filled up his *Nostrils* with Tents, &c. and then finding his lower *Jaws* standing unequally with the upper, supposed them dislocated, and that part of the *Sternum* under the *Collar Bone* was broke down; he being sent for to see the Youth, neither found *Fracture* nor *Wound* in the *Nose*: The next day a Chirurgeon being called in to justify this Pretenders *Proceedings*, but there nothing appearing either of *Luxation* or *Fracture* in the *Jaws*; they examined the *Sternum*, 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 slack, saw the Bone started,

ed, and from that time, it grew painful; then he dress'd it four or five days afterwards, but the *Pain* encreasing, Mr. *Wiseman* was sent for again, who then saw one end of the *Clavicle* riding over the other, and pricking against the *Skin*; the *Callus* being confirmed, the straiter the *Chirurgion* made the *Bandage*, the greater was the *Patient's* pain; he not imagining the Cause, attributed it to the Fault of the *Patient*: Upon which, Mr. *W.* being again sent 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 pressure, 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*, *Sternum*, and *Diaphragm*, 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 equidistant *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.

These do dilate the Thorax.

This double *Series* of *Fibres*, intersecting these *Muscles*, were thus wisely framed by *Nature*, for the assisting of each other in convenient *Motions*, in that, two *Ranks* of *Oblique Fibres* would with *Ease* distort the *Ribs* in the moving of the *Breast*: *Nature* hath therefore prudently contrived, that all their *Fibres* decussating each other, and being affixt to the *Margent* of the *Ribs*, should joynly produce the same operation of moving them upwards and outwards at the same time.

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

he saw one of the true Ribs double, where it was joyned to the *Breast 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.

These con-
fringe the
Trunk.

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 self, is hereby seen 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 largeness of the Wound, or from the Fault of the *Patient*, or the *Chirurgion*; and therefore it will not be amiss, 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 so, there's little hopes left of cure; yet tho' many times these Wounds have proved fatal, yet at other times they have been most certainly cured; and *Fallopianus* 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 safe, and untoucht; but many times, where they have been inartificially treated, they have turned into *Fistulaes*; many of which he hath cured.

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

Tri.

Triangularis, or Pectoralis Internus.

THIS is commonly called *Triangularis*, because it carries in it somewhat of a *Triangular Figure*, altho' not much of it, and *Pectoralis*, it arising from the lower part of the *Sternum*, or *Os Pectoris*, from whence its upper part borrows its Origination, and its lower falling down to its Insertions 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 constrict the *Thorax*, and bring it somewhat forwards.

This Con-
stricteth the
Thorax.

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 Insinuations, that easily participate variety of Motions, as upwards and outwards in Inspirations, as also downward and inward in Expiration; 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 seated 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 *Subclavius*, arising 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-*

ticus

ticus Minor, derived from the *Processus Coracoideus Scapulae*, is inserted 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 lifting up the eight upper Ribs, and expanding the Capacity of the Brest 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 *Sternum*: 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 obtuse 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 *Team* 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 *Sternum*, 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 side, 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 *Sternum*, whence the fleshy Fibres (like lines drawn from the Circumference to the Centre,) pass into the middle Region, where the tendinous Filaments intersecting 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 *Actors*, beginning their Motion from the *Circumference*, 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 *Useful 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 soft *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*, deriving its *Origin* from the *Vertebres* of the *Back* and *Loyns*, and is *Inserted* with four fleshy *Indentments* about the middle of the three *Lower*, and the termination of the last *Rib*: This *Indented Muscle* *Contracting* its self from the middle of the *Ribs*, to the *Vertebral Spines* of the *Back* and *Loyns*, and the *Sacrolumbalis* arising 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*, consisting of many *Muscles* lodged in the *Inside* of the *Sternon*, near the *Cartilages* of the 4th. 5th. 6th. 7th. and 8th. *Ribs*, which they pull downwards, and inwards, by many *Fibres* to the *Inside* 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 effate *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 *Rimula* of the *Larynx*, dilated by the *Postici*, and *Laterales Musculi Cricoarytenoides* into the *Bronchia*, and numerous appendent

Vesicles which are highly expanded by the *Elastick Particles* of *Air*, endeavouring to break Prison, and acquit their Confinement of the Orbicular Pipes, whereupon the Bosom of the *Thorax* is enlarged, by the Muscles encircling it. The *Subclavii*, *Scaleni*, and *Serrati Antici*, 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 tumefied Lobes of the Lungs, and on the other side, the *Antagonist Muscles*, the *Triangular Muscles* lodged in the inside of the *Sternum*, 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; so that these *Antagonist Muscles* do on one Hand elevate the Ribs, and do press 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 side, by the recoyling of the Ribs, and the Weight of the Lungs, compressing the *Bronchia*, and appendent Vesicles, do expel the vapid Particles of air, loaden with smoaky Steams of Blood.

Diaphragma, or the Midriff.

This divides
the middle
from the lower
Belly.

THIS by some is called *Septum Transversum*, it transversly dividing the Trunk of our Body into two Venters, it being made as Nature's 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 *Ensiform Cartilage*, and carrying its Tendon in its Centre: It was chiefly designed for the promoting of our free Breathing, it being assisted 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 Bot-

tom of the *Trunk*, its middle Substance being framed of car-nous Fibres running thro' it, like so many Lines from a Cir-cumference to a Centre; and when they enter the middle, they are entertained and embraced with another sort of tendinous Fibres intersecting them: Its Membrane is double, the upper part whereof expands the *Pleura*, here being plant-ed as its *Mediaſtinum*, or partition Wall, whilst its lower part is carried downwards towards the *Peritonæum*: 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 *Oeſophagus*, and the *Stomack 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.

Uſe.

When this Orbicular Muſcle moves its ſelf, it contracts the upper and lower fibrous Diameters or Semicircles, ſo that the cartilagenous *Terminations* of the *Baſtard Ribs* are drawn down-wards, and its *Viſcera* 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.

Obſervat.

Hollerius Com. ad Aph. 18. lib. 6. writes, that the *Diaphragm* 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 diſſected at *Paris*, that he ſaw 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-

History.

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 *Sum* 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 left, both distinguish'd 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 fleshy *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 left *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 *Nutrimment*.

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 *Angles*,

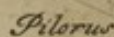
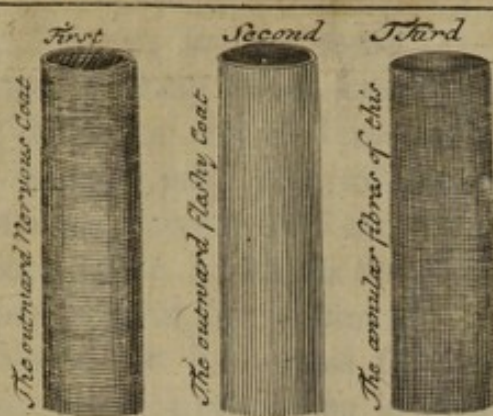


Fig. 1.
The Stomack with its right fibres

The Carnous fibres

Fig. 5.

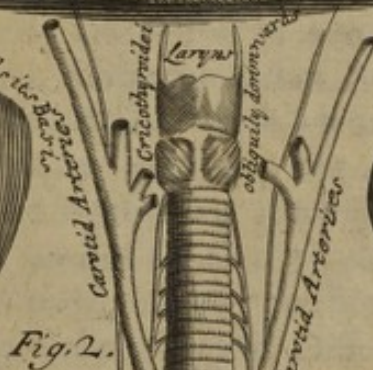
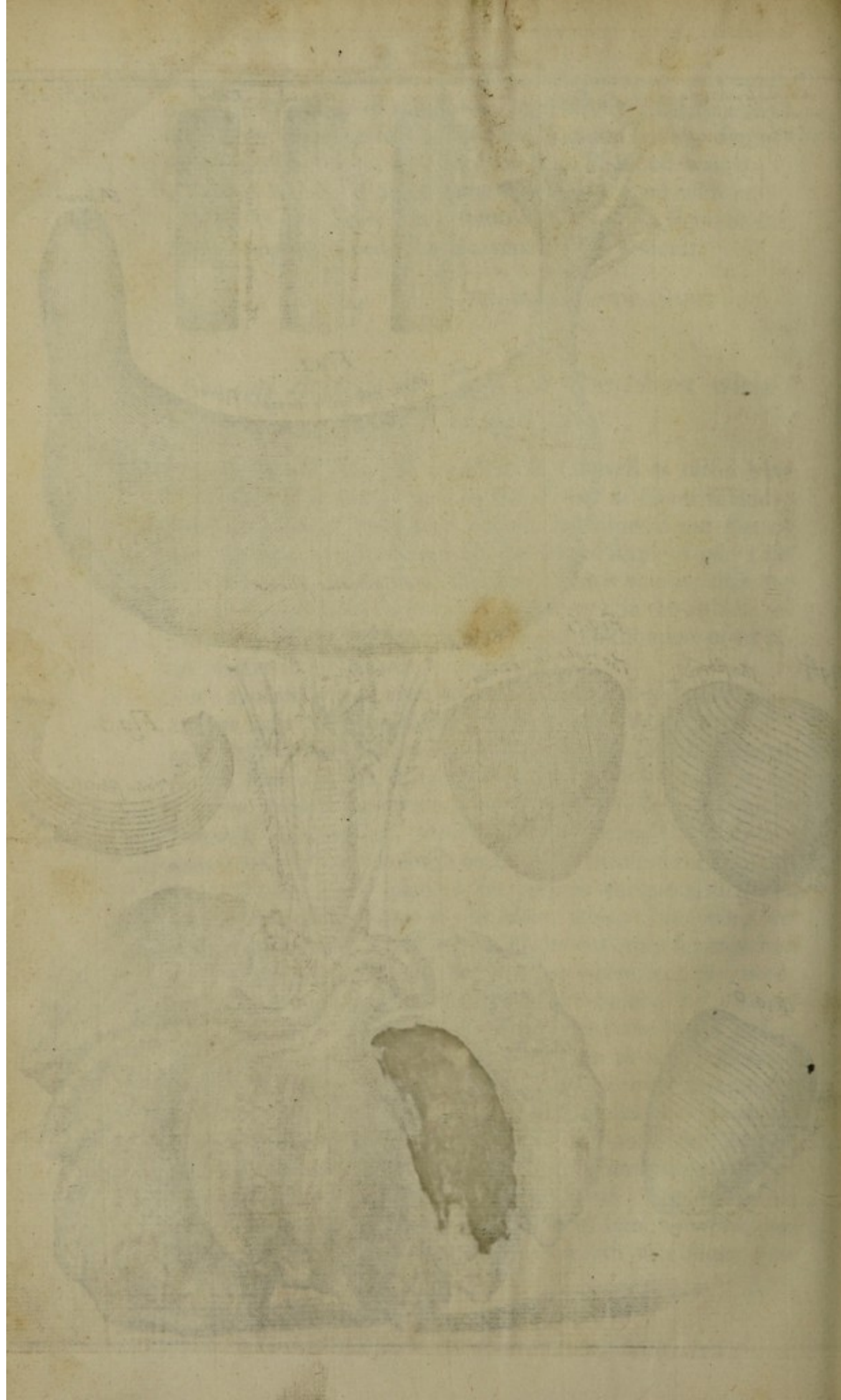


Fig. 6.





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 left *Ventricles*; into which *Tendon*, as Dr. *Lower* well observed, are planted many oblique fleshy *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 seem to march Antagonistically to the others in their Progress, yet they are seen plainly to assist them in their Motions, and do constringe and bring the opposite *Tendons* inwards; and by drawing them closer 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 consider 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 seen to march along in strait Lines, from the *Basis* of the *Heart* to its Extremity, and passing somewhat over the right *Ventricle*; another sort are those which goe from the *Basis*, 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 these

forts of Fibres have allowed them their proper Uses and Offices, for we apparently find, that the streight Fibres do shorten the *Heart*, the *Circular* 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 since, 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 consider how the Blood Circulates in the *Fœtus*, 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 suffering the Blood to enter the Vein, but hinders its coming back again. Now, the blood which comes from the *Placenta*, 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 Cava*, 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 Cava 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 *Ductus Botalli*, into the *Aorta* or great Artery, to be mixt with the rest of the Blood; so that we plainly see, 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 *Fœtus*, 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 *Fœtus*, it does not pass through the *Lungs*, because
 " there is no *Respiration* in the *Womb*, but part of it is seen to
 " pass 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 *Ventricle*, 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 seen to circulate thro' them; as he himself found in
 " dissecting 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 so in some persons of riper *Age*,
 " as he has proved in his *Dissertationes Medico-physicæ*; where he
 " gives an Account of a *Humane Skelleton* he saw at *Paris*,
 " in which the *Vertebræ* 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 *Pe-*
ricardium; 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 *Auri-*
cles, so soon as they are filled with *Blood*, do contract them-
 selves, this *Blood* which they do press or push into the *Ven-*
tricles of the *Heart*, being assisted 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
Auricles are contracted, the *Blood* which advanceth on all sides,

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 emptied; 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 pass 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 see such 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 so 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 circulating 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*, considering 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
 " side of the Basis of the *Heart* , tho' our *Authors* all agree, that
 " these *Nerves* do enter the Muscular Substance of the *Heart*, and
 " produce its constant Motion ; for my part, I neither could my self
 " 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 *Anato-*
 " *mists*) that those very few Branches of the *Intercostal*, and eighth
 " pair, do enter into the *Heart*, which they never can demon-
 " strate, they would still 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 publicly 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 sides, I made as strict Ligature about
 " them on one side 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 side, 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 Disorder: 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 surpriz’d to see
 “ him walk about the room as little discompos’d as before, and
 “ continued so, for several days; which without all doubt had
 “ happed 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*
 “ assert, 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 *Spinal*
 “ *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 *Fœtus*, 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*, *Ser-*
 “ *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 convey’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 leisure, 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 *Cæ-*
cum, and her other Parts, were not posited in their *Natural*
State.

Vesalius says, *Lib. 1. Cap. 5. de Human. Corp. Fabrica*. That
 he found about two pounds of blackish glandulous flesh in
 the left *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 *Peripneumony*, a Root enated, fleshy, whitish, and flaccid, arising out of the *Heart*, and passing into the *Vena Cava*, reach^{ing} even to the *Head* and *Os Sacrum*; and that such 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 Dissection, upon opening his Trunk, so 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, loose 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 emptied the Vessels; that he began to change Colour, grew pale, seized 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 Persons judged past Recovery; at length, after his suffering such a Conflict of Fears, he takes fresh Courage, and by Gods Blessing on his Endeavours, he was cured beyond all Expectation, and restored to his former Health.

The *Heart* upon every Pulsation, is seen to throw forth a good quantity of Blood out of its *Ventricles* into the *Arteries*, as I have already said, 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*, especially

As to the
Arteries.

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 sent 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 swell; and when they are thus swelled 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 since we plainly find, that the *Heart* throws forth the *Blood* into the *Arteries* by various Strokes, the *Arteries* must needs hereupon swell, and fall off, as they fill or empty themselves 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 of the *Arteries*, do bear Correspondence with its Dilatation; from all which we may rationally allow, that the *Arteries* have their Coats encircled with circular fleshy Fibres, since that by their Contractions they push forward the Blood, first made in the left *Ventricle* of the *Heart*, and thence sent 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-
rism.

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 Softness; 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 in Lib. Obs. Anat. & Chir. writes, That he saw the great Artery of a Girl become perfectly Osseal, and the same I likewise saw at my Brother Poynters at Oxford, a famous Chirurgeon of that City.

Solonander Caus. 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 seen very hard, both above and below the Kidneys, and as brittle as Glass, and his Kell stook to his Belly round about it, save only at the Navel.

And tho' Wounds of the Arteries are not generally cured, yet sometimes they have been cured; and we may read of *Galen*, 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^{again}, 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 every part of the Body; nor is their Energy or Constrictive 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 sending the Blood forwards, towards the right Ventricle of the Heart.

The Veins
also have Fi-
bres allowed
them.

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 sorts, Right, Oblique, & Transverse, finely interwoven, & curiously put

together: These fibres also are seen to add strength to the *Veins*, and are of great use in high Dilatations; when ever the blood upon any extraordinary Effusions, seems to force its self beyond its usual Course thro' these inward Parts, even to the very rending of their *Circular fleshy 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, fit 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 morbid 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 *Ankle 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 favour 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 Di-
 " lata-

„ dilatation 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
 „ likewise in some respect a *Continued Heart*; because they have
 „ a *Systole* and *Diastole*, and *Orbicular Fibres* as has the *Heart*,
 „ so that I cannot reckon the *Arteries* passive, in receiving the
 „ *Waves* of *Blood* poured out from the *Heart*, by a *Contracti-*
 „ 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 Vi-*
 „ *vens*, I cannot grant it to be the *Ultimum Moriens*; I mean,
 „ that 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 Obser-
 „ vation I have sometimes made, and which I never yet met
 „ with in any *Author*; which is, that I find no *Blood* in the *Ar-*
 „ *teries* after death, but all the *Mass of Blood* is dispatcht from
 „ them into the *Veins*, from whence I draw these two Conclu-
 „ sions; first, in that while we are living, neither the *Arteries*
 „ nor *Veins* are half full, since the *Veins* alone do contain the
 „ whole *Mass of Blood* after death, and are then scarcely full;
 „ secondly, 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*) and into the most ex-
 „ tremest *Capillaries*; and from thence pusheth it forwards into the
 „ gaping *Orifices* of the smallest *Veins*, so that instead of allow-
 „ ing 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 Stu-*
dents 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 *Connexi-*
ons frame the *Liver*; and whereas each *Lobe* is shut up in a
 delicate *Membrane*, dividing its self from the rest, yet it ceas-
 eth not to intermix with them by small *tendinous Fibres*,

First, of the
Liver.

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 considerable Bulk. And as the *Vena Porta* and the *Arteries*, do convey the Blood to the *Glands* of the small Lobes, the Branches of the *Hepatick Vein* are said to carry it away again into the *Vena Cava*, whilst 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 *Beddevoile*, where also you may clearly see the tracing of the *Ductus Cysticus*: 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 *Cystick Channell*, and runs in abundant into the *Duodenum*, to dissolve 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 dissolving its Sulphures by *Alcalies*, and by diluting it with its Flegm, as he also very well observes.

Schenkius, fol. 389. obs. 7. writes *de Jecore*, of a Body whom he dissected, was found 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 very remarkable and rare, made me insert it here.

And altho' it is a general received Opinion amongst Physicians, that Wounds of the *Liver* are Mortal; yet, notwithstanding 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 hapned in a Noble Man, who being Wounded in the Wars, and shot into the *Liver* with a Bullet, was given over by the
them

then present *Physicians* as past Cure, the substance of the *Liver* 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* assures 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 searcht 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 Forceps, and cut it off; and tho' some cruel Symptoms succeeded this, yet by God's Blessing 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 mentioned in his Observation, he cryed out aloud, *Is it not a miserable thing, that he should then be so seized with a Feaver, as not to be cured by two Physicians, 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 Blessing restored to his Health by one Chirurgion 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 the *Liver*.

As we have already shewn, that the Blood doth pass out of the Right Ventricle of the *Heart*, and enters the Pulmonary

Next, of
Lungs.

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 *Bronchie*; these *Bronchie* are every where saluted 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 *Bronchie* and the *Vesicles*; and since we plainly see, that the *Wind pipe* shares with the outward Air by the Mouth and Nostrils, we may hence be satisfied, that the whole Frame of either, was made for Conveyance of the external Air, into the *Vesicles* of the *Lungs*; and since we find, that the Air enters the *Lungs*, as the Breast is enlarged, and goes out as it is compressed; 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. *Cosmoscrit.* cap. 6. writes, He hath seen the Fibres of the *Lungs* 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 tho' *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 sixth 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 denied it, the outward parts became mortified, and *Worms* bred inwards; the chief *Chirurgeons* of the place being consulted,

sulted, they left him for dead; he being afterwards sent for, made a Circular Incision into the *Cutis* about the Wound, the length of a Nail 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 *Gullet*, being framed like a hollow Pipe, or Neck, is implanted into a Bag, not much irresembling a *Bag-pipe*, 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 carnosus Fibres; and when ever we examine its middle Coat, we usually find three degrees of Fibres in Beasts, and but two in men; the first being a Continuation of the longitudinal Fibres of the *Gullet*, and these extend themselves from the upper Orifice of the *Stomach*, as far as the *Pylorus*, and the other is no more, than the Continuation of the Circular Fibres of the *Oesophagus*, which are intersected by the longitudinal Fibres at right *Angles*, as *Willis* observes; 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*.

Of the
Stomach.

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 largeness 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, Obs. 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.

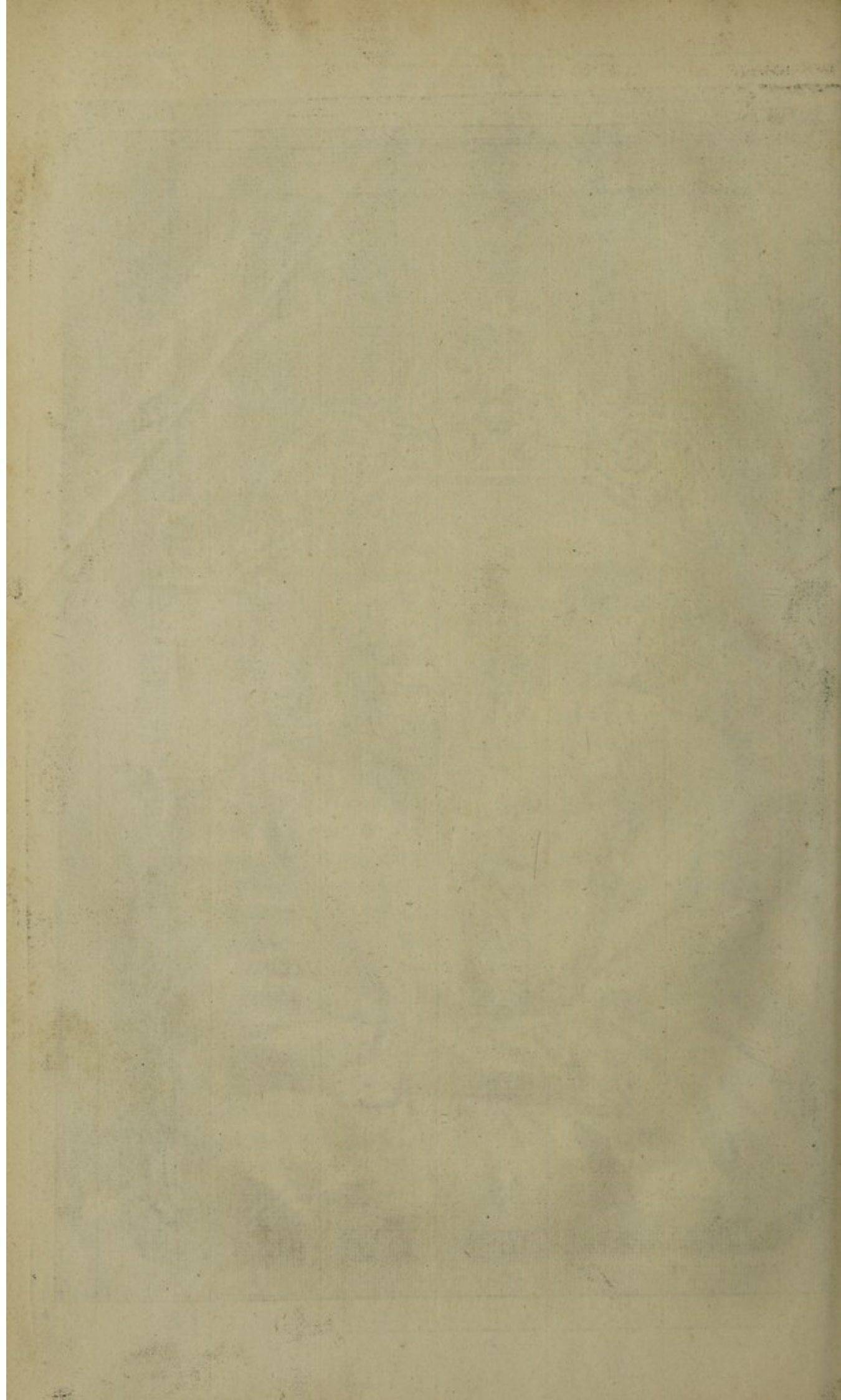
Chr. à Vega, Com. ad Aph. 18. Lib. 6. Hip. tells of a Chirurgion of Reputation, who cured a Wound in the Stomach, through which the chewed Meat past not long before with the Chyle.

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

Of the Guts.

The *Guts* are made up of three Coats, as is the *Stomach* and the *Gullet*, in every respect, and are allowed to be six in Number, three small, and three great; the first called *Duodenum*, the second *Jejunum*, beginning where the first ended, and ends where the Excrements begin; the third *Ileon*, the fourth *Cæcum*, being only the small end of a *Gut*, fastned to the rest; the fifth *Colon*, and the sixth the *Rectum*; and since 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, so 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 soon 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 puffed up with Wind, arising from an Inflammation, which the Wound does soon 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 Chirurgions dilating the Wound, and enlarging the Orifice, for the readier discharge of what is inwardly contained. And whereas nothing is seen 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 Dyer 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 *Chestnut*, 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 sticht 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 fifteen days was perfectly 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 Recovery, yet he received a very good Cure.

Jacotius, *Com. 2. ad Aph. 17.* writes, That tho' its asserted 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.

Detrusor Urinæ, or the Urine's Discharger.

This dis-
chargeth the
Urine.

AS Man hath *Kidneys* allowed him, as proper *Colatures* or *Strainers* of his *Blood*, so hath he given him a *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 *Urine's* Excretion, and others for preventing its involuntary *Egression*.

This by most *Anatomists* is allowed the first proper *Membrane* of the *Bladder*, whose fleshy *Fibres* embracing it on every side, are seen compressed or contracted, in our making of *Water*; and therefore it is very fabulous what some *Physicians* do contend for, that besides this, and the following, many other *Muscles* 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 *Urine's* Excretion, contrary to the others, which being *Transverse*, are as properly said to hinder the involuntary *Egression* of the same.

This is a part variously attackt with *Diseases*, and sometimes seen 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 see nothing that may hinder any *Wounds* healing, which may happen in this part.

Wounds of
the *Bladder*
cured.

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 *Perinæum*, making a wound so 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,

stitution, and by observing a regular Course of Diet, and applying *Arcæus's* Liniment to his Wound, he was perfectly 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 notwithstanding Cured. That also of *Cabrolus*, 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 prolixity.

And since 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 Hildanus* 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 testifies.

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 ruffle and discompose him in his Temper, &c.

And because the *Pericardium* is tied to the *Mediastinum*, and *Diaphragm*, in a violent Laughter the *Diaphragm* is violently moved; and whereas the *Diaphragm* is also annexed to the *Lumbal Vertebres*, and to the extremities of the bastard *Ribs*, and to the lower part of the *Sternum*, and *Ensiform Cartilage*, as also in its lower part to the *Peritonæum*; and as the *Pleura* invests the upper Parts with Membranes, hence it is, that in violent or extraordinary Laughter, both the *Pectoral 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 of the *Diaphragm*, and the *Pectoral Muscles* moving the *Arm*, are both agitated and shaken; first, 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 *Muscles* moving the *Head* and *Neck*, do partly arise from the *Os Pectoris*, it is necessary, that the *Head* also should be moved in violent Laughter, by the agitation of the *Diaphragm*, and *Pectoral Muscles*; hence is it also, that those who are given to extraordinary Laughter, are sometimes seen to bow their *Heads*, sometimes backwards, and sometimes either to the right or left *Arm*.

And since 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 *Hæmorrhages* in the *Arteries*.

Sphincter Vesicæ, or the Bladders Closer.

This closeth
up the urina-
ry 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 *Sphincter 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 fibres planted in the several Coats of the *Bladder* are drawn into Motion by Consent, according to the Action of the ner-

vous Fibres of the inward Coat, making their various Contractions, lessning its Cavity hereby, and forcing the Urine contained in it towards its Neck, whereby the Fibres of this *Sphincter 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 sixth *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 else but a spongy Body well stockt with variety of Glands, wherefore by *Vesalius*, and *Regn. de Graaf*, it is called *Corpus Glandulosum*, its Magnitude for the most part not exceeding the bigness of a *Walnut*, 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 seen to swell with a waterish Kind of Liquor, which makes it distend 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 compressed, 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, arising 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.

Of the *Prostrates*, or *Corpus Glandulosum*.

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, whilst others write, that in this part, a sharp Humour is separated from the Blood, for raising 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 it may seem 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 Worthy Friend Dr. Cockburn, about Claps, which by his directions I here Insert.

"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 Illness 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 perplexed with a
 "running; and after having laid open the *Penis* on one side
 "of the *Urethra*, to prevent any hindrance of his discoveries,
 "and the Parts not being sullied 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 Disease 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 these fretted, and grated Cells are of Irregular, tho' ge-
 "nerally of pentagonal Figures, and filled with that sort of
 "stuff 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-
 "poses to give a mighty clearness into this obscure and pre-
 "carious

‘carious affair, tho’ he is of opinion that every other circum-
 ‘stance 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 since 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 corrosive 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, ma-
 ny things hapned to be seen in her worth our Observation;
 for first, she had two *Bladders* in her *Hypogastrick Region*, di-
 stant 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 *Rectum* 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.

Sphincter Ani, or the Fundaments Closer.

THIS from its use is called both *Sphincter*, *Constrictor* or
Orbicularis, it being annexed to the lower *Margent* of the
Os Sacrum; it arising 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 annexed to the *Cutis*, that
 it is scarce separable from it; and therefore by some *Ana-*
tomists is called *Cuticulofus*, and *Cutaneus*; this being contracted,
 doth purse up, and close the Perforation of the *Anus*, where-
 by it gives a stop to the involuntary egression of the *Excre-*
ments, for which piece of Service, Nature hath planted this
Constrictor here as its proper *Officer*.

This keeps
 in the *Excre-*
ment.

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 *Stomach*, *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 *Rectum*. 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 *Anus* up-
wards.

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 *Sphincter*, 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*, *Vesica*, 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.

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

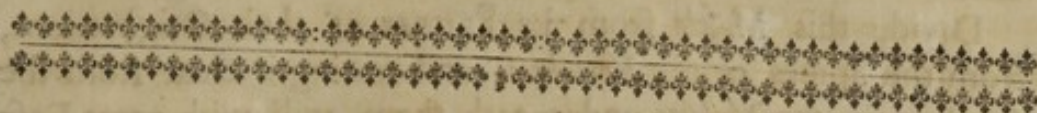
Salius Annotat. Cap. 79. writes, That Experience hath taught that the Collick Pain has been caused from a Stone bred in the *Guts*; and he knew one so desperately troubled with it, that his Pains could no ways be removed till he discharged a Stone by his *Fundament*.

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. Alaphang.* and *Mastich*, she discharged a round Stone by her *Guts*, the bigness of a *Pigeons Egg*, which he saw.

And

And Crato in *Epist. ad Jordan*, writes, That he saw many Stones excreted from the Body of a Priest, by the *Guts*, as big as *Chestnuts*, 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 Vesicæ.



Lecture IV.

In which are Contained these following *MUSCLES*, viz.

<i>Trapezius,</i>	}	<i>Obliqui Superiores,</i>
<i>Levator Patientiæ,</i>		<i>Obliqui Inferiores,</i>
<i>Rhomboides,</i>		<i>Transversalis Colli,</i>
<i>Latissimus Dorsi,</i>		<i>Spinalis Colli,</i>
<i>Serratus Posticus Superior,</i>		<i>Sacrolumbalis,</i>
<i>Serratus Posticus Inferior,</i>		<i>Sacer,</i>
<i>Splenius,</i>		<i>Semispinatus,</i>
<i>Complexus,</i>		<i>Longissimus Dorsi,</i>
<i>Recti Majores,</i>		<i>Quadratus Lumborum.</i>
<i>Recti Minores,</i>		

Trapezius, or Cucullaris.

THE first Name it takes from its *Geometrical Figure*, and the second from the Resemblance it carries with a *Monks Hood*: The *Scapula* being made as *Natures Buckler*, 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 fleshy from the lower part of the *Os Occipitis*, and Tendinous from the

This moves the Scapula variously.

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 self, is inserted into the whole *Spine*, and broader part of the *Clavicle*; and according to its various *Originations*, and *Diversity* 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 *Muscle* 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 shew 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 Scapulae, or Patientie.

This brings
it Upwards.

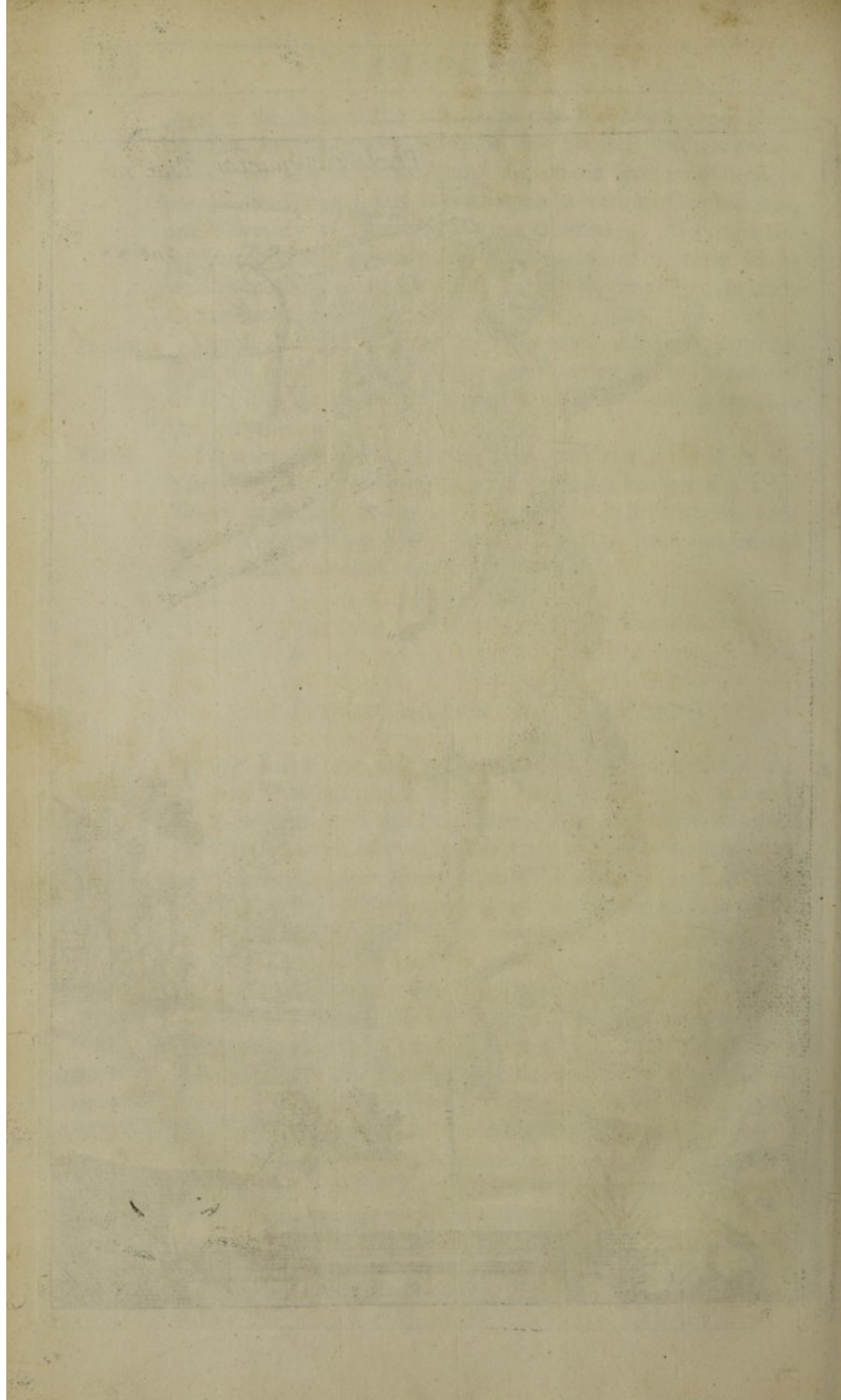
THE first Name it has from its Use, in raising the *Scapula*, and *Patientie*, from the Use *Porters* make of it, in carrying their Burthens; this immediately laying under the former, (as *Diemerbroeck* observes) doth arise from the second, third, and fourth, and sometimes from the fifth *Transverse Processes* of the *Vertebres* of the Neck, which joyning in one large fleshy Body, fixeth it self 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 sinewous and cunicular Ulcer, besides Splints of Bones, he found two spongy Tents, which had been left for some Months in a certain Cavity of the Ulcer, by the Inadvertency of the former *Chirurgeons*; which being extracted, he

was

Prælectio Quarta TAB. XV





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 Porcintum* was exempted; by all which we may see, that Nature will not admit so much as a piece of Sponge to lodge in any part of the Body, altho' its softer than Silk.

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

Rhomboides.

THIS hath its Name from its Figure, and affixeth the *Scapula* to the Neck, and the back parts of the *Trunk*, it arising 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,

This brings it Backwards.

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

Annotat.

This is commonly said to bind the *Scapula* to the *Back*; and hence it is, that in old people, and consumptive persons, their *Scapulae* are seen so 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 seldom 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 *Pu-tresfaction* arise, it communicates the same immediately to the *Heart*, and other principal Parts, which sharing with it, they summon in a train of direful Symptoms, and oft times prove the consequence of Suddain Death.

History.

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

Latissimus Dorsi, or Ani Scalptor.

This brings
the Arm down
Backwards.

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 Sacrum*, and the 6th. *Vertebre* of the *Thorax*; and sometimes it is seen to take its Origination from the upper part of the said *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 *Pectoralis*, and *Rotundus*, it bringing the Arm down backwards, and sometimes somewhat upwards, or downwards, as its Course of fibres are variously employed and contracted.

Annotat.

Great care must be had in raising this *Muscle* from its Origination, least with it, you do also raise the Origination of its Subjacent *Muscle*, *Serratus Major Posticus*; if you be not very careful in your Dissection, you will also borrow from *Quadratus Lumborum*, as you raise him from the *Ileon*, to which it firmly joyns it self, 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 assigned 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, Rise, and Insertions 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 Muscle*, 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 *Muscles*, in their alternate and opposite motions, do move the *Os Humeri* as it were Circularly in different interrupted moments, and not
by



The first section of the report is devoted to a description of the geological features of the area. It begins with a general statement of the location and extent of the section, and then proceeds to a detailed description of the various rock formations and their relative positions. The author notes the presence of several distinct layers, including a thick bed of sandstone, a layer of shale, and a thin bed of limestone. The description is accompanied by a series of sketches and diagrams illustrating the geological structure and the distribution of the different rock types. The second section of the report is devoted to a description of the fossils found in the section. It begins with a general statement of the types of fossils found, and then proceeds to a detailed description of the individual specimens. The author notes the presence of several species of brachiopods, bryozoans, and corals. The description is accompanied by a series of sketches and diagrams illustrating the morphology and structure of the fossils. The third section of the report is devoted to a description of the stratigraphic column. It begins with a general statement of the relative positions of the different rock formations, and then proceeds to a detailed description of the individual layers and their thicknesses. The author notes the presence of several distinct layers, including a thick bed of sandstone, a layer of shale, and a thin bed of limestone. The description is accompanied by a series of sketches and diagrams illustrating the stratigraphic column and the relative positions of the different rock types.

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 motion: 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 so much advantage to the lifting up the weight of the *Arm*, as if they were Inserted at a greater distance 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 inserted 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 saw-like Indentions, and *Posticus*, it being an *Antagonist* to those planted in the Fore-parts, as also *Superior* and *Inferior* from their Scituations: This is a small Muscle immediately lodged under the *Rhomboides*, as I have already said, it ariseth 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*,

This Dilates the Trunk.

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*,

History. *Felix Plater. de suis 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 Consumption; yet a stop being given to its Running, and a piece of a *Vertebre* of the Trunk, which was eroded by this corrosive 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 saw-like Muscle.

This Dilates
the Lower-
part of the
Trunk.

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 Dorsi*, 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.

History.

Peter Pigray writes of a Soldier wounded in the Trunk, by a Musket Bullet, who 3 or 4 Months after he was cured, vomited up a Fragment of a Rib, the length of 3 Fingers by his Gullet, 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 arising 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 insert themselves into the middle of the *Occiput*; You must take it off from its Origination, and preserve as many of its *Ansule* as you can between the *Spines*, by running your Knife between them, and recovering its *Tendon*.

Annotat.

If both move, they bring the *Head* directly backwards, if one only move, it turns the *Head* sideways.

Its Use

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*, assisted by the *Obliqui Superiores & Inferiores*, arising from the first and second *Vertebres* of the *Neck*, and are inserted into the middle, or sides, 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 arising from the top of the *Sternum*, and are inserted 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 *Tensors* and *Flexors* of the *Head* and *Neck*, do by their *Tonic Motion* ballance each other, and keep the *Head* in an erect Posture; and the *Musculi Recti, & Obliqui*, being short, and small *Muscles*, cannot by any single 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 *Tensors*, which being more vigorously performed by the *Recti & 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 inserted 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 Dimension, do move the *Head* further backwards, than the *Recti* and

the *Obliqui*; and each of them acting singly, 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 *Tensors* and *Flexors* do act separately, they bring the *Head* backward, and forward laterally, alternately, and each combatant, when highly invigorated as Conquerors, relaxeth his unactive vanquished *Antagonist*.

This you have at Tab. XVII.

Complexus, or Trigeminus.

This extends
the Neck.

THIS hath a threefold Origination, first from the fourth and fifth *Processes* of the *Vertebres* of the *Thorax*, then becoming 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* laterally: 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 Dorsi*, and its Origination will plainly appear.

Use.

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.

Recti

Fig. 1.

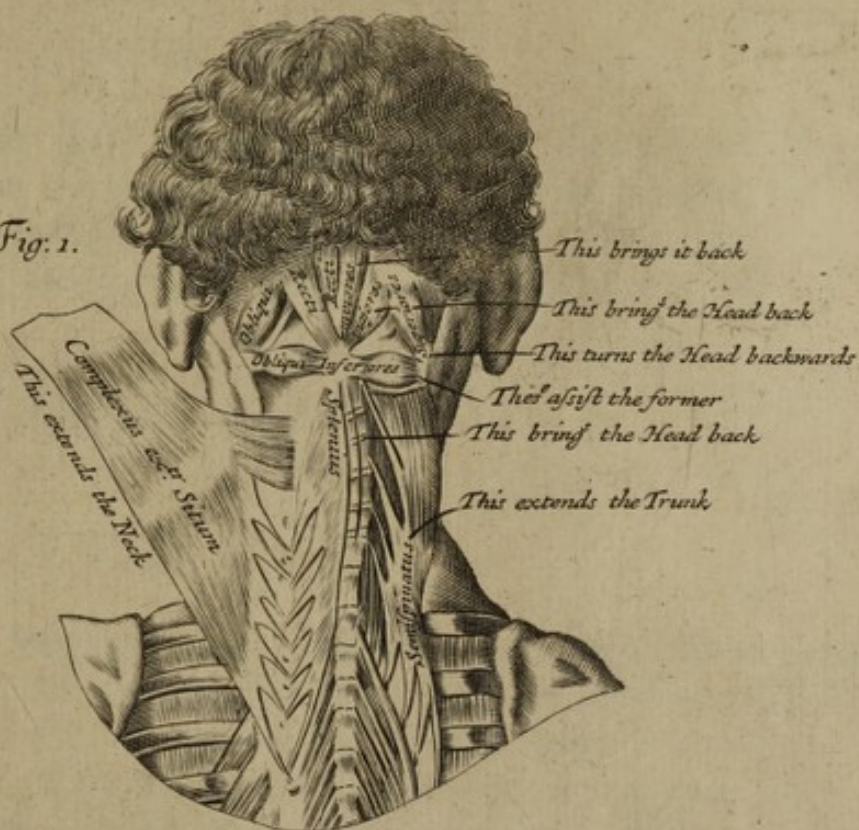
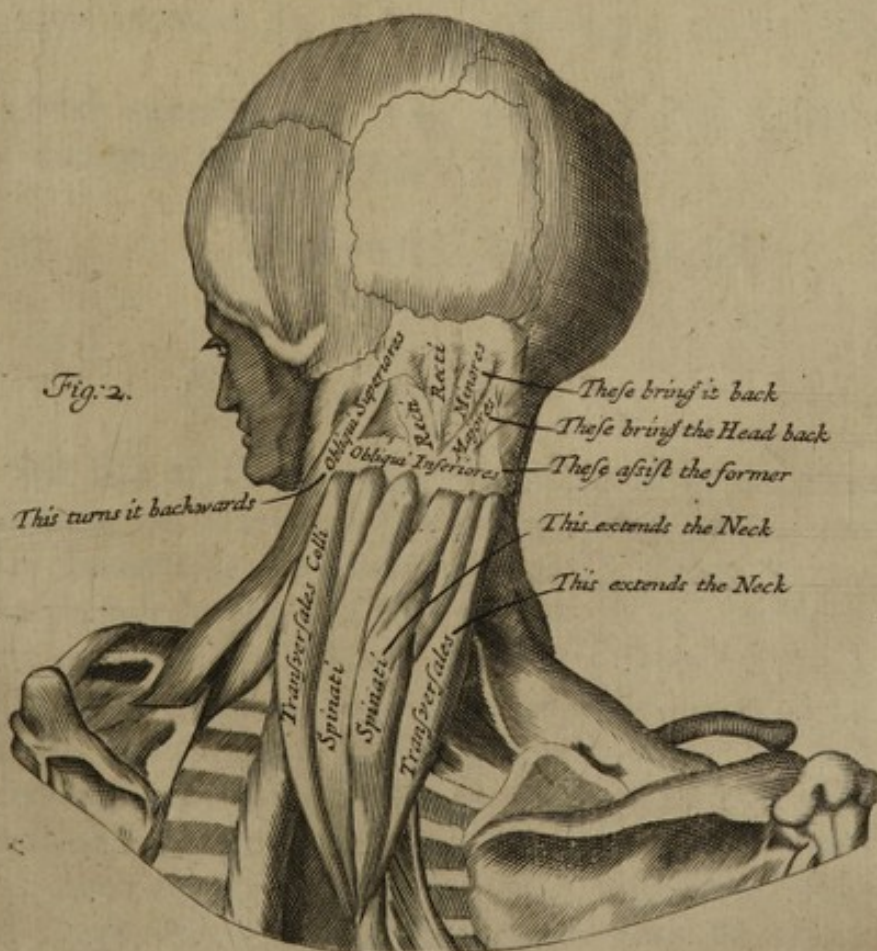
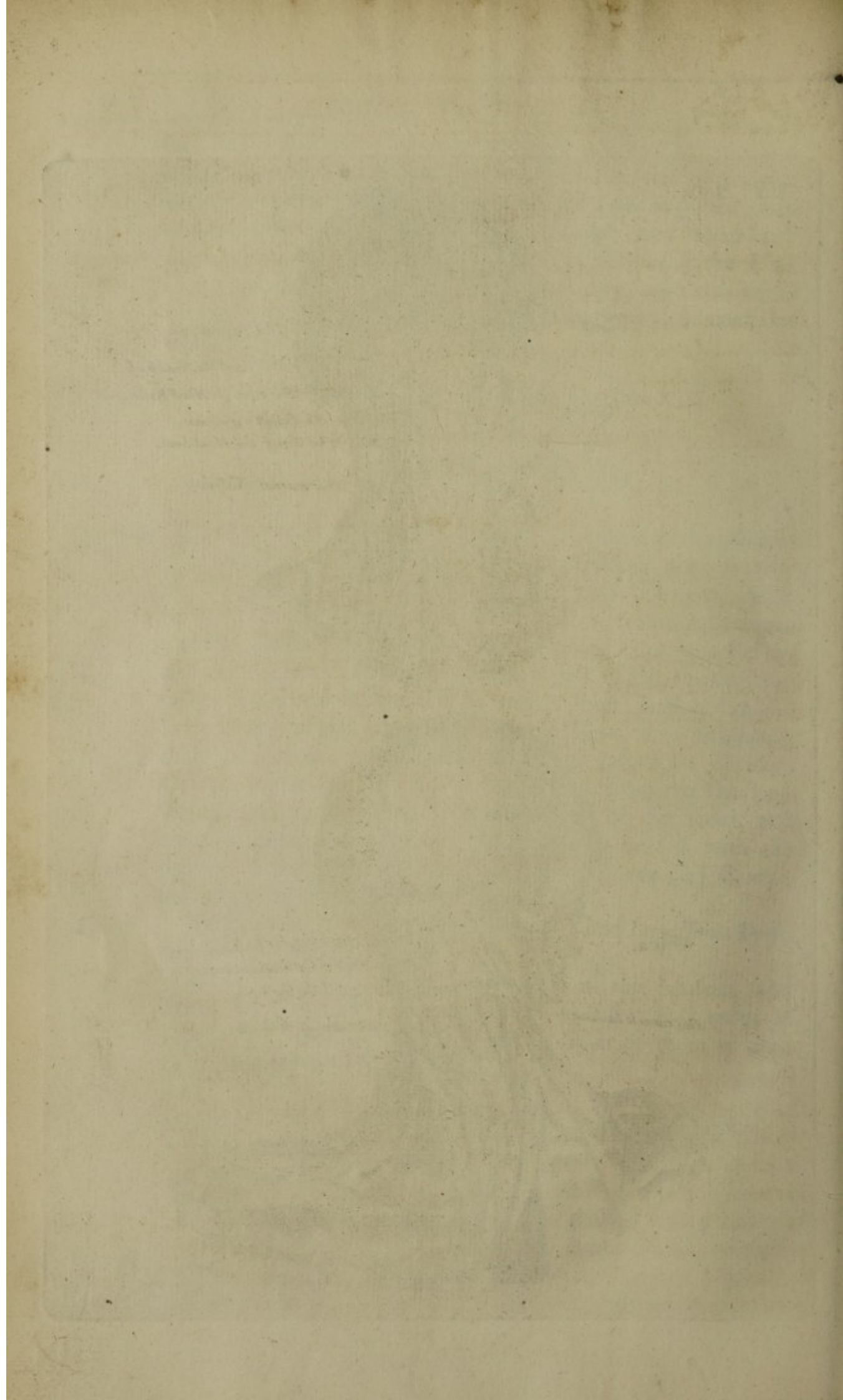


Fig. 2.





Recti Majores.

THESE being small, thin, fleshy and short, do arise out of the Spine of the second *Vertebre*, and growing broader, 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 bring
the Head
back.

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

Recti Minores.

THESE Pair lodging under the former, are likewise two small *Muscles*, being much of the same Substance and Shape, accompanied with the like *Ductus*, they arising fleshy from a small *Protuberance* of the first *Vertebres* of the Neck, and ascending, are implanted like the former, just under them, assisting them in their Motions, by drawing the *Occiput* towards the Neck.

These do
assist the former.

If they both operate, they bring the Head directly backwards, if one only acts, it brings it laterally.

use.

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

Obliqui Superiores.

THE first Use of the *Dentiform Process*, is to be a Centre of Motion, on which the first *Vertebre* being pliant, does freely play backwards and forwards, as Dr. Collins writes; whence he proposeth, that the first may be called *Epistrophis*, tho' diverse *Anatomists* have assigned 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 *Recti*, 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,

These turn
the Head back-
wards.

and being carryed along in an oblique Course, are inserted into the sides of the *Occiput*, near the outward side of the *Recti*:

Bauhine 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 *Left* being implanted as their *Antagonists*, ending in the same manner on that side, must also bring it to the *Left Shoulder*.

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

Obliqui Inferiores.

These assist
the former.

THESE are seen to arise fleshy, thin, and long from the *Spinal Process* of the second *Vertebre* of the *Neck*, near the beginning of the *Recti*, and growing more fleshy, 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
the Neck.

THIS hath its Name, it arising from the *Transverse Processes* of the *Neck*; that is, it ariseth fleshy from their roots, and growing more fleshy, are thereunto annexed 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.

THIS hath its Name from its place, it bordring upon the *Spines* of the Neck, and ariseth from the Seven *Spines* of the *Vertebres* of the *Thorax*, and the five *Spines* of the *Vertebres* of the Neck, bringing them together, and not distinguishable but by the said *Spines*; and becoming fleshy in its descent, is implanted into the Lower Part of the Second *Vertebre* of the Neck, and is said to bring the Neck directly Backwards:

This extends as the former.

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

Sacrolumbalis.

THIS arising from the back part of the *Spine* of the *Ossileon*, and Upper of the *Sacrum*, and the *Spines* of the *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 12th. *Vertebre* of the *Thorax*, where they seem to be two, altho' scarce divideable by the Knife, and then growing thinner, doth insert its self 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 send 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 *Muscle*: 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 divideable; 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;

This assists the former in its Extension.

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

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

Sacer.

This extends the
Loins.

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 sent into their spongy parts; and as the *Os Sacrum* is an admirable strong Structure so made, both for *Strength* and *Thickness*; so 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 Processes* of the *Loins*, and is joyned to their upper *Spines*, and is allowed three tendinous *Insertions*; the first in the upper part 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* & *Sacrolumbalis*, from their membranous *Originations* at the *Os Ileon*, *Os Sacrum*, and from the *Lumbal Spines*, and immediately under these, this will appear *in Situ*, it being allowed to assist *Latissimus Dorsi* in its *Operations*.

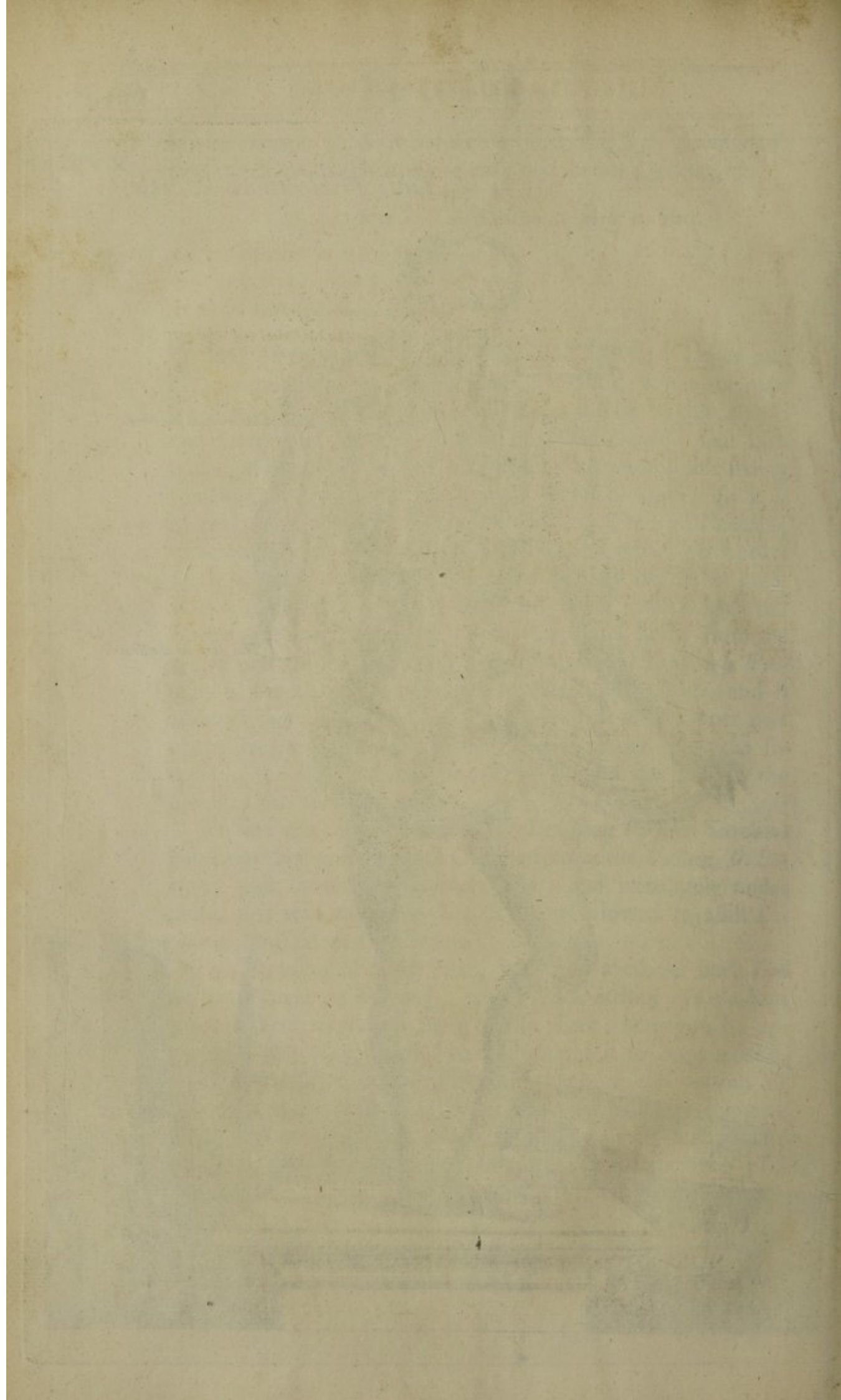
History.

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 *Chirurgion*, 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.

Semi-





Semispinatus.

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

This extends the Trunk.

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.

Its Use.

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 Inflammation, 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 Cautey*, and the Ulcer afterwards cleansed with proper Injections, &c.

History.

This you have at Tab. XVIII.

Longissimus Dorfi.

THIS hath its Name from its length, it being one of the longest *Muscles* belonging to the Body; and a Muscle 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 Vertebres*, 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 inwardly fleshy; it adjoyning its self in its Ascent to the *Transverse Processes* of the *Loins*, and then becoming more fleshy

This extends the Trunk.

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

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 twelfth Vertebre of the Thorax, and in its whole Progress to the Loins.

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

Quadratus 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 fleshy 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 Proceffes of the Loins, just beneath the Psoas.

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

Lect.

Lecture V.

To which these following *MUSCLES* do belong, viz.

<i>Deltoides,</i>	<i>Perforatus,</i>
<i>Pectoralis,</i>	<i>Perforans,</i>
<i>Biceps,</i>	<i>Extensor digitorum Communis,</i>
<i>Supraspinalis,</i>	<i>Indicis Extensor,</i>
<i>Infraspinalis,</i>	<i>Lumbricales,</i>
<i>Teres Major,</i>	<i>Flexor primi Internodii Pollicis,</i>
<i>Teres Minor,</i>	<i>Flexor tertii Internodii Pollicis,</i>
<i>Nonus Humeri Placentini,</i>	<i>Pollicis Adductor,</i>
<i>Subscapularis,</i>	<i>Pollicis Abductor,</i>
<i>Brachialis Externus,</i>	<i>Extensor primi Internodii Pollicis,</i>
<i>Brachialis Internus,</i>	<i>Extensor secundi & tertii Internodii Pollicis,</i>
<i>Anconæus,</i>	<i>Interossei Manus,</i>
<i>Gemellus,</i>	<i>Auricularis,</i>
<i>Palmaris,</i>	<i>Minimi Digiti Abductor,</i>
<i>Caro Musculosa Quadrata,</i>	<i>Pronator Quadratus,</i>
<i>Flexor Carpi Exterior,</i>	<i>Pronator Radii Teres,</i>
<i>Flexor Carpi Interior,</i>	<i>Pronator Radii Longus,</i>
<i>Extensor Carpi Exterior,</i>	<i>Supinator Radii Brevis.</i>
<i>Extensor Carpi Interior,</i>	

Deltoides.

THE Bone articulated above with the *Scapula*, and beneath with the *Cubite*, is by *Celsus* called *Os Humeri*, 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 Δ , and therefore by some it is called *Deltoides*, or *Triangularis*, and by others *Humeralis*; it arising 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 fleshy Covering, and inwardly with a nervous Membrane almost reaching the middle of the *Arm*, and is allowed to bring the same either upwards, forwards, or backwards, according to the various working of its Fibres.

This lifts up the Arm.

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.

History.

We read of an *Infant* born without *Arms*, 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 serving himself with his *Toes*, as others do with their Fingers, and several 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.

Pectoralis.

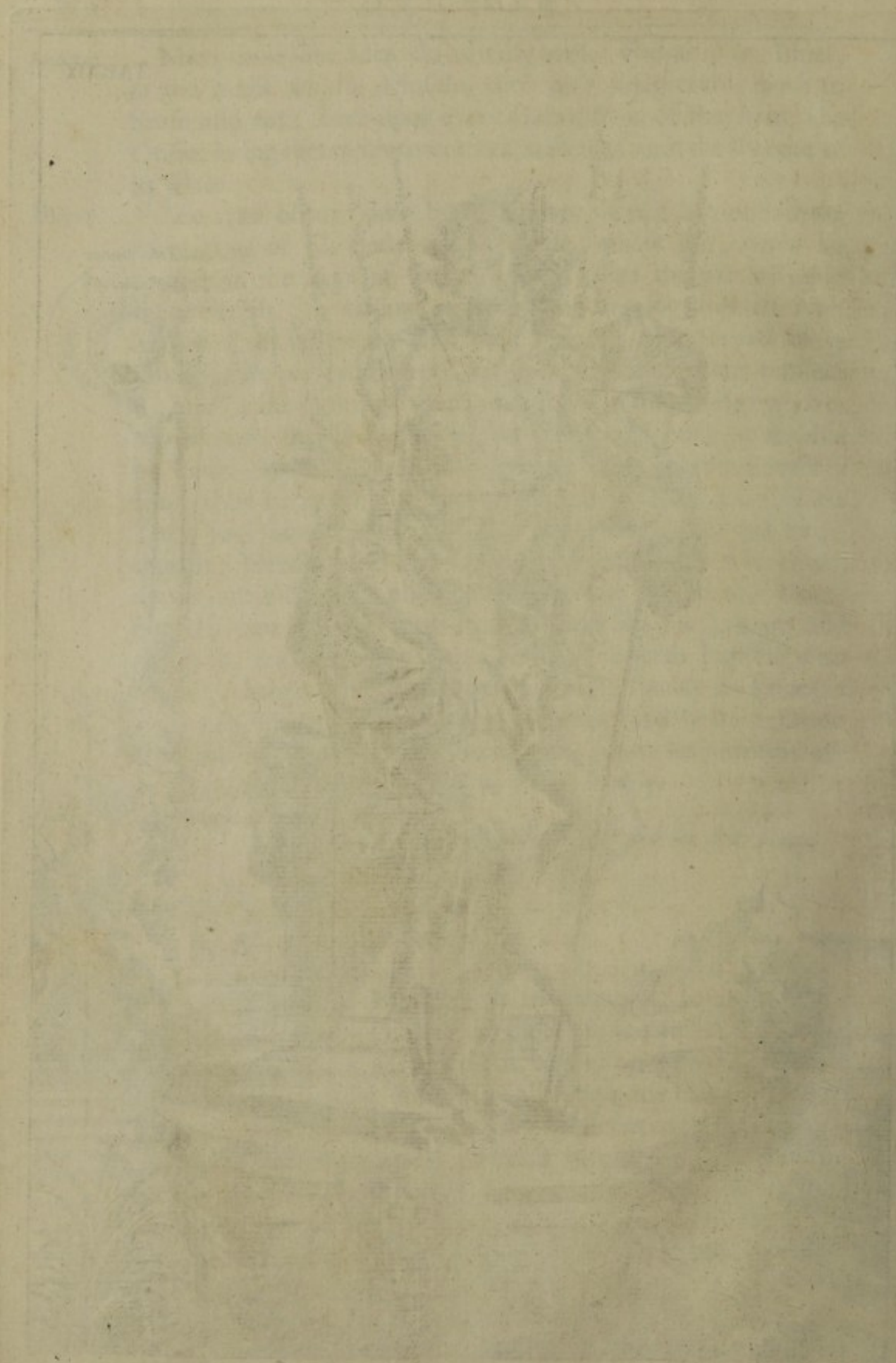
This brings
the Arm for-
wards.

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 *Sternum*, 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



XIV



There are generally two unfortunate Accidents which happen to the *Arm*, from bold Pretenders, and ignorant Practisers, they both arise from the ill Exercise and Use of the *Lancet*; and since 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, *Obs. Chir. Cent. 6.* That in the Year 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 distant from the *Deltoid*; in which, after having been lodged near Seven Weeks, (an Abscess arising on the Part) the Bullet made its way thro' it, and beyond all expectation, the Gentleman received a perfect Cure thereof. Historied

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 *Basilick Vein*, entred the *Artery* with it, whence presently an *Aneurism* arose; to whom, when Medicines 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 somewhat hard, in which he not only perceived a Pulsation by his Finger, but plainly by his Eye, and that the Patient could not Extend his *Arm*, altho' not accompanied with much Pain, but when he tryed to Extend it; he seeing 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 repress'd, the Influx hindred, and the whole *Arm* Restored to its perfect Use again.

Admonit. *Galen de Anat. dissect. 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 *Aneurism* 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 flowing 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
the Arm.

THIS hath its Name from its double Head, or Origin; it first arising from the top of the *Acetabulum Scapulae* 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 riseth broad, fleshy 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 fleshy 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 Protuberance at the upper Head of the *Radius*, where some have declared to have found it double.

Annotat.

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

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

Supra

Prælectio quinta

TAB. XX



XX. RAT.

Supraspinalis, or Suprascapularis.

THIS hath its Name from its Situation, it being planted above the Spine of the Shoulder-blade, it arising long and fleshy from the Basis 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 inserted by a strong round and broad Tendon, into the Neck of the Os Humeri, assisting the former in bringing the Arm about, whilst others as strenuously declare, that it lifts up the Arm with the Deltois.

This brings it about upwards.

This you have at Tab. XX. laid bare.

Infraspinatus, or Infrascapularis.

THIS hath its Name from its Situation being planted below the Spine, that is, covering the whole outward part of the 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 self, according to the Form of the part, as it passeth over the Juncture in a semicircular Manner, and then becoming tendinous, is inserted to the Head of the Os Humeri.

This brings it about directly backwards.

I humbly conceive, that this Muscle according to its Situation, cannot but assist 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 Fallopius it is held to be the eighth Muscle of the Scapula, and from its Situation he calls it Transversalis & Brevis, & Rotundus, from its Origination and Shape; it arising sharp and fleshy from the lower Angle of the Scapula at its Basis; and then growing more fleshy towards its Venter, doth again les-

This brings the Arm upwards.

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 *Octavus 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 assist the former in its Motion.

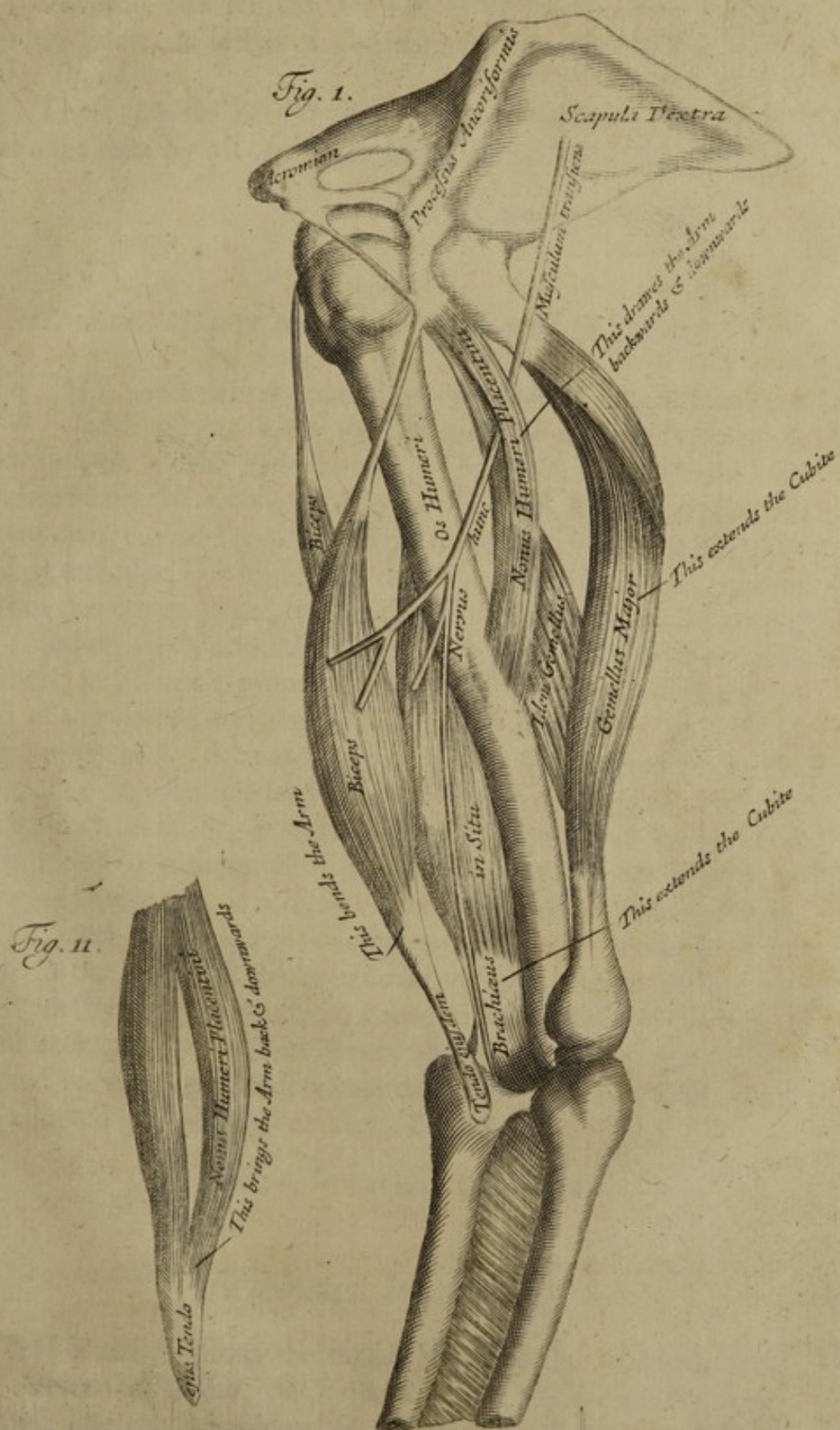
THIS is so named by *Spigelius*, as being the 9th. Muscle of the Arm; & by some it is called *Pectoratus*, its Venter being Perforated, and thro' which passeth a Nerve; and *Coracoides*, and *Coracobrachialis*, it arising from the *Coracoidal process* of the *Scapula*, it being partly Fleshy, and partly Tendinous, at its said Origination from the same Process, and marching forwards 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 *Pectoralis* with it forwards to the Breast, and being perforated 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*.

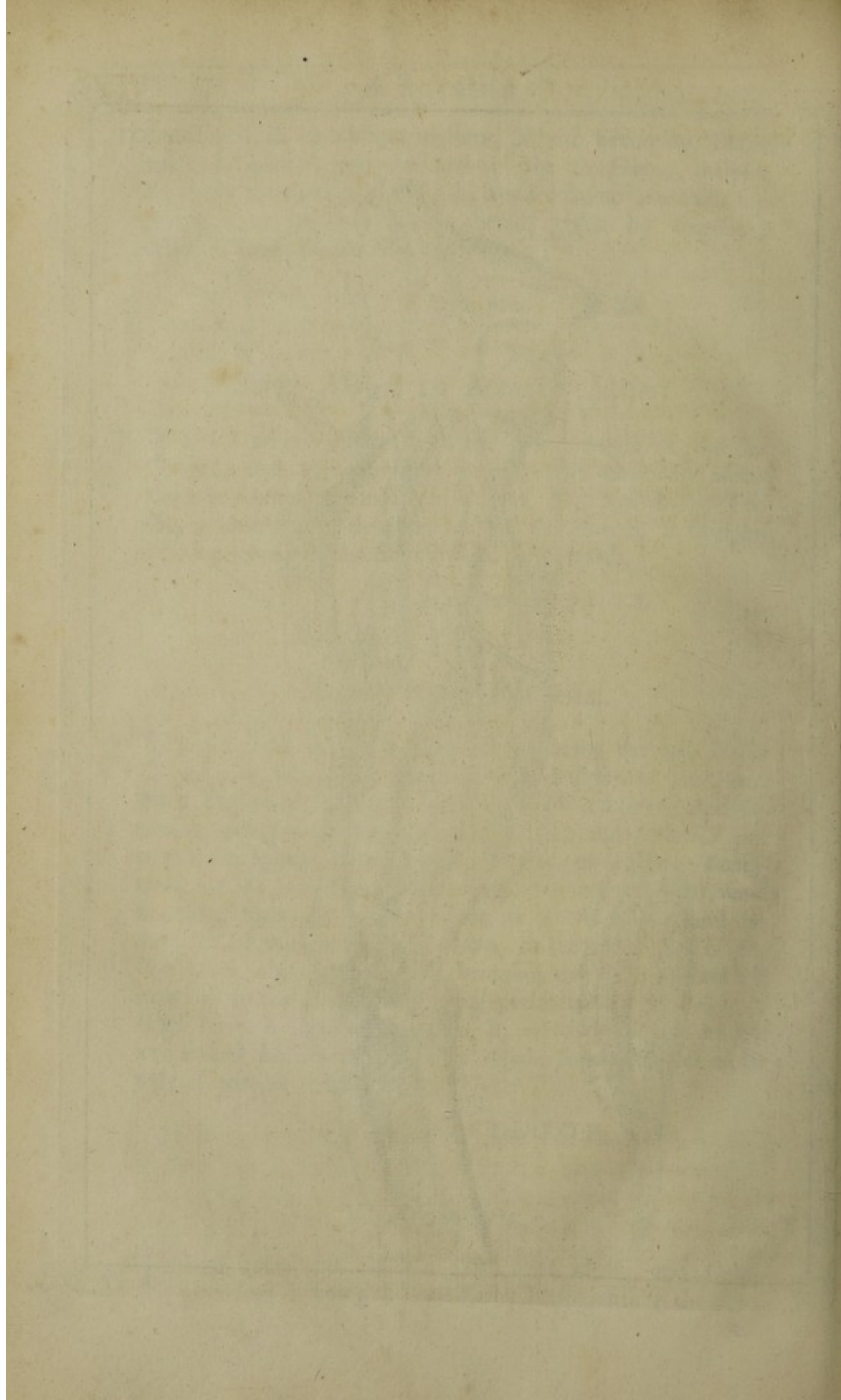
This you have at Tab. XXI Fig. I, II.

Subscapularis.

This brings the Arm outwards.

THIS takes its Name from its place, and Origination, it being a large fleshy Muscle, filling the inner hol-





hollow part of the *Scapula*; and arising fleshy from its *Basis* inwards, and lessning its self in its march along the Bone, doth Insert its self 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 called *Radius & Ulna*, the first planted near the *Orbite* of the lower part of the *Shoulder-blade*, with which the *Ulna* is articulated; the *Ulna* being thick and solid in its upper part, having 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 *Joynr*, 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 *Insertions* 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 arising double, broad and strong, first tendinous from the upper part of the lower *Costa*, 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 self to the inside of the *Os Humeri*, where it meets with another fleshy *Origination* both broad and fleshy from the upper and back part of the same Bone, and there making one, is inserted to the upper and outward part of the *Olecranon*, and is allowed an *Antagonist* to *Biceps Internus*.

This ex-
tends the
Cubite.

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

Brachialis Internus.

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

This affixes
the former.

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

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

Anconæus.

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 *Anconæus* given it, from its Situation, as *Riolan* supposeth, it arising fleshy from the lower and back part of the *Os Humeri*, and is planted between the *Cubite*, and the *Radius*; being inserted with a Nervous Tendon into the side of the *Ulna*, a Thumbs length below the *Olecranon* or Elbow, and is said to assist in Extending both of *Longus & Brevis*.

This has no Figure here.

Gemellus.

This extends the *Cubite*.

IT hath 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 fleshy in its march, doth joyn its self with its other Origination; it appearing broad and fleshy from the upper and back part of the *Os Humeri*, where shewing its self first outwardly Tendinous, and then inwardly fleshy, is plainly seen to Insert its self into the upper and outward part of the *Olecranon*, it being generally allowed one of the *Cubiti Extensors*.

This you have at Tab. XXI.

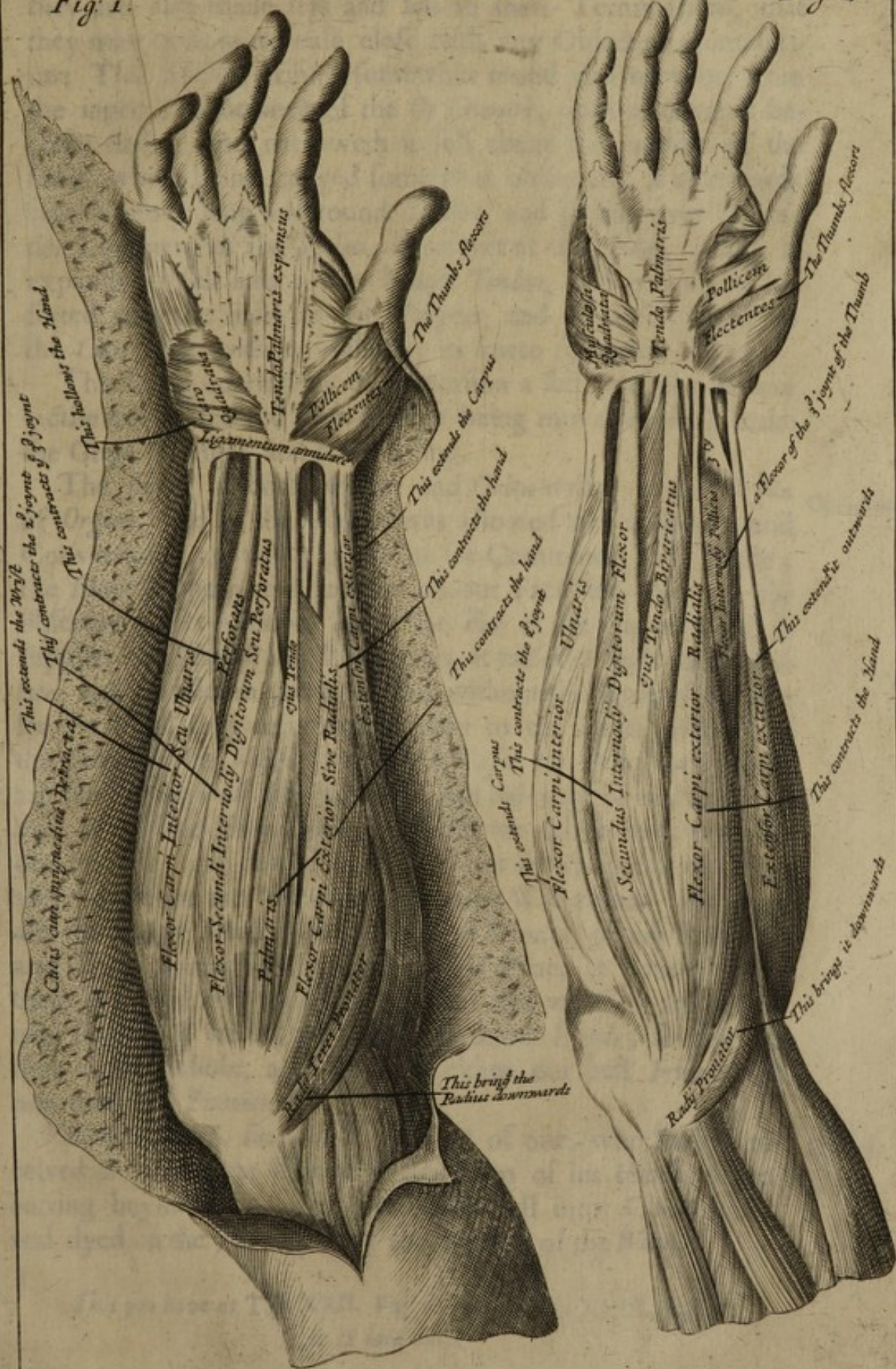
Palmaris.

This contracts the *Hand*.

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 different Set of Bones, formed for the most part round, and covered with Muscles and Skin, they being also somewhat depressed in their upper and lower parts, for the better enabling them

Fig. 1.

Fig. 2.



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: 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 self into a very broad *Tendon*, and is laterally inserted 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* 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 *Cæsar* his Due; our *Hands* are the *Registers* of all our *Laws*, and the very *Nerves* and *Sinews* of all our *Government*; by them we salute and embrace our *Friends*, and defend and guard our selves against our *Enemies*; these are the *Instruments* that wage War abroad, and these are the happy *Masters* 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*; so that we may in the whole, account them either our best *Friends*, or our worst of *Enemies*.

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

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 hol-
lows the
Hand.

THIS has its Name from its Shape and its Origination; it ariseth in the lower part of the *Mons Lunæ*, as *Diemerbroeck* writes, or as *Fallopious* 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.

Use. This Muscle hollows the Hand in its Contraction, drawing the *Mons Lunæ* 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 transversely, 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-finger; these two acting together, do both contract the *Wrist* and the *Hand*; one only acting, it brings it somewhat obliquely lateral in its Contraction.

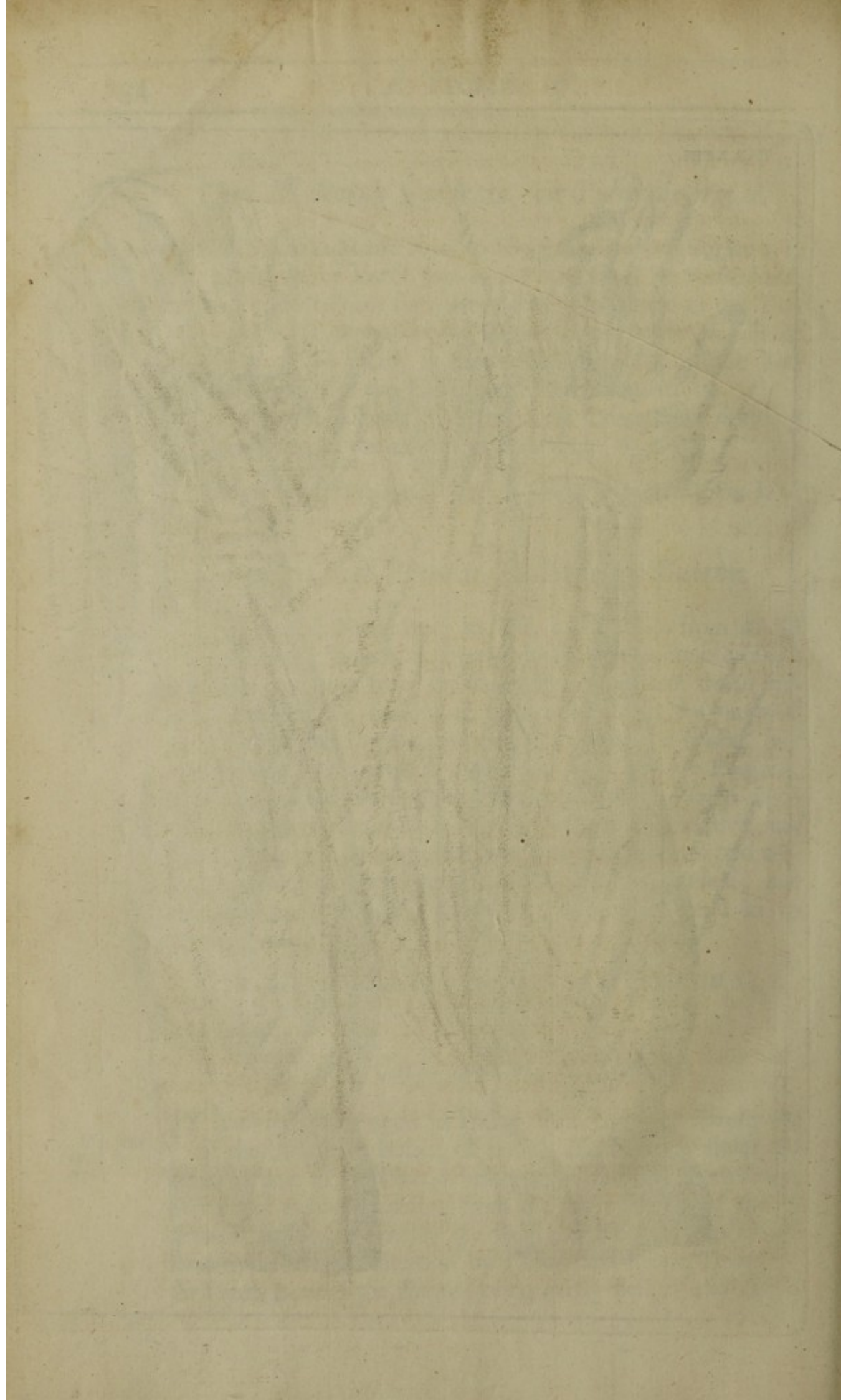
This you have at Tab. XXII. Fig. I, II. and at Tab. XXIII. Fig. I.

Flexor Carpi Interior, or Ulnaris.

This con-
tracts the
Wrist.

IT hath its Name upon its arising from the inner Extuberance 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, fleshy and nervous, arising from the inner *Process* of the *Os Humeri*, and running fleshy 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 fleshy, and partly
nervous





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, so they always arise in the inside of the *Arm*, while we plainly perceive the *Extensors* do take their Originations from the outward Extuberance thereof.

Its Use.

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

Extensor Carpi Exterior, Radialis, or Bicornis.

IT hath its first Name from its Office, and its other two from its Situation and Make; it has two Originations, the outermost 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 inserted by a double Tendon into the first and second Bones of the Fore and middle Fingers; and in respect of its double Origination, and Insertion, it is also called *Geminus*.

This extends the Carpus.

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, II.

Extensor Carpi Interior, or Ulnaris.

THIS arising from the inner Extuberance of the *Arm*, as also from the Top of the *Cubite*, and being dilated all its whole Length thro' it near the *Carpus*, it is converted into a strong and round Tendon, by which it inserts its self into a Sinus, above the lower end of the *Cubite*, and to the 5th. Bone of the *Carpus*.

This extends the Wrist.

Nature hath framed two sets of Bones for making the *Carpus* or *Wrist*; by the Benefit whereof, the first is joyned to the *Radius*, and the second to the *Metacarp*, and the first Bone of the *Thumb*; the upper being so closely put together, that they all seem but as one Bone, which is taken in as it were

Observat.

M m 2

into

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 2^d Joint 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 secundus 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 so on purpose, 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 seen furnished with *Appendages* for their better Terminations, but have also allowed them *Asperities*, for the more ready Admission of their tendinous Insertions: This Muscle ariseth nervous 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 self into four fleshy Portions, from each of which are sent out 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*, till 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

FIG. I

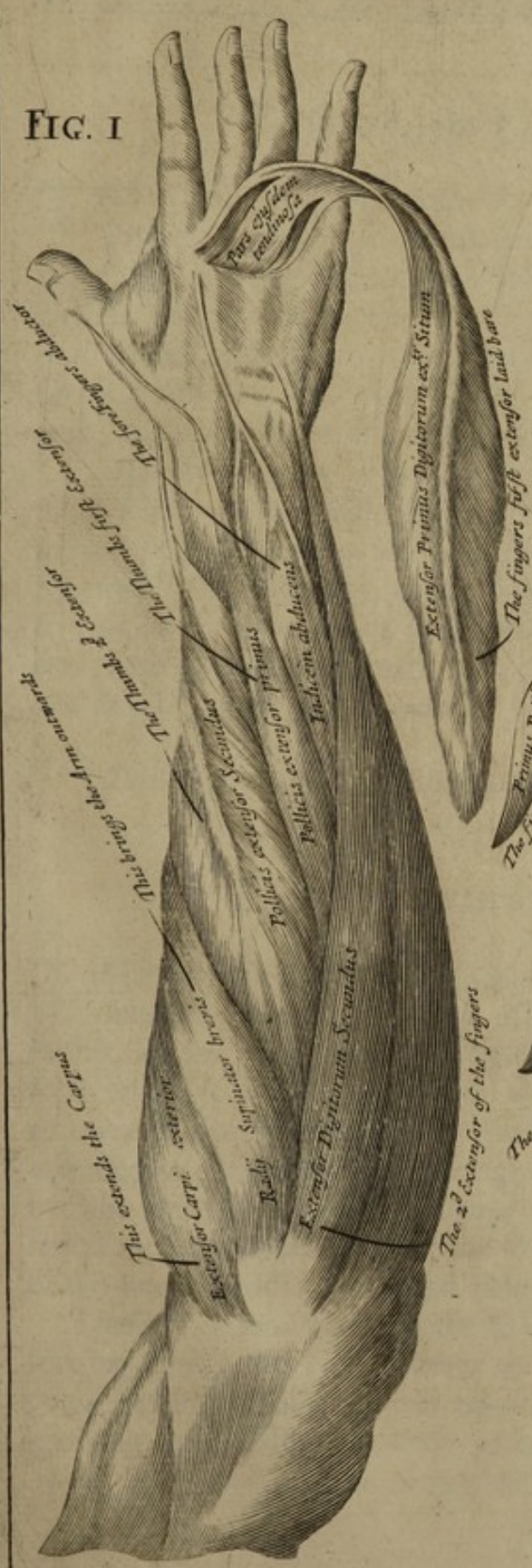
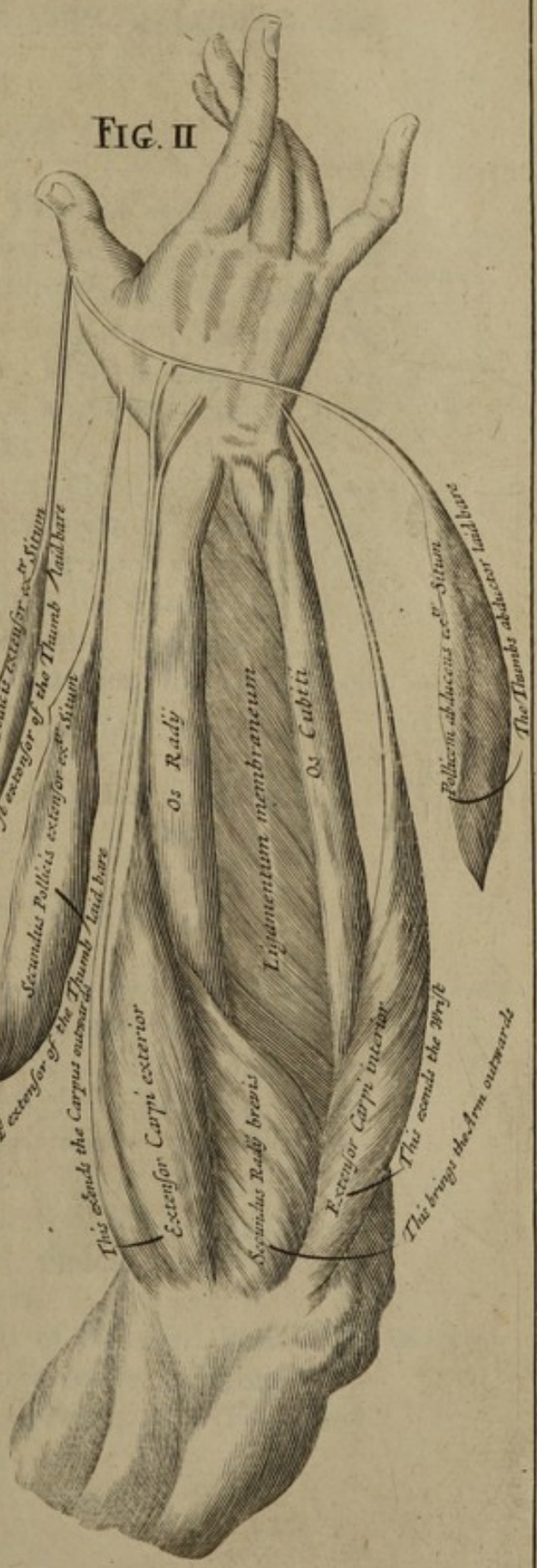
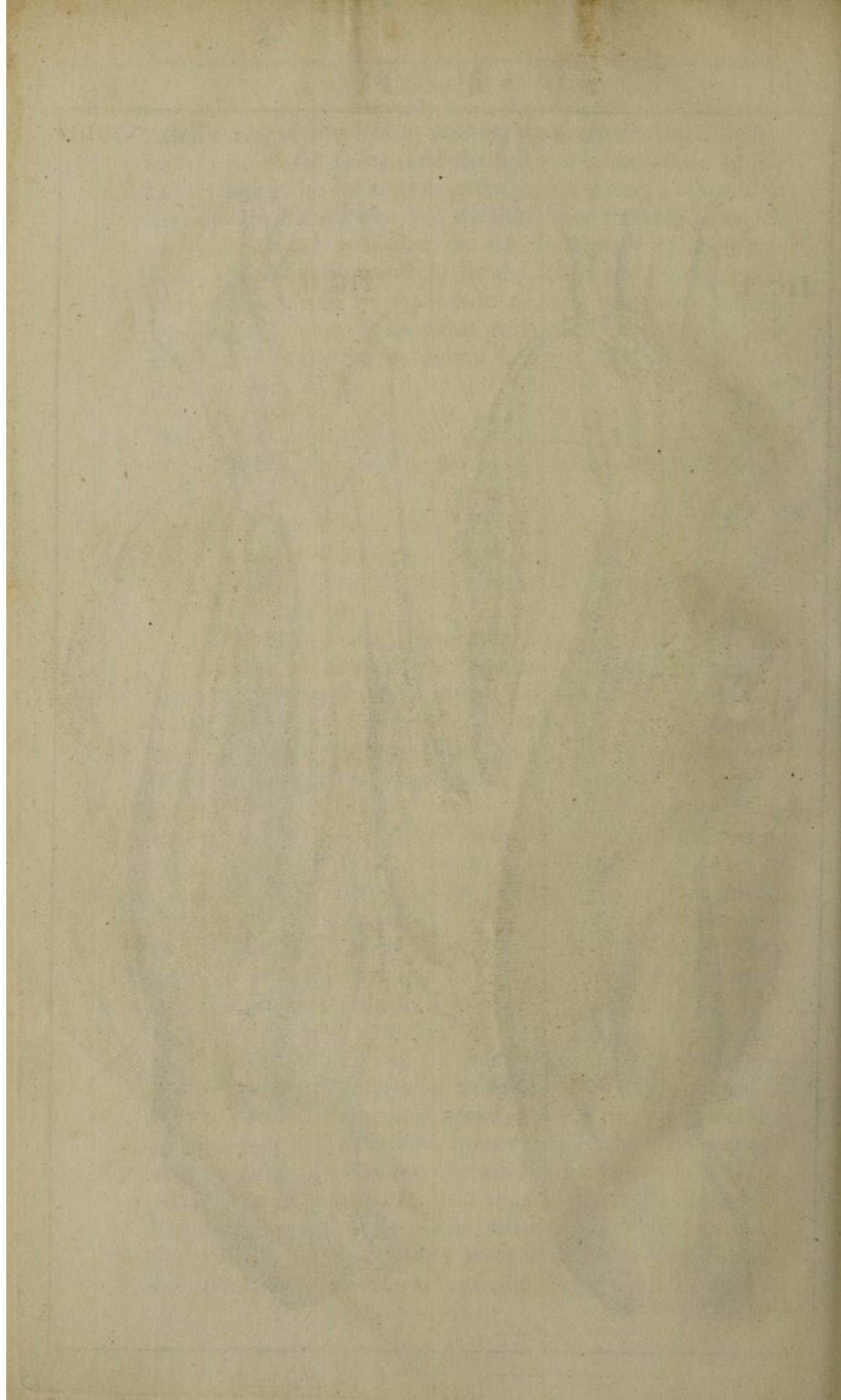


FIG. II





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. I, II. it is laid bare.

Perforans, or Flexor tertius.

THIS hath its Name from its *Tendons* passing thro' the former Muscle; it ariseth fleshy from the upper part of 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.

This contracts the 3d. Internodes.

Nature hath made a very excellent Order in the forming 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 pass freely in order to their Operations; and not only so, but these also are so framed, that they are seen to move without any Injury to the former.

Observat:

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

Extensor Digitorum Communis.

THIS ariseth partly fleshy, and partly nervous, from the outward *Apophysis* of the *Os Humeri*, and becoming more fleshy, in less than half its Progress, it is seen to narrow its self, 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.

This extends the 2d. and 3d Internodes of the Fingers

These *Tendons* reaching the Ends of the third Bone, and 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.

Observat.

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 *Veslingius* 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 18. Cent. 1.* of a Fisherman about *Montpelier*, 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. I.

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 fleshy, 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 the 3d. Joynt of the Thumb.

THIS oft times hath shewn its self with a double Origine, it first arising fleshy, from the inner Extuberance of the

Fig. 1.

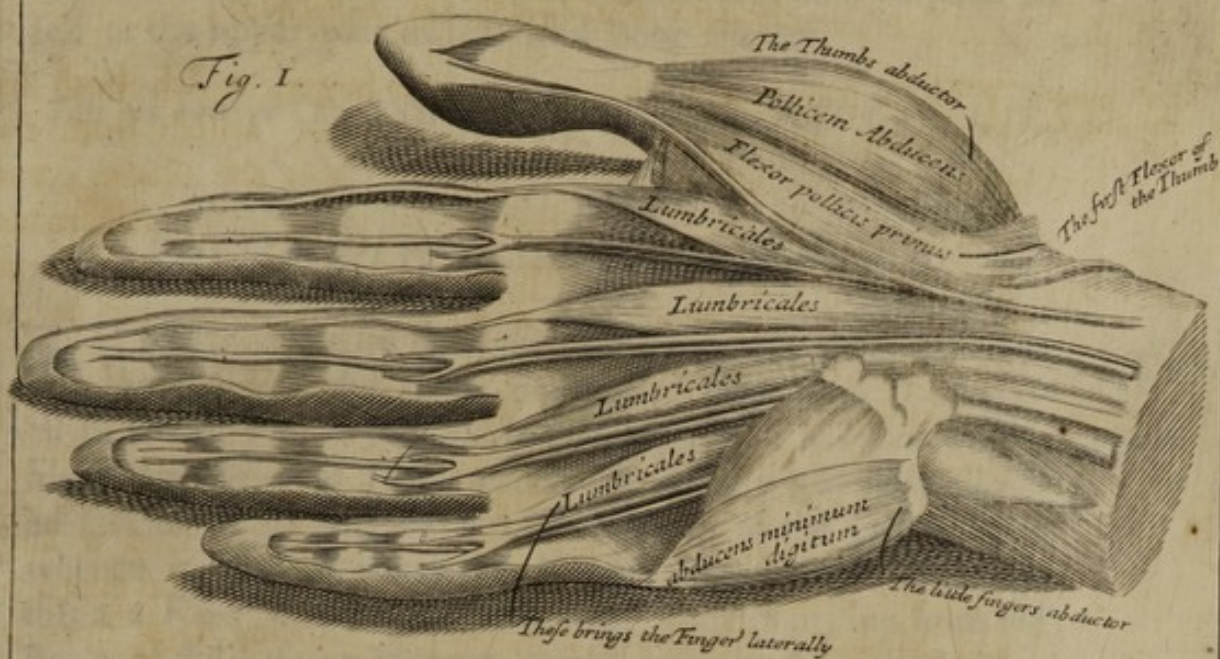
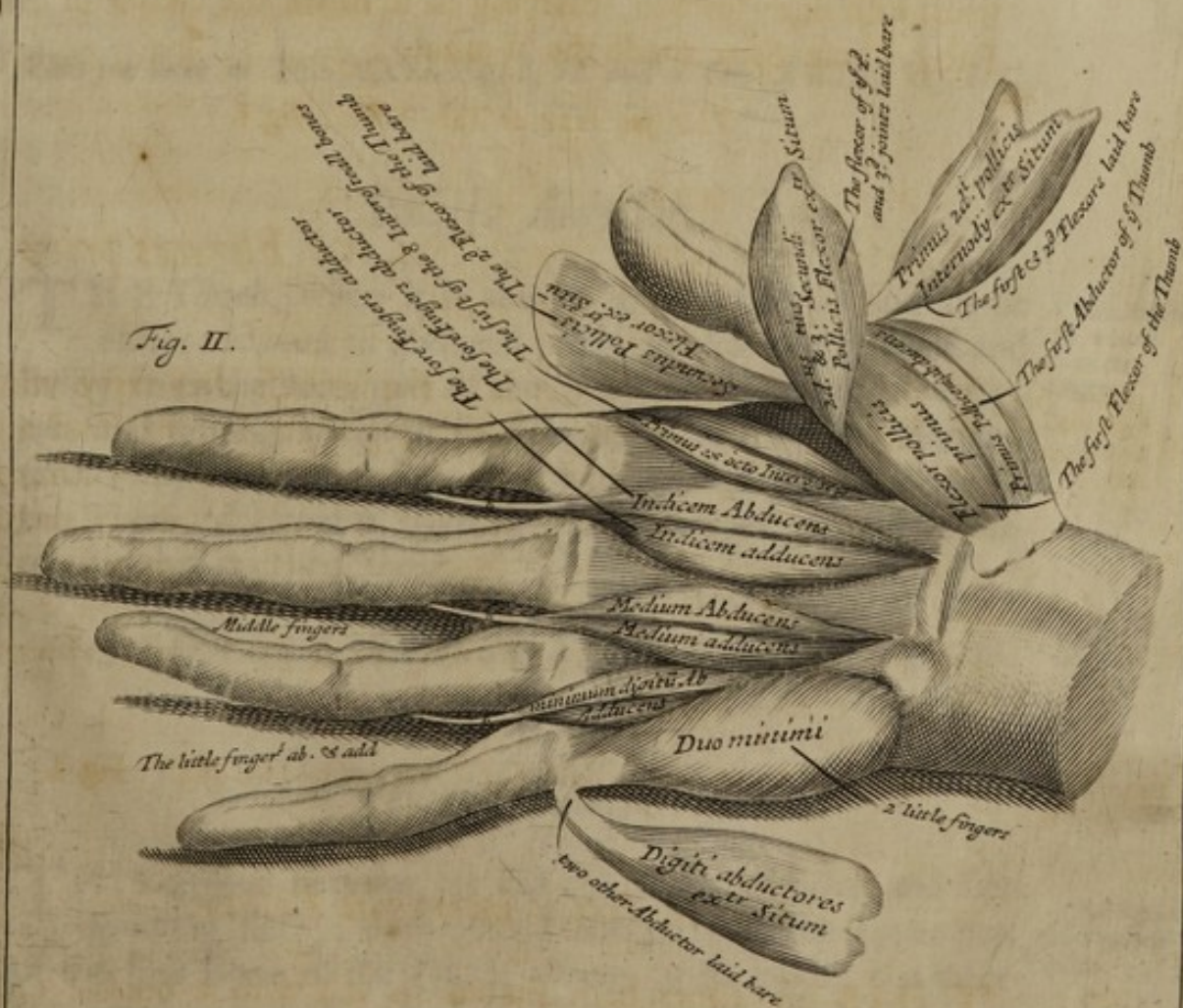
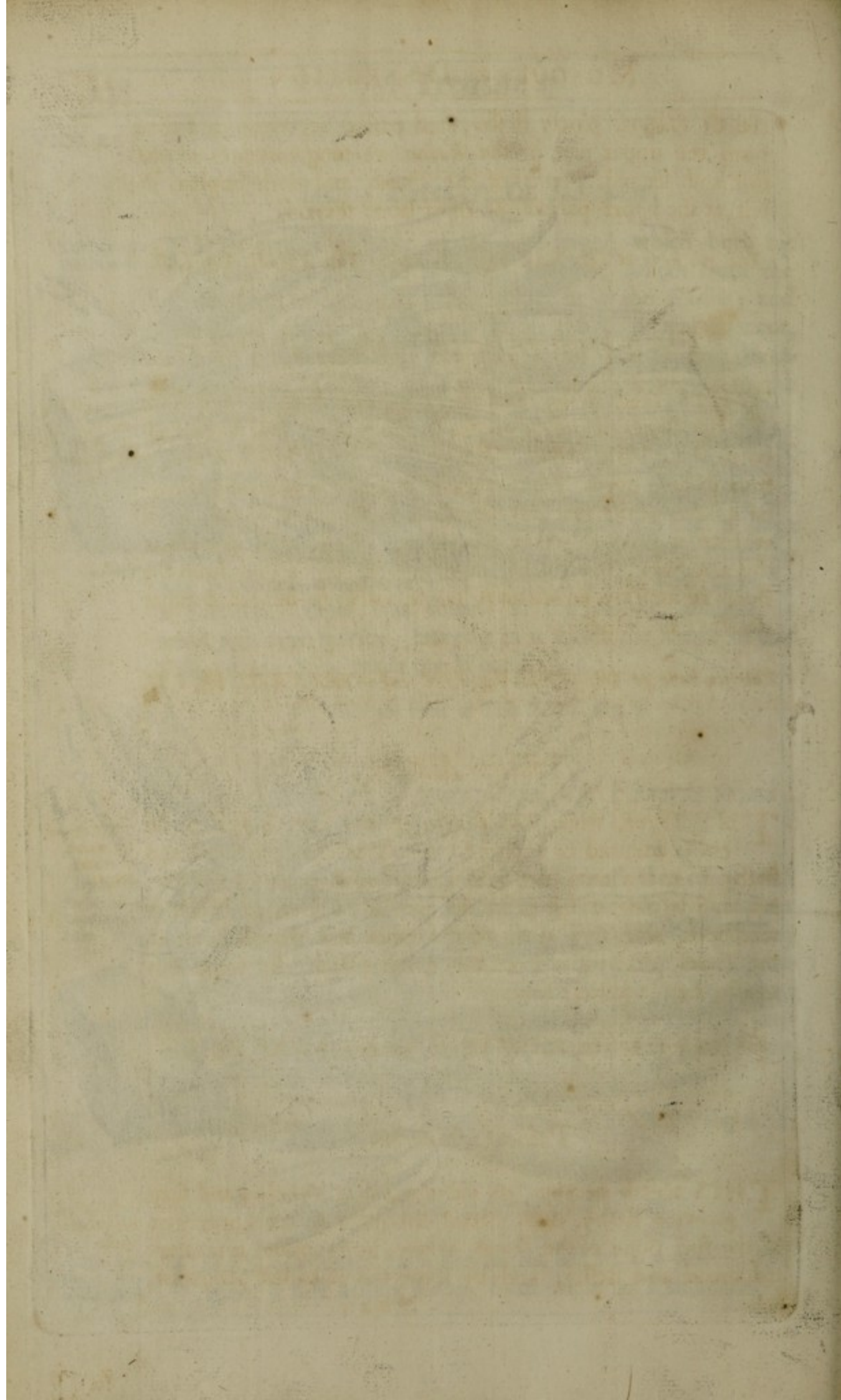


Fig. II.





the *Os Humeri*, partly fleshy, and partly nervous; and then from the upper part of the *Radius*, running forwards to the first and second Joints of the *Thumb*, and doth implant its self 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 & secundi Internodii Pollicis.

THIS ariseth fleshy from the *Ligamentum Annulare*, and from the Bones of the *Carpus*, under the former, and is extended to the middle of the *Thumb*; its variety of Motions arising 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 *Flexor*, but thinks, that these Muscles arising from the Bones of the *Carp* or *Metacarp*, ought rather to be called either *Abductors* or *Adductors*.

This bends the 1st. and 2d Joints of the Thumb.

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

Pollicis Abductor.

THE *Thumb*, when it is drawn to any side, is said to be either adduced or abducted; this *Abductor* ariseth broad and fleshy from the inner part of the *Transverse Ligament* of the *Carpus*, and lesning its self 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 draws the Thumb from the Fingers.

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

Pollicis Adductor.

THIS ariseth nervous, as did the *Indicis Abductor*, and then growing fleshy, doth ascend obliquely to the upper part of the first Bone of the *Thumb*, where, at its inside, it is inserted broad and fleshy, and by some this is called *Antithenar*,

This draws the Thumb inwards.

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*.

THIS 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 unequal 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.

Interossei Manus.

These bring the Fingers lateral y.

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 fleshy and small Muscles, arising inwardly fleshy from the upper Bones of the *Metacarp*, near the *Carpus*, and

Fig. 1.

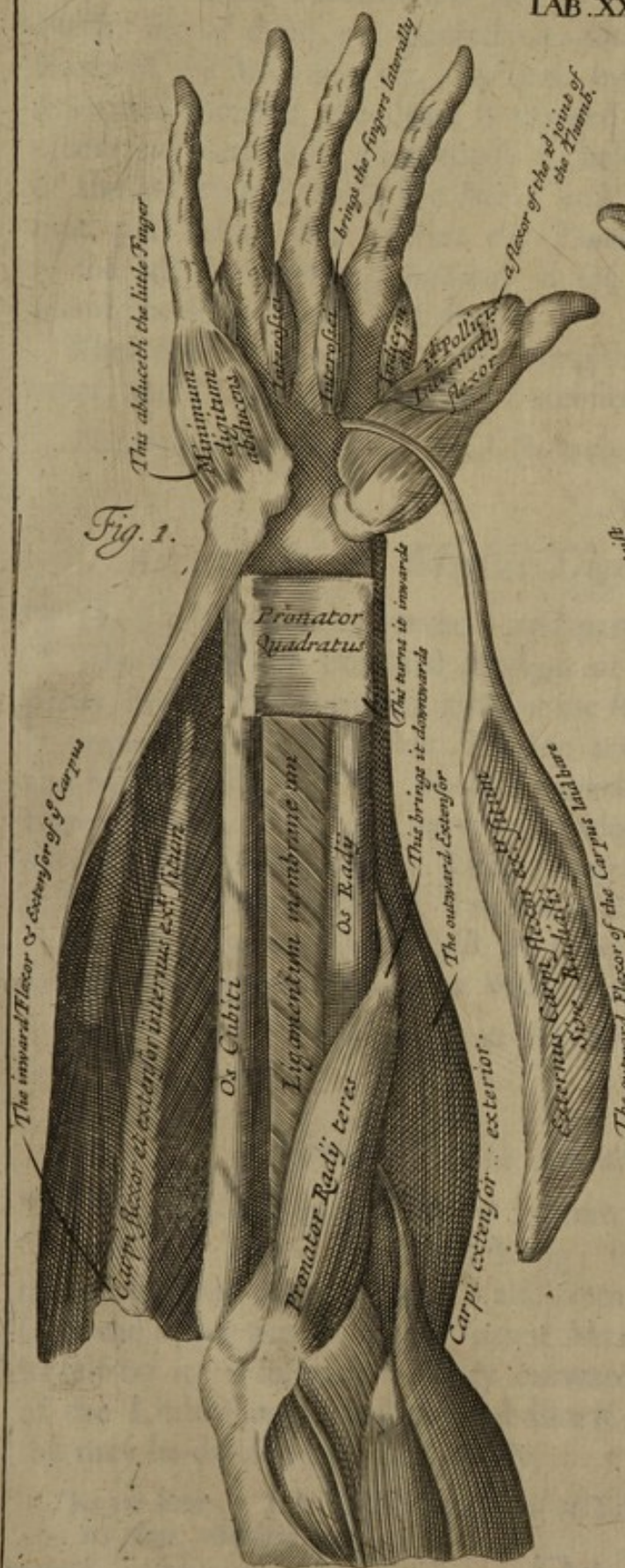
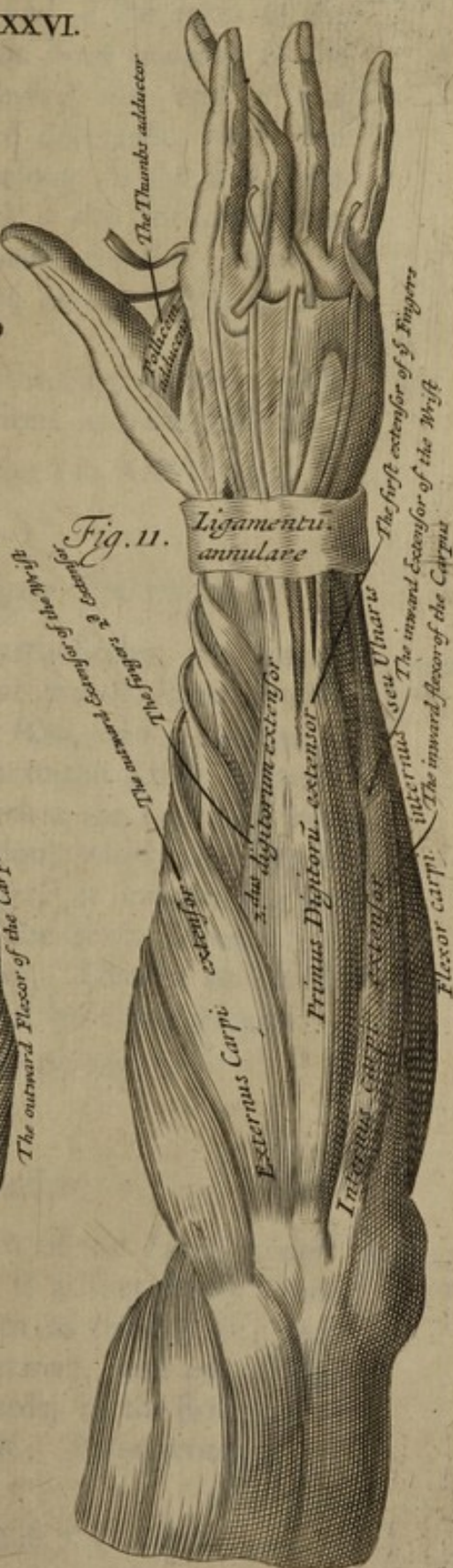
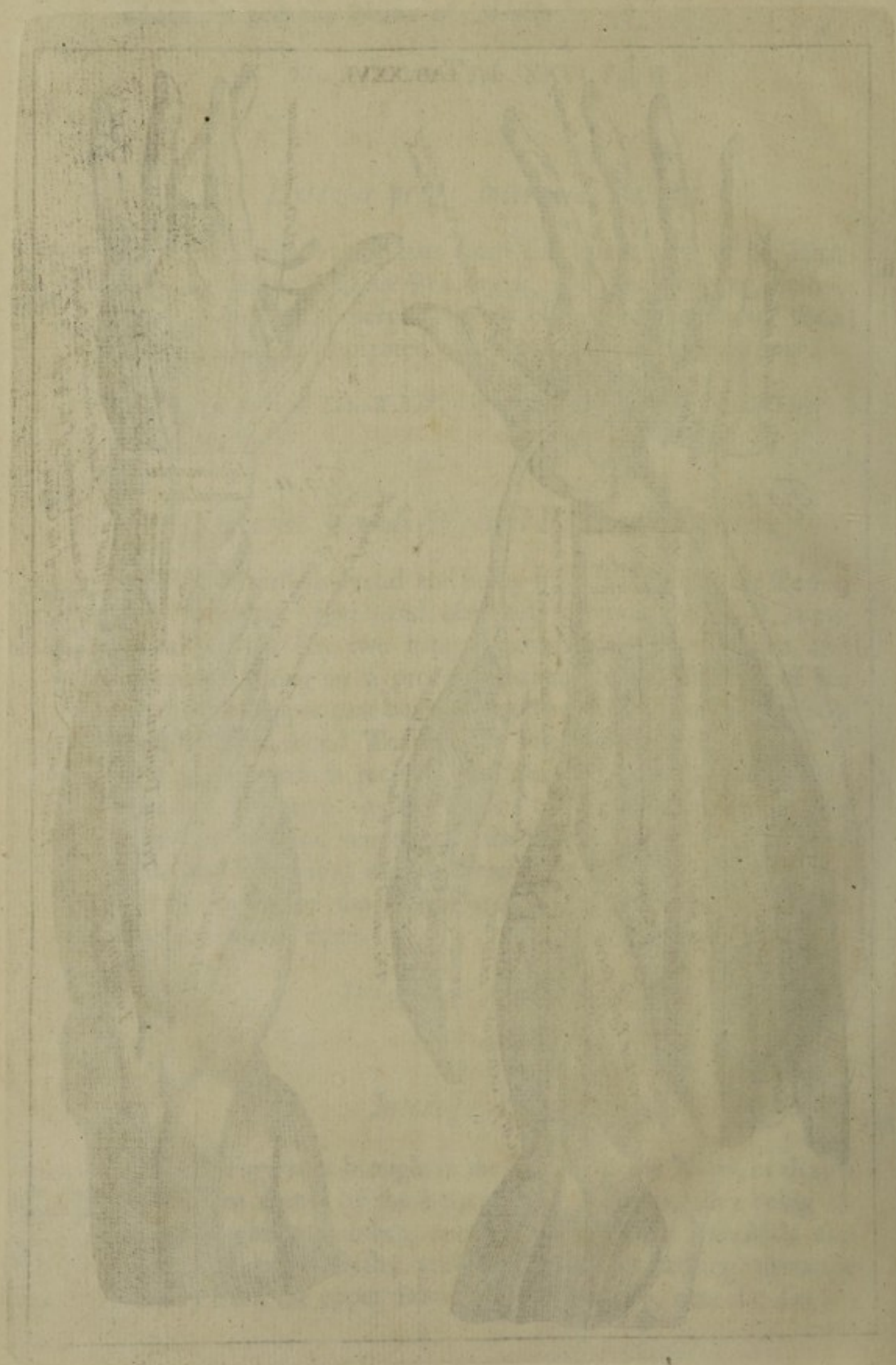


Fig. 11.





and intermixing with the *Lumbricales*, become tendinous at the first Joynt of every Finger laterally, and marching to their Insertions, their Tendons are seen to end at the roots of the Nails, six 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, whilst the others are seen 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 *Thumb*; 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.

Use:

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

Auricularis, or Minimi Digiti Extensor.

THIS ariseth partly nervous, and partly fleshy, nervous at the end of the outward *Apophysis* of the *Os Humeri*, and 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 inserted into the third Bone of the Little Finger, it intermixing its self in its passage, with the Tendon of the *Tensor Communis*.

This extends the Little Finger.

Horatius Augenius Lib. 9. Epist. 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 fleshy from 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 draws off the Little Finger.

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

Pronator Quadratus.

This turns
the Wrist in-
wards.

THIS ariseth broad and fleshy, (being transversely 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. Epist. 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-out-
wards.

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 membranous Tendon, and is fastened to the outer and lower part of the *Radius* near the *Carpus*.

Use.

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.

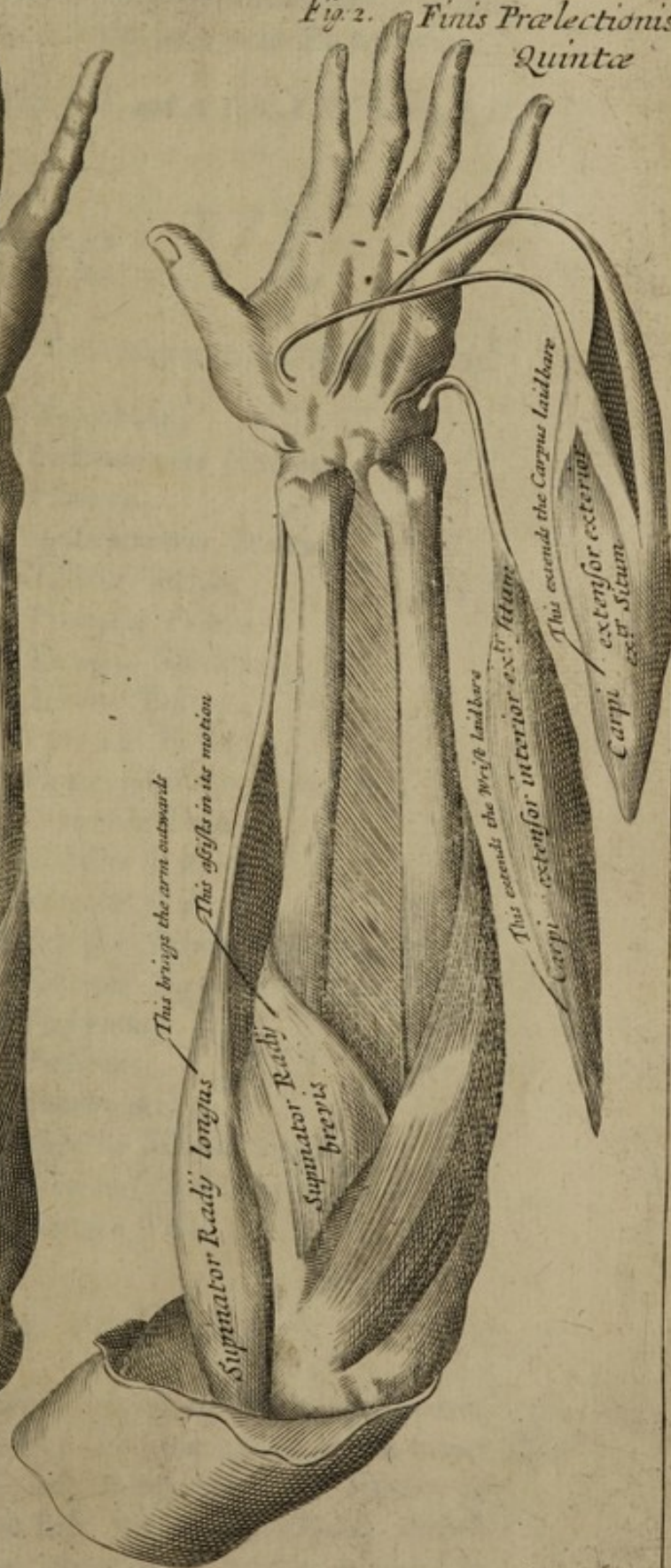
This assists
the former.

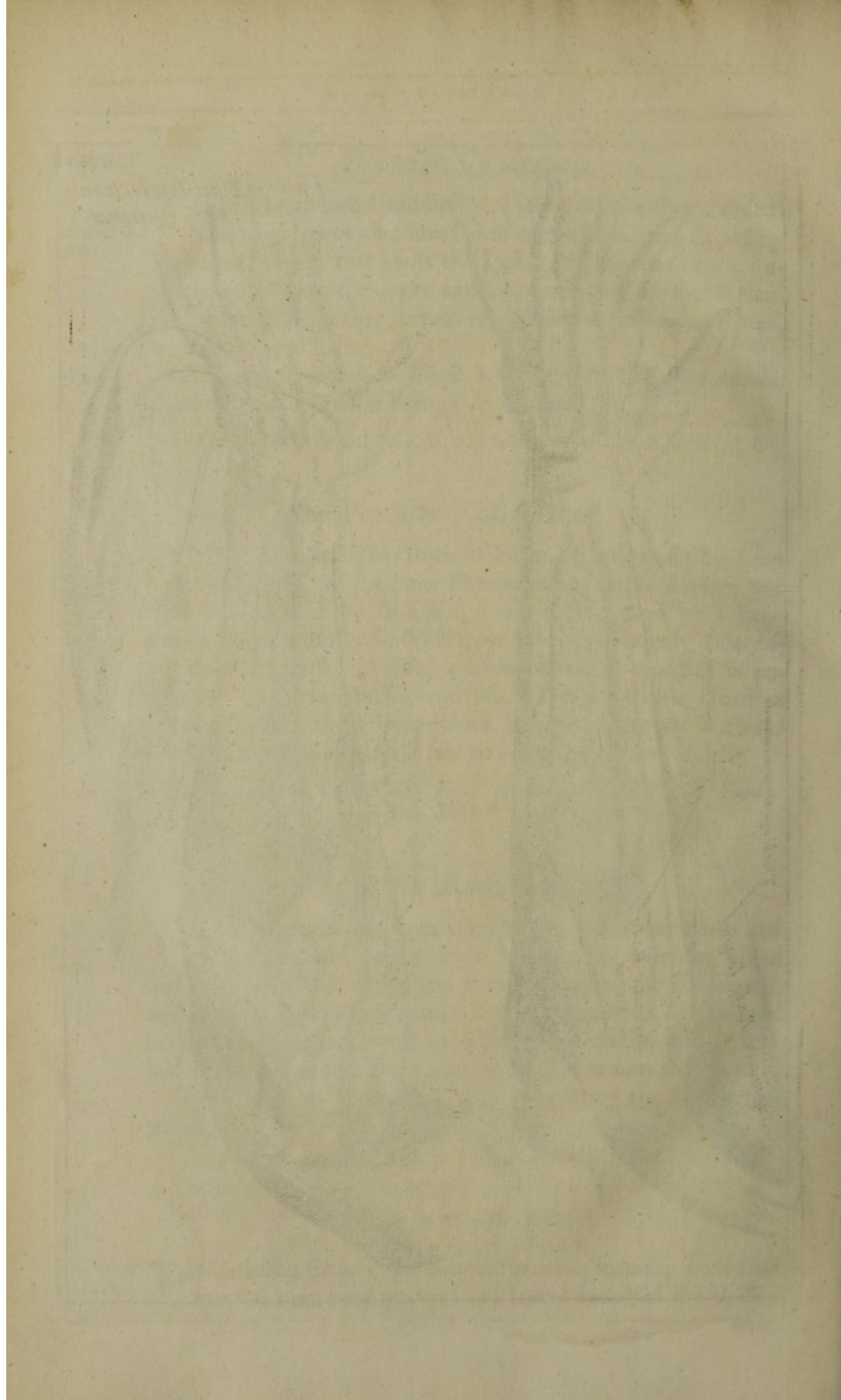
THIS being shorter and thinner than the former, doth arise from the outward part of the lower Head of the *Os Hu-*
meri.

Fig. 1.



Fig. 2. Finis Prælectionis Quintæ





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:

<i>Psoas Magnus,</i>	<i>Suppopliteus,</i>
<i>Psoas Parvus,</i>	<i>Gasterocnemius Externus,</i>
<i>Iliacus Internus,</i>	<i>Plantaris,</i>
<i>Pectineus,</i>	<i>Gasterocnemius Internus,</i>
<i>Gluteus Major,</i>	<i>Tibialis Anticus,</i>
<i>Gluteus Medius,</i>	<i>Peroneus Primus,</i>
<i>Gluteus Minimus,</i>	<i>Peroneus Secundus,</i>
<i>Pyriformis,</i>	<i>Tibialis Posticus,</i>
<i>Marsupialis,</i>	<i>Extensor Pollicis,</i>
<i>Quadratus,</i>	<i>Flexor primi & secundi In-</i>
<i>Triceps,</i>	<i>ternodii Pollicis,</i>
<i>Obturator Externus,</i>	<i>Abductor Pollicis,</i>
<i>Membranosus,</i>	<i>Adductor Pollicis,</i>
<i>Sartorius,</i>	<i>Extensor Digitorum Longus,</i>
<i>Gracilis,</i>	<i>Extensor Digitorum Brevis,</i>
<i>Seminervosus,</i>	<i>Perforatus,</i>
<i>Seminembranosus,</i>	<i>Perforans,</i>
<i>Biceps,</i>	<i>Lumbricales,</i>
<i>Rectus,</i>	<i>Abductor Minimi Digiti,</i>
<i>Vastus Externus,</i>	<i>Transversalis Placentini,</i>
<i>Vastus Internus,</i>	<i>Interossei Pedis.</i>

Psoas Magnus, or Lumbalis.

HAVING cleared the *Muscles* belonging to the upper parts, and those of the *Trunk*; we now arrive at the lower parts of the *Body*, beginning with the *Flexors* of the *Thigh*, where we first meet with *Psoas*, which has its Name; *ἐκ τοῦ ἀπὸ τοῦ πύου*, they being *Muscles* planted in the inner part of the *Loins*, as *Hippocrates* writes: And whereas

*This Con-
tradicts the
Thigh.*

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 securing 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 distinct Bodies, appointed as so 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, fleshy 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 *Muscle*, 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.

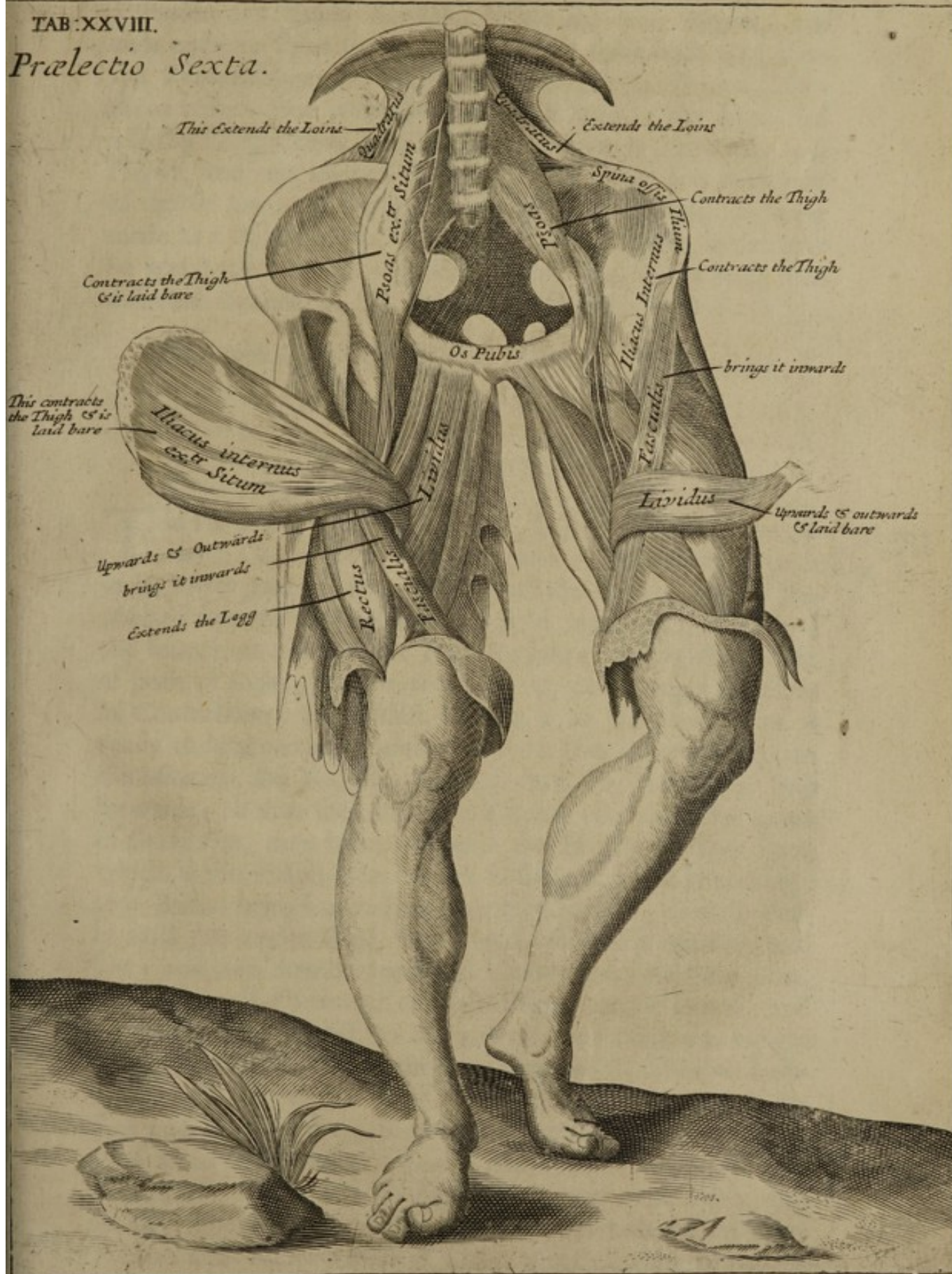
This you have at Tab. XXVIII. both in and out of its place.

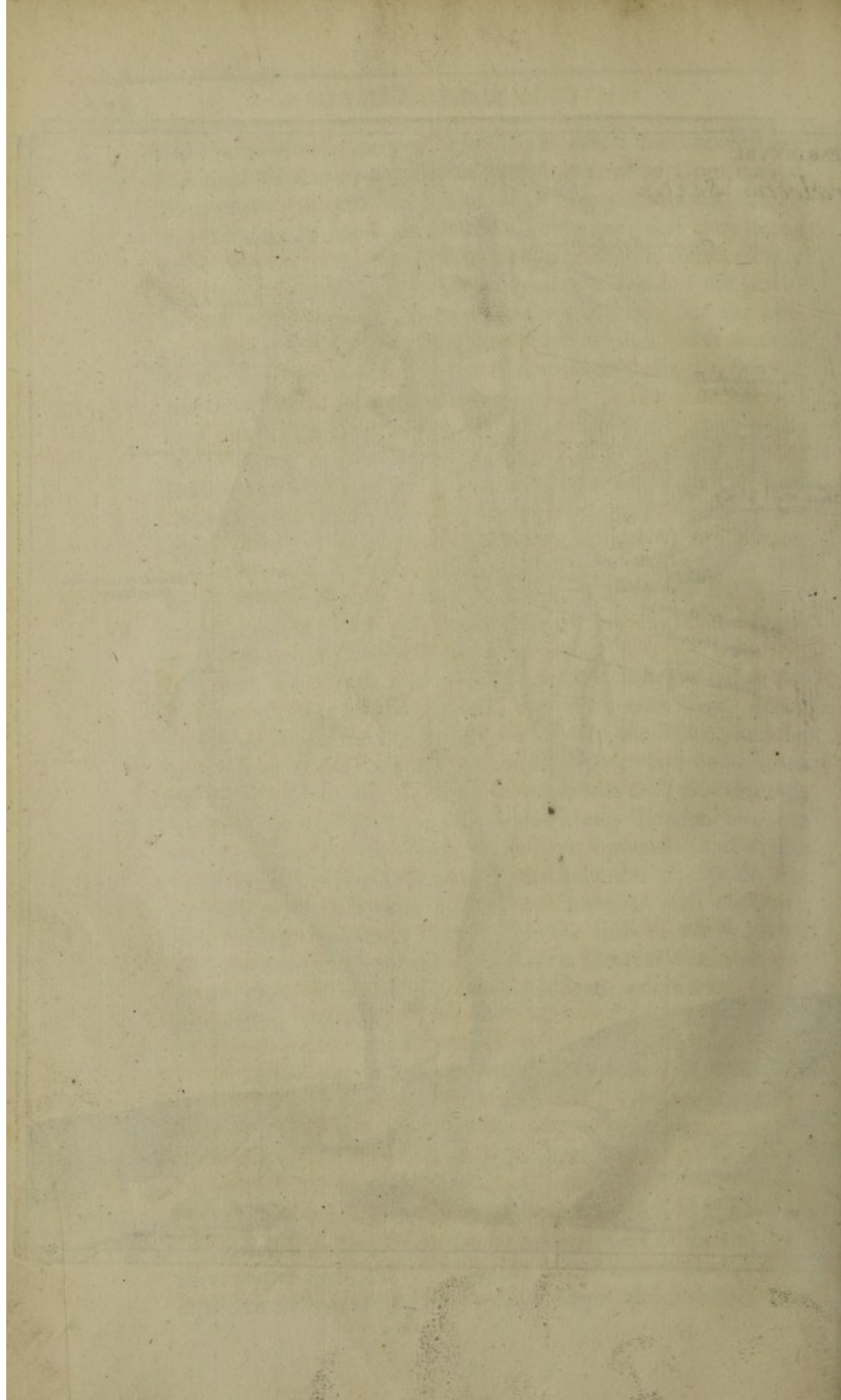
Psoas Parvus.

This affixes
the former.

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*: *Bauhine* saith, it ariseth fleshy the length of a *Little Finger*, and is dilated with

Prælectio Sexta.





a slender and broad Tendon, above the *Psoas Magnus*, and ends with the *Psoas* and *Ileon*, embracing them both very firmly: *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 transverse Fingers, and was inserted 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 Master of *Anatomy*, shewed this Muscle in a Body then dissected by him, at the Theatre in *Chirurgeons Hall*.

This Muscle laying under the former, is not here shewn in Figure.

Iliacus Internus.

THIS ariseth with a thin and fleshy Beginning, in the inner Cavity of the *Os Ileon*, and in its descent over it in its lower part, it joyns its self 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 wheeling upon 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 hurried in a violent Motion, does suddenly 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 so 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 opposite Motion, or Extention of the *Thigh* is made good by the *Glut-*

This bends the *Thigh* directly.

tei; 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* up-
wards and
outwards.

THIS is so called from its arising both broad and fleshy, from the outward part of the *Os Pubis*, or *Pectinis*, or *Shave 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 *Adductor*.

Observat.

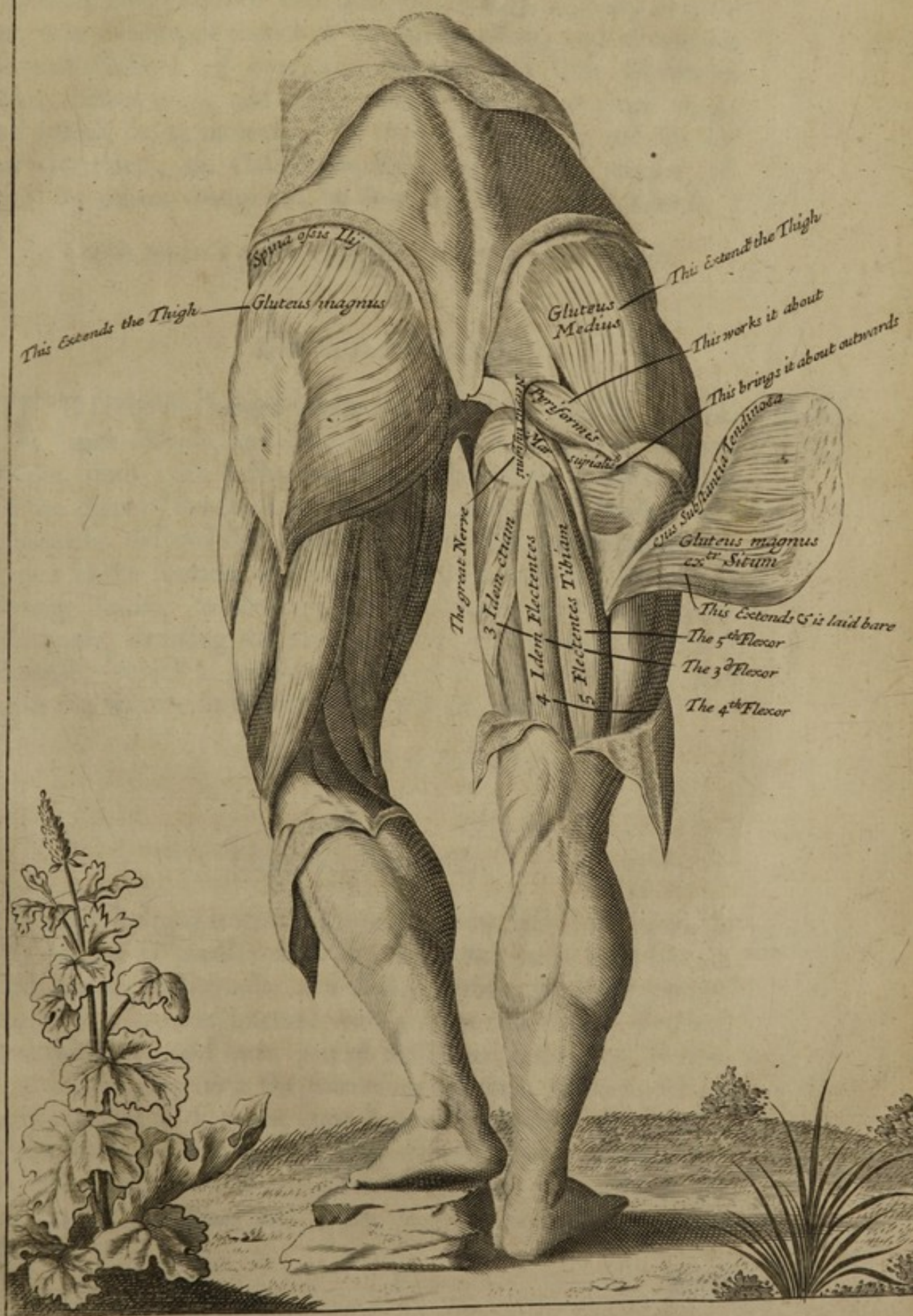
This Muscle is an *Assistent* to *Triceps*, and by bringing the *Thigh* inwards, it proves of great Use in Riding, in a great measure keeping the Horseman close to his Saddle; by some it is allowed as a part of the *Triceps*, tho' it doth not so closely adhere to it, but that it may with ease be separated from it.

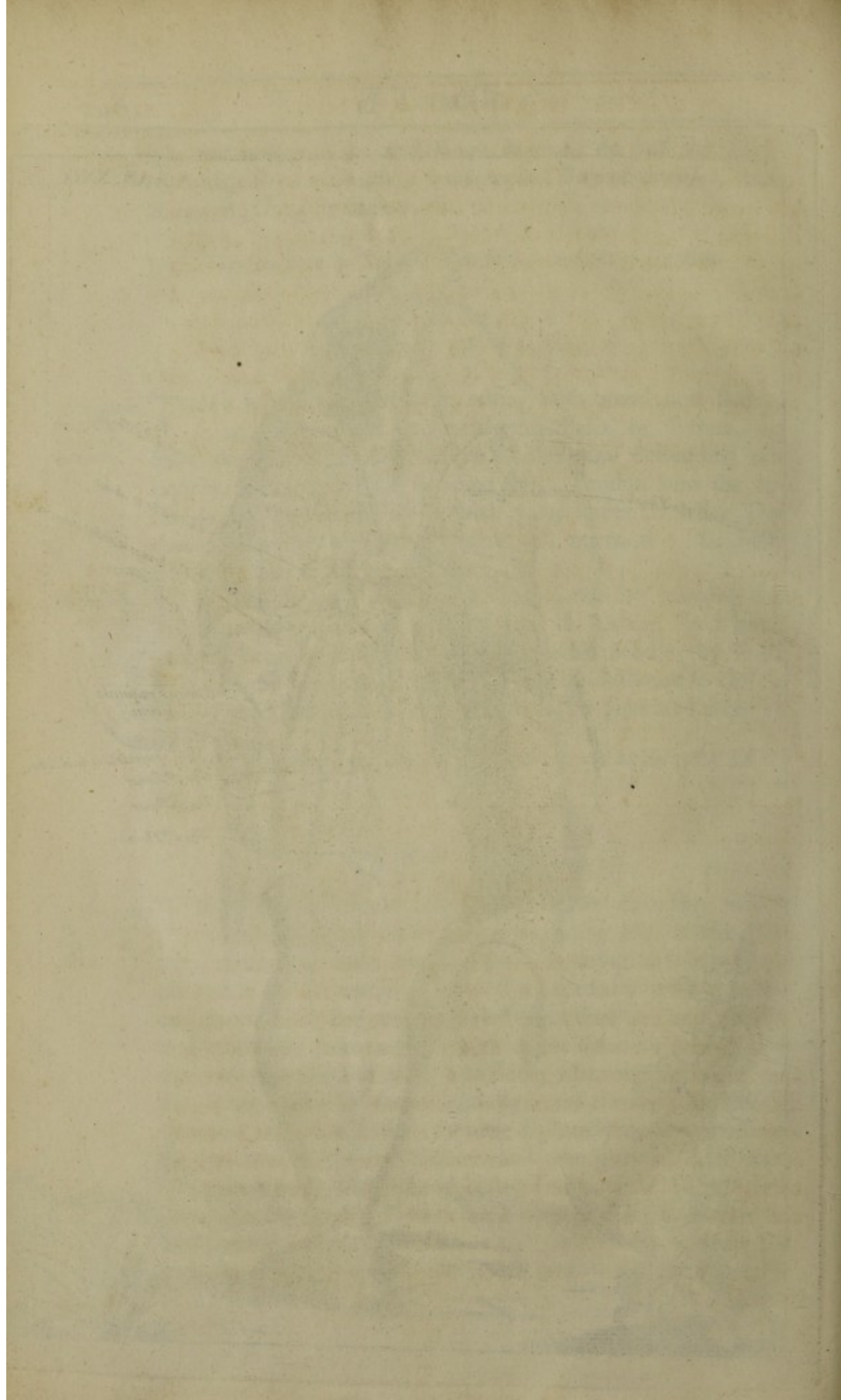
This you have at Tab. XXVIII. in its place, and at Tab. XXXI.

Gluteus Major.

This pulls
the *Thigh* di-
rectly back-
wards.

THIS is the first and largest of the three *Extensors*, which with the others do make up the fleshy *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 fleshy from the back part of the *Spines* of the *Os Sacrum* laterally; and thirdly from the *Os Coxendix* large and fleshy, 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 *Trochanter*, and part of it also into the *Linea Aspera*, on the back part of the *Os Femoris*, beneath the aforesaid great *Trochanter*, and is said to pull the *Thigh* directly backwards.





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 *Ætural Cautey*, 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 *Ulcer* cicatrized; his Case being by some supposed natural, altho' by others thought to be done by *Magick*, or *Witchcraft*. History

This you have at Tab. XXIX. in its place, and laid bare.

Glutæus Medius.

THIS being lodged under the tendinous part of the former *Muscle*, and being much like it in its Situation and 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 Joynt as the former, and is inserted by a nervous, broad and strong *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 assist the former in depressing of the *Os Femoris*. This assists the former in Extension.

This you have at Tab XXIX.

Glutæus Minimus.

THIS lodging under the former, being less than it, as the second is smaller than the first, doth also arise like it, 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 *Trochanter*; 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 shewn. This extends as the former.

Use. 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 beneath, 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 depressed in Extension by the *Glutæi*, which being contracted and abbreviated, do pull the *Thigh* downwards, and cause it to be made more streight in progressive Motion.

Observat.

This you have at Tab. XXXIII. laid bare.

Pyriformis, or Iliacus Externus.

This works the *Thigh* about.

IT has its first Name from its Figure, and *Iliacus Externus* from its site; it ariseth thick, round, and fleshy 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 fourth 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 stuf 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* about outwards

THIS ariseth large and fleshy, 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 fleshy *Purse*; and so making one *Tendon*, are implanted into the *Sinus* of the great *Trochanter*.

Observat.

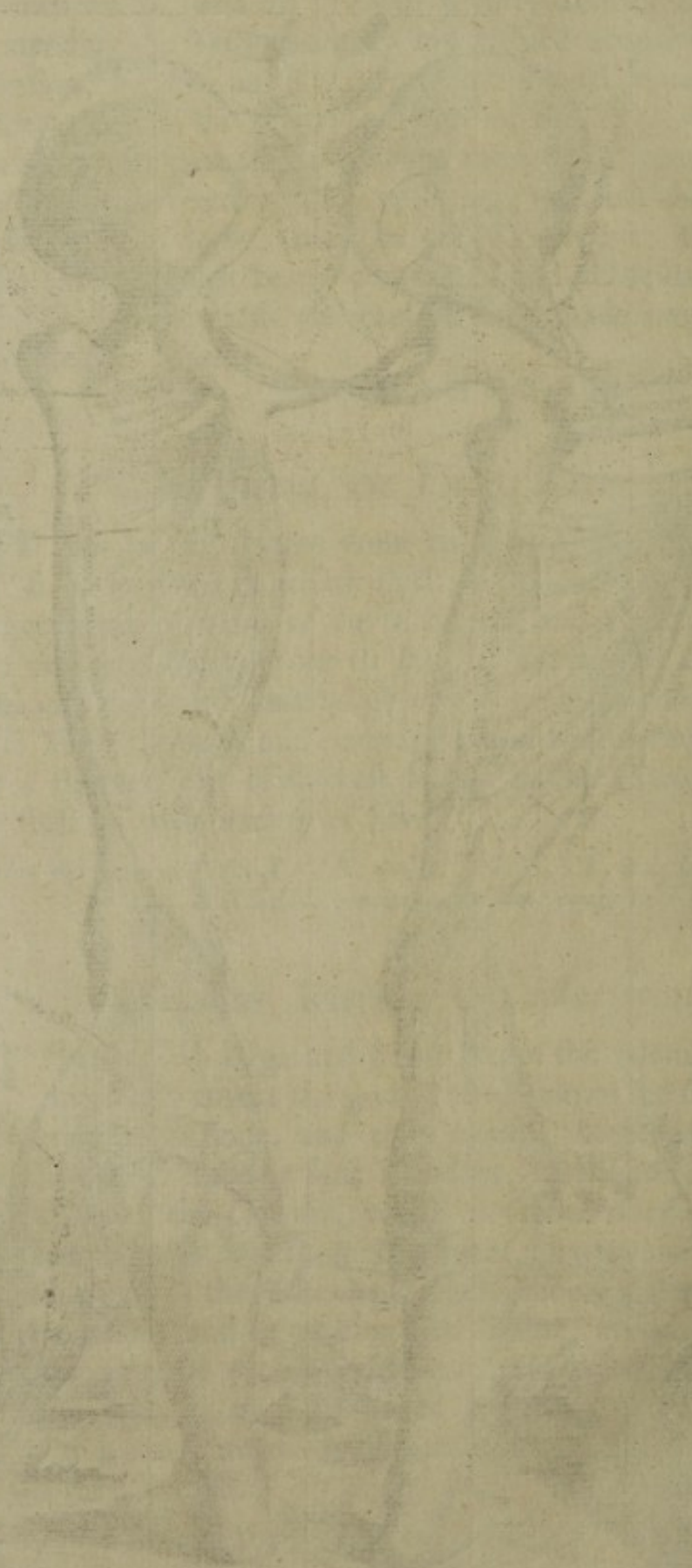
This Muscle must be raised inwards, where having got thro' the *Sinus*, under the *Ligament*, you will plainly see the *Purse* shew its self.

This is shewn at Tab. XXIX. and at Tab. XXXIII. it is laid bare.

XXVII

ANNA SAT

with a small
drawing of a
bird



Quadratus Femoris.

THIS hath its Name from its Figure, it arising broad and fleshy from the rising of the *Os Ileon*, and from the *Appendix* of the *Coxendix*, and doth run broad, short and fleshy towards the back part of the great *Trochanter*, and is inserted into that *Space* of the Bone, which is between the two *Trochanters*.

This brings the Thigh about backwards.

The Head of *Livinus*, 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 *Quadrangimus*, 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 Heads or Originations, all which do conclude and terminate in one; its first and largest Head being partly fleshy, and partly nervous, arising 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 ariseth 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 *Aspera Linea* of the *Thigh Bone*; the third ariseth 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 Pudicitie*, it being assisted by *Livinus* in keeping the *Legs* close.

This brings the Thigh inwards.

I shall here insert an Observation, which hapned in *St. Thomas'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

Observat.

being there at work on the Top of the House, fell thro' the Joice three Stories high, and broke his left Thigh Bone in several Pieces; for the Cure of which, he was sent 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 tumefied, and his Thigh Bone came thro' the Flesh, he had continual Pain, and Impostumations dayly arising thence; all which, with good Fomentations, and other warm Dressings were so much lessened, and so 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, so that in about six 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 at Tab. XXXI. and at Tab. XXXII.

Obturator Externus, or Marsupialis.

This works the Thigh about inwards.

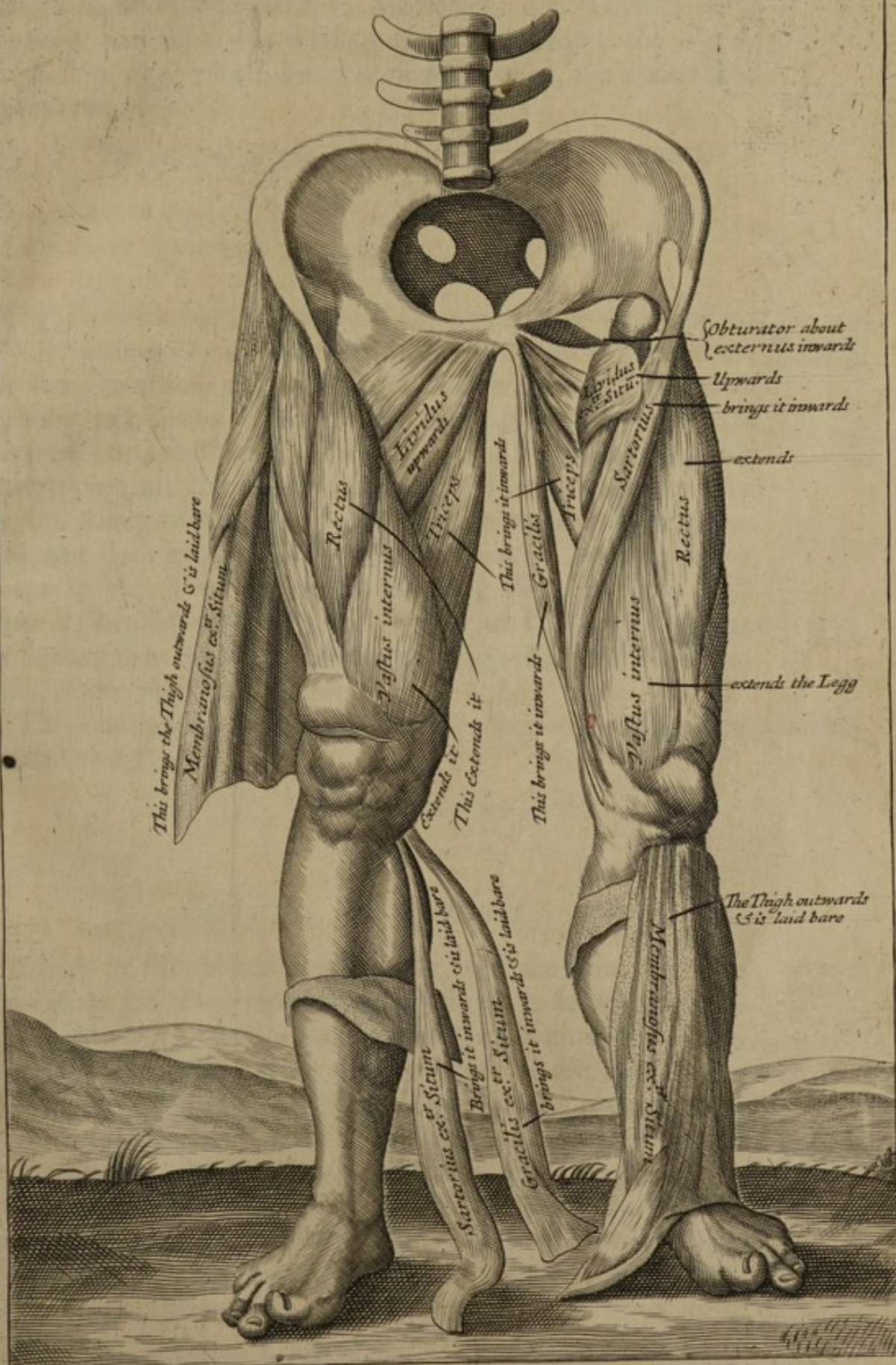
THIS hath its Name from its Situation, it arising from the outward part of the Cavity, between the *Os Ischium*, and the *Os Pubis*, lying under the *Pectineus*, it arising large and fleshy from the Membrane that enwraps the Perforation of the *Os Pubis* outwards, and then transversely marching to the back part of the Thigh, (becoming narrower) is inserted 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.

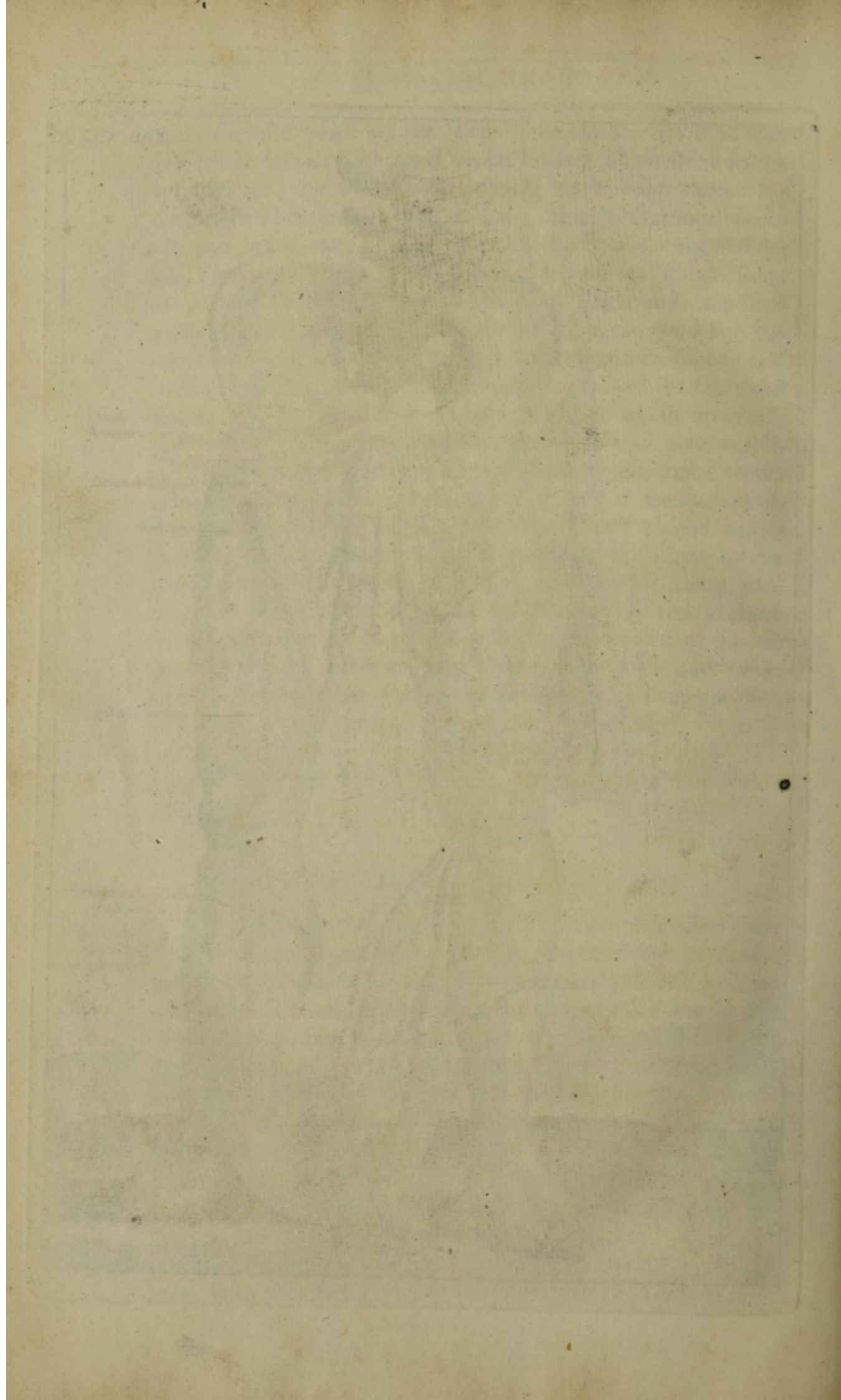
Annotat.

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. Hist. mirab. Lib. 4. Cap. 30. writes of a Woman, who after her lying in, had a very large Tumour arose in





her Thigh, which dayly encreased in bulk; after the Application of diverse suppurative Medicines, the Tumour being opened, out of it was discharged a white Stone, the bigness of a *Hens Egg*, which being removed thence, the Patient soon recovered, &c.

This you have at Tab. XXX, XXXI, XXXII, and XXXIII.

Membranofus.

THIS hath its Name from its membranous Expansion, it arising sharp and fleshy from the upper Spine of the *Os Ileon*, to that side 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 self with the *Ligamentum Annulare*, 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 brings the *Thigh* and *Leg* outwards.

This Muscle doth assist the *Legs* in extending^{sion}, by bringing them forwards and outwards. Annotat.

This you have at Tab. XXXI.

Sartorius, or Fascialis.

IT hath its first Name from its use, and the other from its crossing the *Thigh* like a *Swathing Band*, in keeping the rest of the *Muscles* aright in their places; it riseth 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 inserted 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 rather extends it.

This brings it inwards.

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

Gracilis.

This affixes
the former.

THIS has its Name from its Make and Shape, it being a very slender *Muscle*, lying next the former; it arising partly 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 straight descent, in the inside 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 assisting it in its Contraction, and bringing the *Thigh* and *Leg* inwards.

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

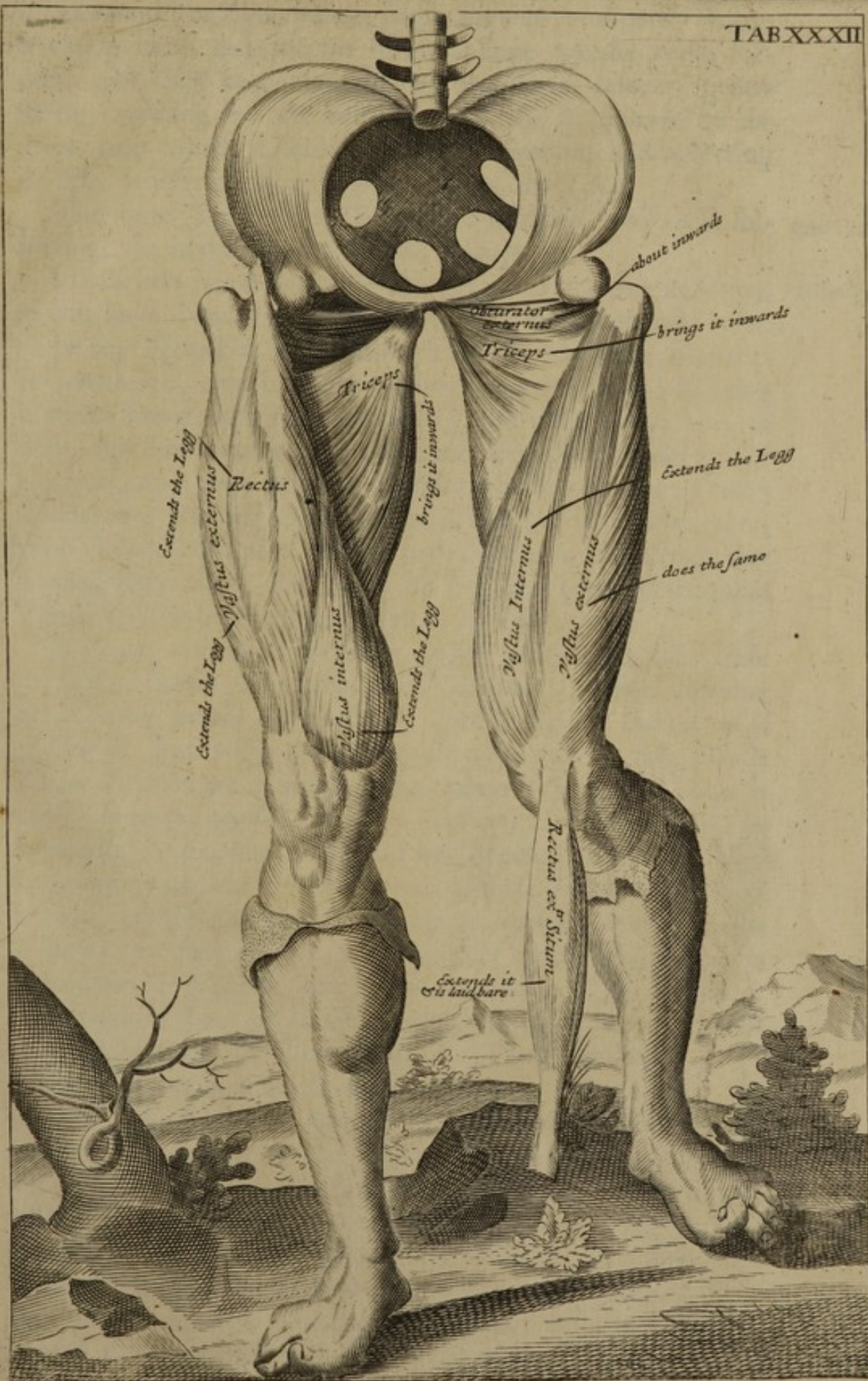
Seminervosus.

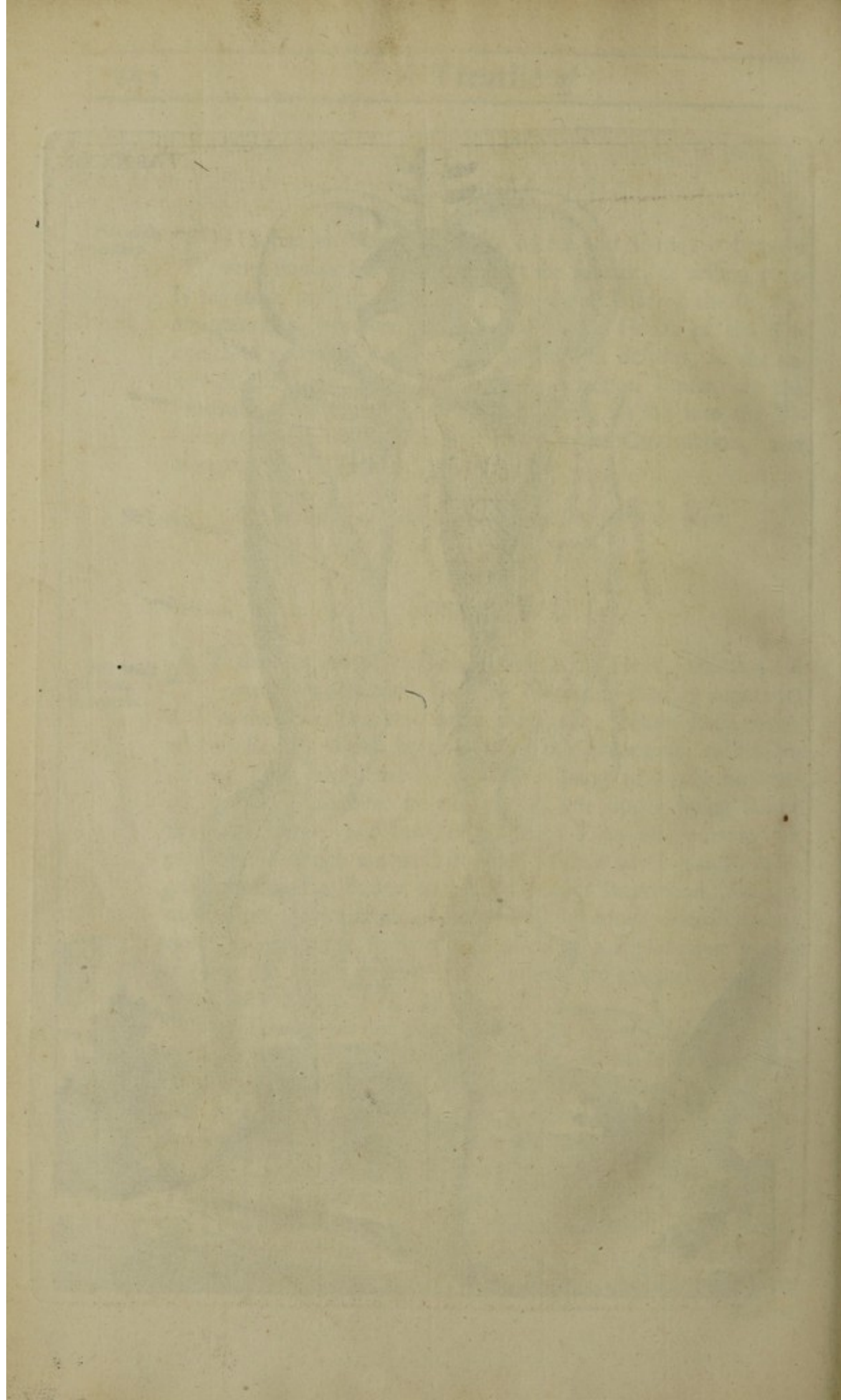
This bends
the *Tibia*
backwards.

AT the outside of the *Thigh Bone* at its Head, ariseth 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 inside of that Bone, which we generally call the inner *Ankle 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

Name





Name from its *Substance*, being allowed either nervous or membranous, or if you please, partly nervous, and partly fleshy; 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 following, do make up the inward *Ham-strings*. Observat.

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 excroissance charnue de la grosseur de deux poigns qui contraignoit auparavant de telle sorte le Tendon d'Achilles que le malade portoit toujours sa jambe en L'air a la hauteur du genovil opposé: Mais, les Caustiques, les Catheretiques, les Suppuratifs, & les Mondificatifs que Mr. Browne avoit mis en Usagè depuis environ une Mois avoint tellement dissipé la Tumeur & de chargé la partie, que Malade pouvoit alors Mettre son pied a terre avec asses de facilité pour faire prejurer qu'il pourroit s'appuyer d'essus apres la Cicatrification de L'ulcere, dans le fond du quel on ne voyoit plus de chair spongeuse; Lors que la Chyrurgie est pratiqué de la sorte, elle est un grand Ornement dans L'art de guerir. Thus translated,

I saw 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 arise from a *Cancerous Excrescence*, the bigness of two *Fists*, which did prest so hard upon the great Tendon, that the Patient was forced to carry his *Leg* as high as his right *Knee*, but by the *Causticks*, actual *Canteries*, *suppurating* and *mundifying Medicines*, which Mr. Browne had used for near a Month, he had so disperst the Tumour, and so discharged the *Fungus*, that the

Patient could set 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.

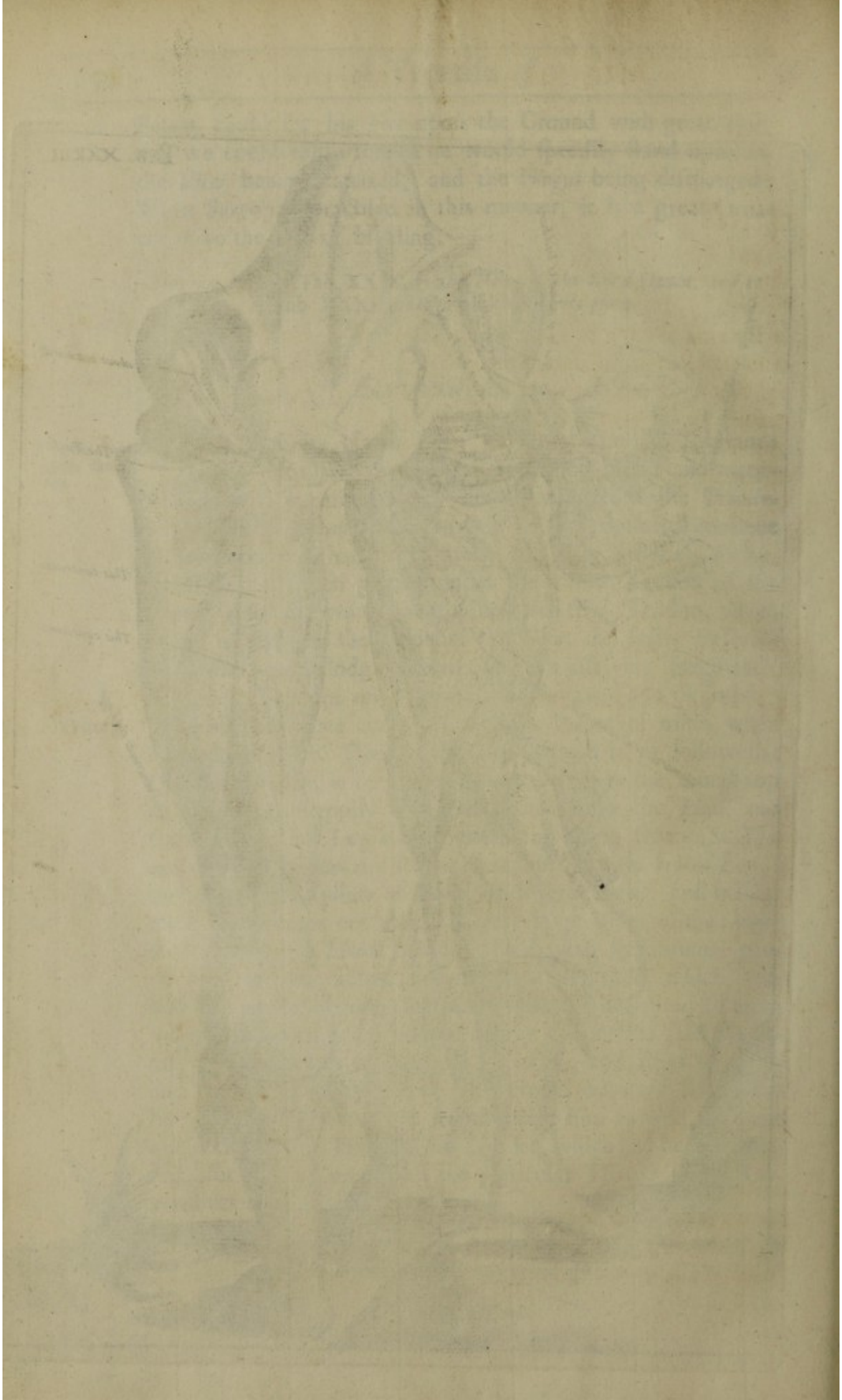
THIS hath its Name from its membrane-like Substance laying just under the former, it arising broad and membranous with it, and running downwards from the *Protuberance* of the *Os Ischium*, where growing broader, doth still continue membranous near half its Progress, and after growing fleshy, and thick, 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 fleshy Belly 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 sent to *St. Thomas's Hospital*, he was my Patient there, out of whose 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 wasted him to that degree, that many times he despaired of recovery, all which being abated by the Dr. of the said Hospital, and afterwards by *vulnerary Decoctions*, and other convenient Drinks inwardly taken, and proper outward Medicines being applyed to him, I at length made him so 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 the two former; and then growing fleshy and large in its march externally downwards, and having got near half its progress, is seen to narrow its self; and joyning with the other Head, which ariseth from the *Linea Aspera* of the *Os Femoris*, where the *Gluteus Major* hath its Insertion, and growing thicker, tho' outwardly *Tendinous*, as it marcheth in a *Channel* in the outward *Appendix* of the *Os Femoris*, it firmly ties its self to the outside of the upper *Appendix* of the *Fibula*, with its tendinous Insertion.

This Con-
trafts the
Leg.

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 shewn both in and out of its place.

Rectus Femoris.

IT hath its Name from its streight Progress, and carries in it the true Figure of a *Muscle*, it arising fleshy from the lower *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 extends
the Leg.

This you have at Tab. XXIX. Tab. XXXI, XXXII. both in and out of its place.

Vastus Externus.

THIS takes its Name from its great *Mass* of *Flesh*, it arising outwardly nervous, and inwardly fleshy from the 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*,

This extends
the Leg.

does farther promote the making a stronger Covering for the *Patella*, it carrying the same Insertion with it.

This you have at Tab. XXXI, XXXII. in its place.

Vastus Internus.

This works
as the former.

THIS hath the same 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 same Insertion 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 *Glutæi*; 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 acute Angle with the *Leg*, and to an Obtuse one with the *Foot*.

This you have at Tab. XXXI, XXXII.

Suppilitæus.

This brings
the *Leg* ob-
liquely.

THIS ariseth with a short and strong *Tendon*, from the lower and outward Extuberance of the *Os Femoris*, and obliquely marching over its Junction, does become fleshy; then extending its self, is inserted into the upper part of the *Tibia*, in its inside a little beneath its upper *Appendix*, and doth assist the former *Flexors* in contracting the *Thigh*.

This you have at Tab. XXXI, XXXII. in their places.

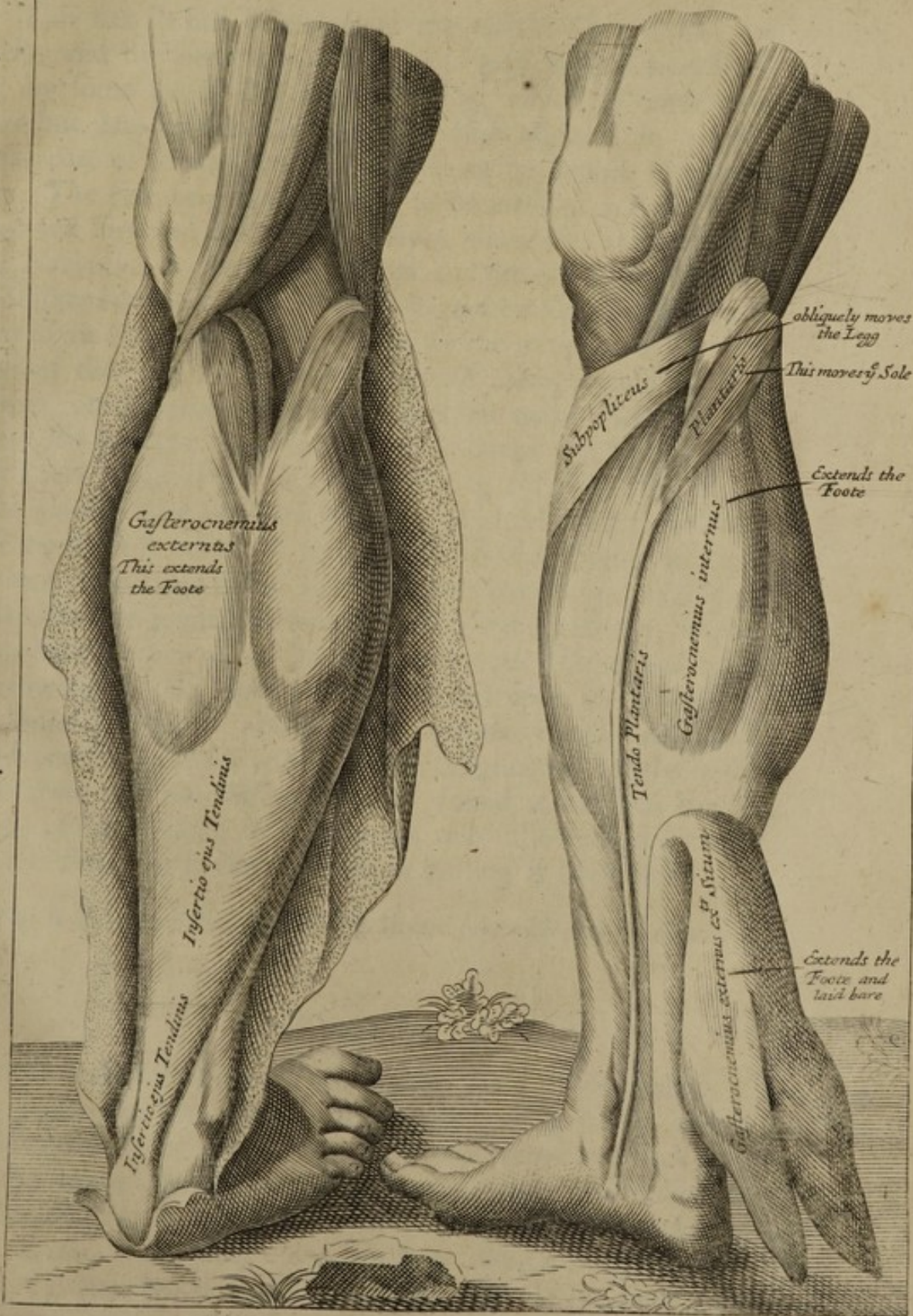
Gasterocnemius Externus, or Gemellus.

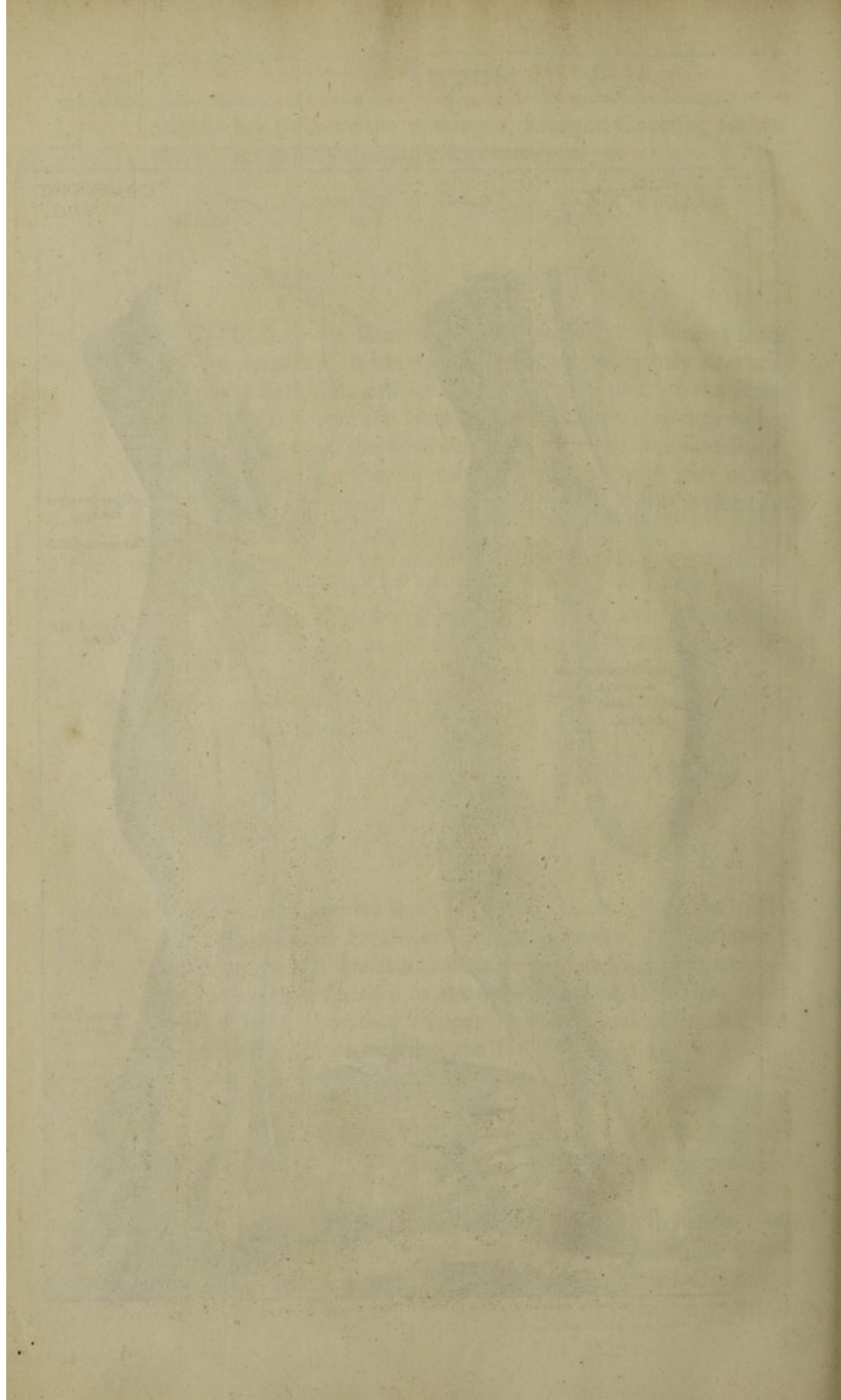
This extends
the *Foot*.

THE *Foot* is allowed to be *ὄργανον ἢ βάλανος*, or *Instrumentum Ambulatorium*; and as Man, who is granted the wisest of all Creatures, has *Hands* given him as his chiefest of Organs to work

Fig: I.

Fig: II.





work with, so has he given him also two Feet to walk upright, and view the spangling Heavens, and admire the wonderful Works of his Great Creator in thus wonderfully framing 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 *Creature* but *Man* hath the like *Mass* of *Flesh* allowed it, on the back part of its *Leg*, and *Gemellus* from its double Origination: The *Foot* we generally allow to be made of a *Tarse*, *Metatars* and *Toes*, and the *Tarse* has 7 *Bones* allow'd it, as the *Astragalus*, *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 *Metatars* being made of five *Bones*, are separated each from other, to make room for the *Interosseal 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 *Insertions*, are joyned to each other about the mid-way, where they become one entire strong and nervous *Tendon*; and upon narrowing its self, doth intermix its self with the *Tendon* of *Gasterocnemius Internus* above its *Insertion* into the *Os Calcis*, making one strong *Muscle* with a double Origination: *Riolan* saith, that there are two *Sesamoidal Bones* found at the two beginnings of this Muscle, this being not only allowed an *Extensor* of the *Foot*, but is very assisting 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 sends into the *Sole* of the *Foot*, it arising fleshy, round and slender under the former, from the upper and back part 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 fleshy *Bellies*, by their broad *Tendons*, does run over the *Os Calcis*, and stretcheth its self over the *Sole* of the *Foot*, firmly adjoyning

This moves the Skin of the Sole of the Foot.

to the fleshy part of the *Perforatus*, and is afterwards inserted on both sides, to the first *Internodes* of the *Toes*.

Use. 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
the *Foot*.

THIS is implanted under the two former Muscles, and hath the Name of *Soleus*, from the likeness it hath with a *Sole-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 fleshy, 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.

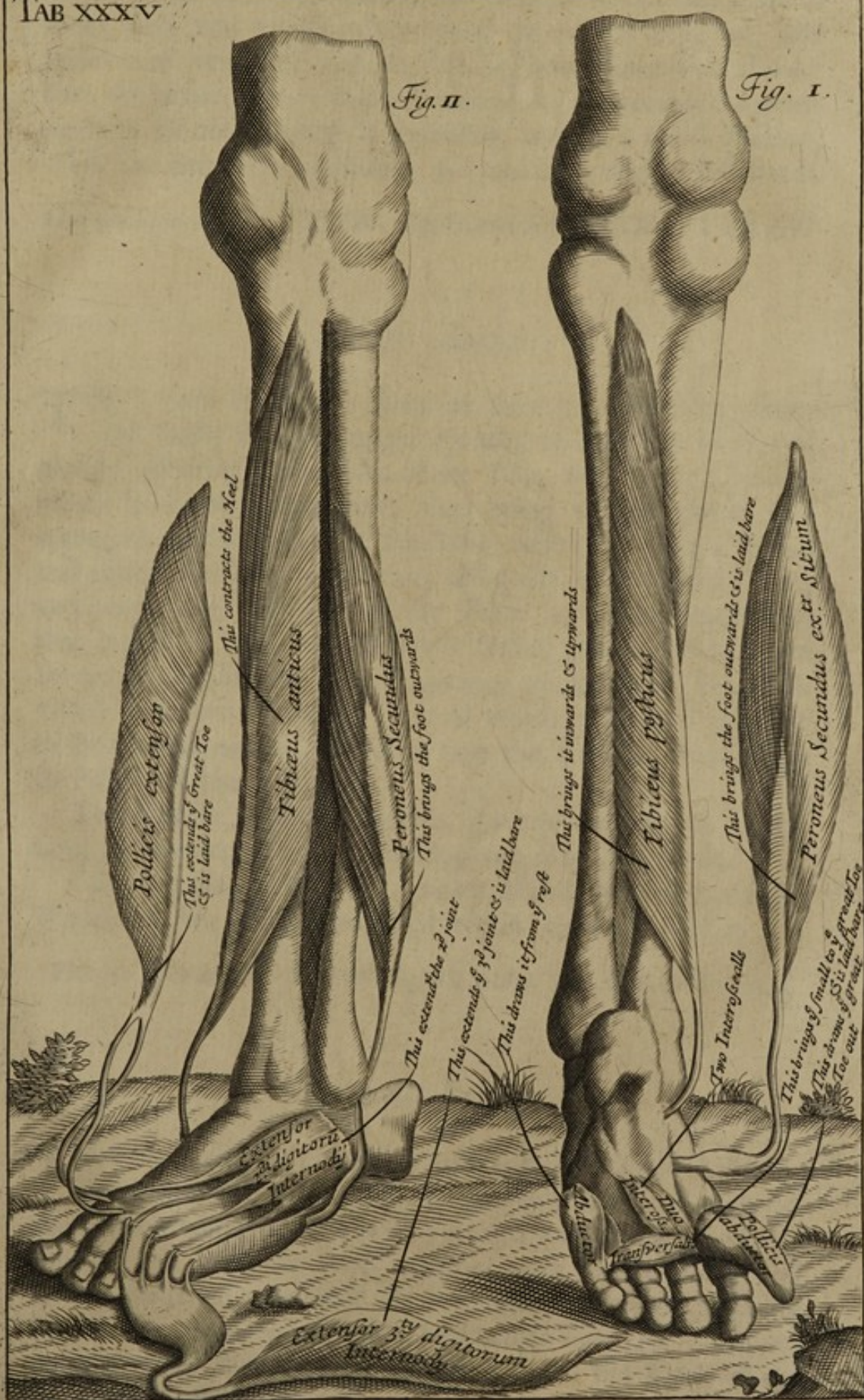
These three Muscles are all united in their *Terminations*, forming one very strong *Tendon*, implanted into the back part of the *Os Calcis*, which by reason of its largeness, and singular Strength, above the *Tendons* of other Muscles, does gain the Name of *Chorda magna*, which being bruised and wounded, (as *Hippocrates* writes) proves very dangerous, if not mortal, and this part also being any wise inflamed, soon runs into Mortification.

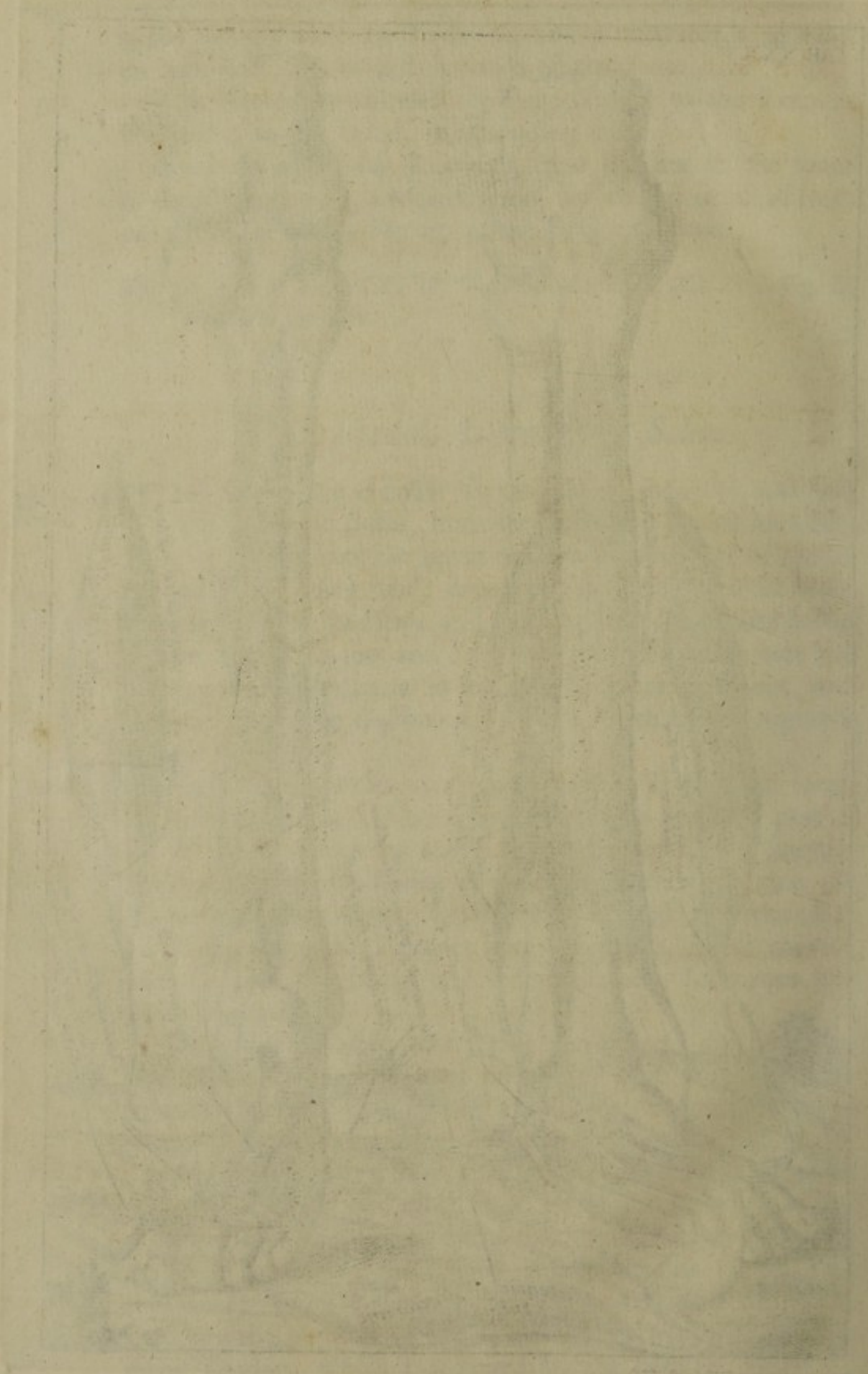
Use.

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 since, 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 Mortifications on the parts, but one more particularly arising on the great *Tendon*, which I removed by the help of *Escaroticks*,
by





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.

THIS hath its Name from its Situation, it arising sharp 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 inside of the *Os Tarsi*, that is before the *Os Pollicis*; and sometimes under the same Ligament of the *Foot*, being divided into two Tendons, one of which is inserted into the *Os Primum Innominatum*, the other into the aforesaid Bone of the *Os Pollicis* of the *Metatarse*.

This bends the Heel.

This Muscle, as I do conceive, governs the *Foot* in its Motion, in keeping it from squailing too much outwards.

Use.

Valleriola, Lib. 3. Enar. 8. writes of one receiving a slight Wound in her *Heel*, who dyed within 17 days after it.

History.

This you have at Tab. XXXV. Fig. II. and at Tab. XXXVII. Fig. I.

Peronæus Primus.

THIS Muscle doth arise nervous outwardly, and inwardly fleshy, from near the upper *Appendix* of the *Fibula*, and in its descent, 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.

This brings the Foot outwards.

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.

This affixes
the former.

THIS by some is called *Semifibulaus*, and *Peroneus à Perone Fibula*, or the *Minor Focil*, it arising long and fleshy 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 Metatarsi* of the little *Toe*, and serves 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 *Gastrocnemii* 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.

Tibiæus Posticus, or Nauticus.

This brings
the *Foot* in-
wards and
upwards.

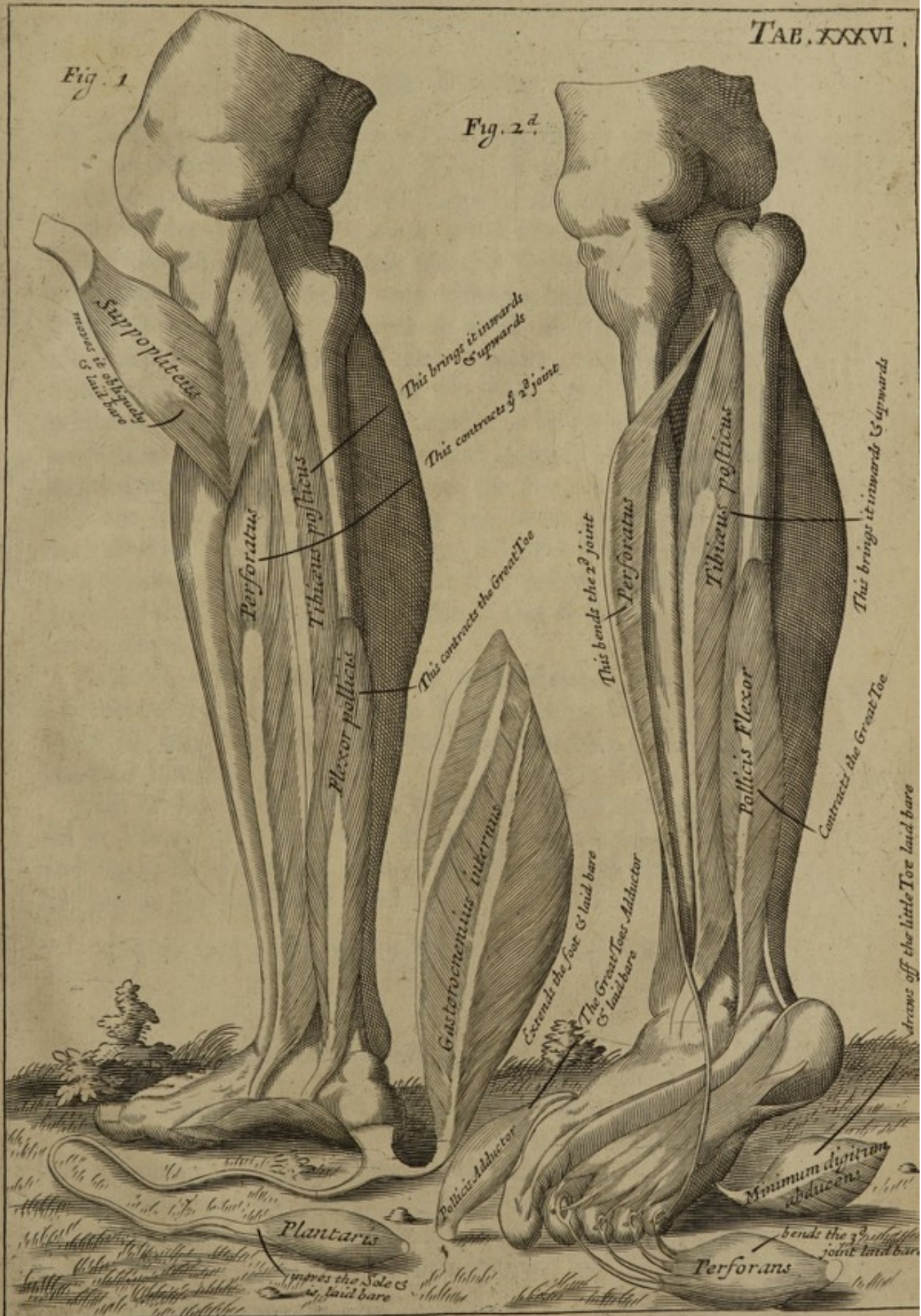
IT hath its Name from its Situation, it being planted backwards, as also the Name of *Nauticus*, from the Use that *Sailors* make of it, in climbing the *Shrowds*; this ariseth partly nervous, and partly fleshy, from the upper and back part of the *Fibula*, as also near the *Tibia*; and having past near half its progress, it narrows its self; 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 Metatarsi*, which joyns its self 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*.

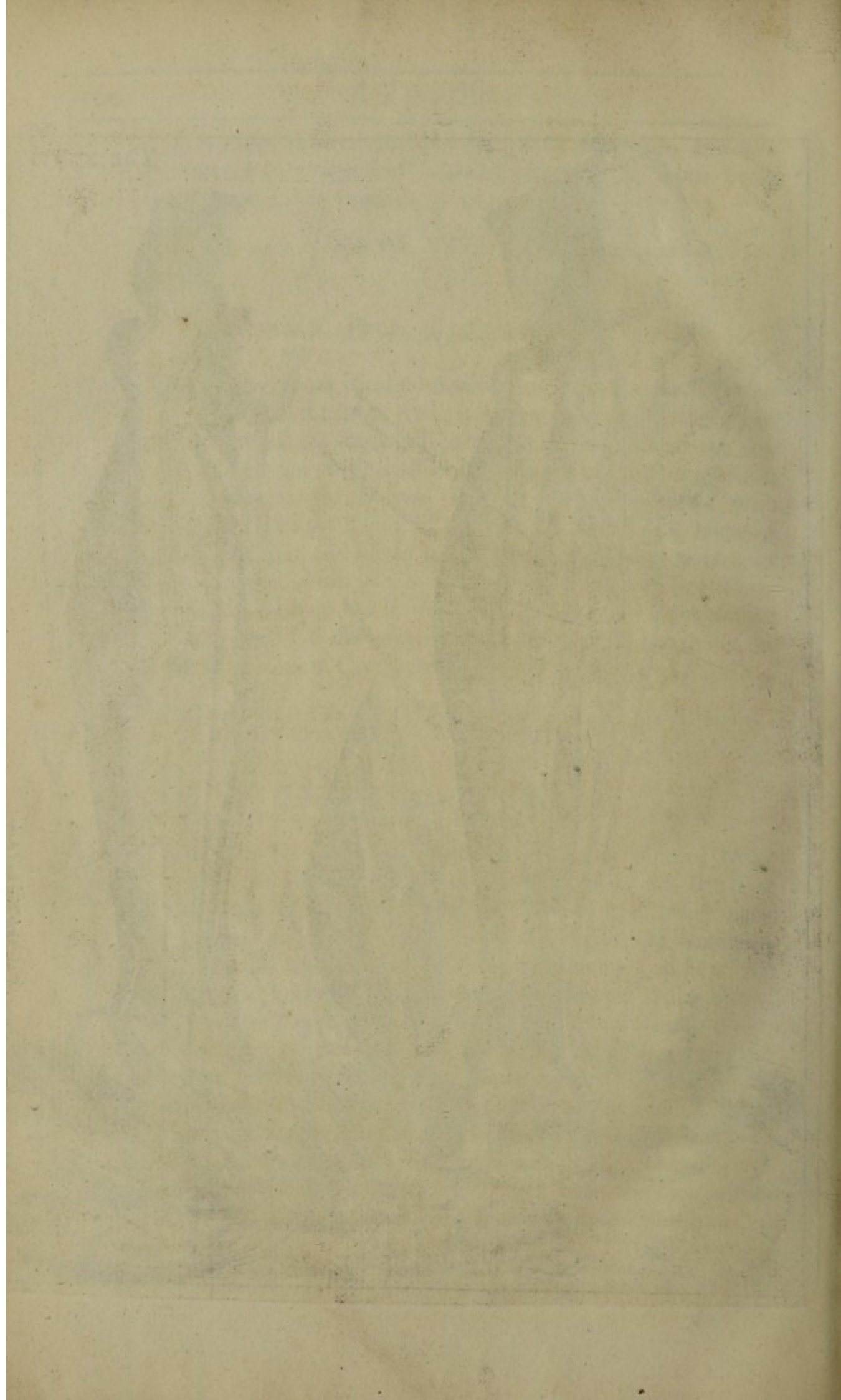
This is shewn at Tab. XXXVI. Fig. I, II. and at Tab. XXXVII. Fig. II.

Exten-

Fig. 1

Fig. 2^d





Extensor Pollicis.

THE Toes of the Foot, as well as the Fingers of the Hand, 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 *Sesamoidea*, being much like the *Sesaminseeds*, 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* ariseth 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 seen divided into two, one of which is inserted into the last Joynt of the *Great Toe*, and the other in that *Os Metatarsi*, which lies under it:

This extends
the Great Toe

Valleriola, *Lib. 4. Obs.* writes of a monstrous 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 six Fingers in either Hand.

Histories

And *M. Janssonius* in *Tom. 3.* writes of a Monster born, horrid in View, with the Head of an *Ape*, with a long Beard, and *Eagles Claws* at the ends of his Fingers and Toes, who so soon 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 *Fibres* 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 bends
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.

Abductor Pollicis.

This brings
the Great Toe
inwards.

THIS takes its Name from its use, it arising fleshy 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 fleshy Origination at the *Os Cuneiforme*, 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 fleshy from the lower part of the *Os Cuneiforme*, and enlarging its self to a round fleshy Belly, then grows less, and afterwards becomes tendinous, obliquely inserting its self to the latter and inner part of the first Bone of the Great Toe, bringing it towards the rest.

History.

Coiter Obs. Anat. pag. 109 writes, he has the Bone of the Great 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 perfectly turned osseal.

This you have at Tab. XXXVI. Fig. I. Tab. XXXVII. Fig. I, II. Tab. XXXVIII. Fig. I.

Extensor Digitorum Longus.

This extends
the 3d. Joynt
of the Toes.

THIS ariseth partly nervous, and partly fleshy, from the upper Appendix of the *Tibia*, and then becoming fleshy, it joyns it self to the Ligament, that ties the *Tibia* to the *Fibula*, lessning 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 fifth of the *Os Metatarsi* of the other Toe, and is allowed to extend them.

This you have at Tab. XXXV. Fig. I. and at Tab. XXXVII.

Fig. 1.

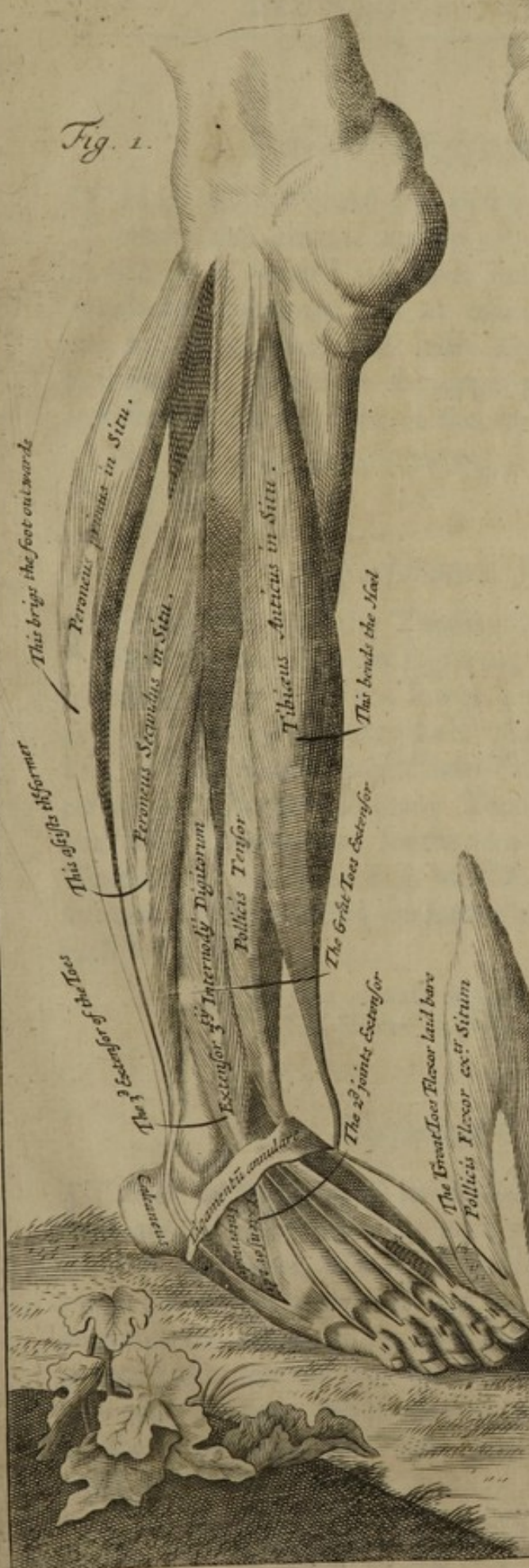
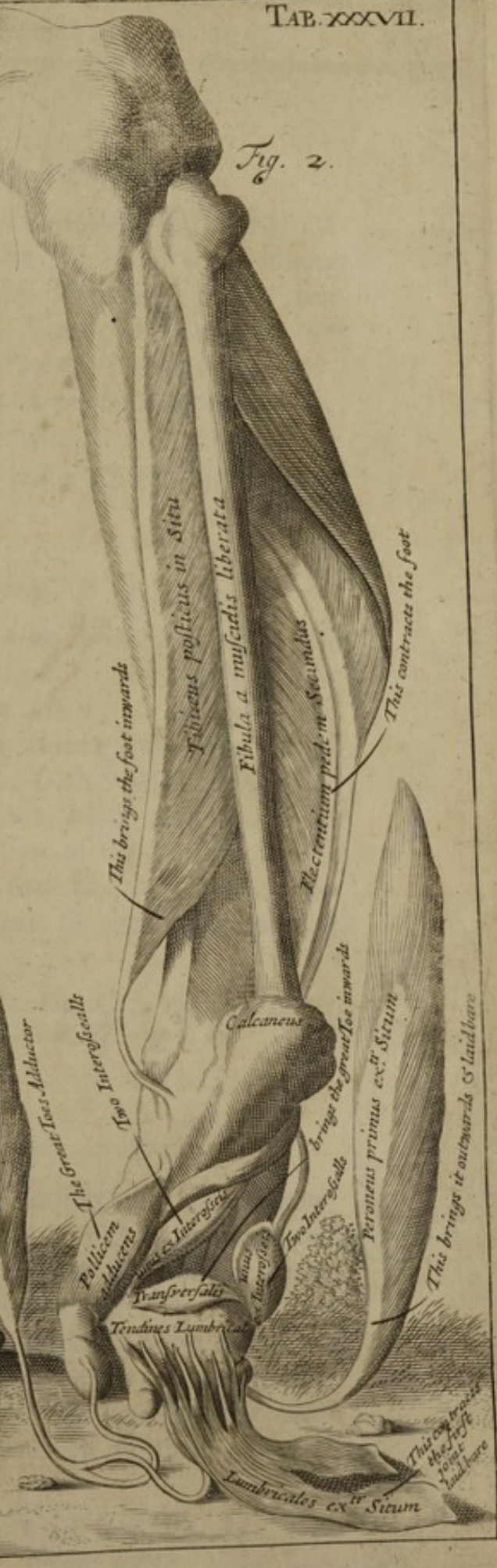
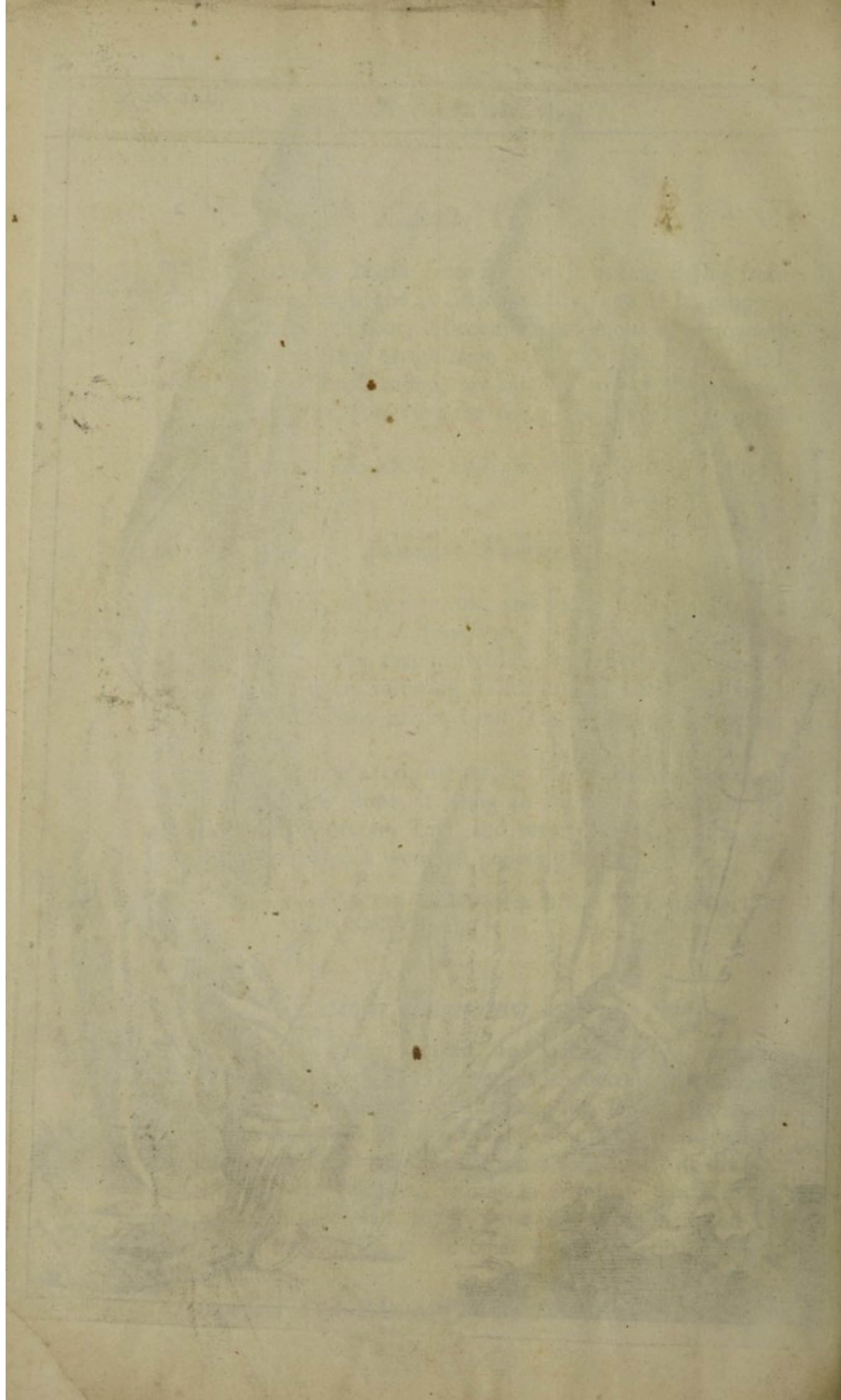


Fig. 2.





Extensor Digitorum Brevis.

THIS ariseth broad and fleshy from the transverse Ligament that covers the top of the *Foot*, and then dilating its self, it is divided into four fleshy Portions, which afterwards are converted into as many Tendons marching over the first *Internode* of each lesser *Toe* to their upper Insertions, and they are planted to the upper part of the second *Internodes*, intersecting the Tendons of the former.

This extends the 3d. Joynt.

This you have at Tab. XXXV. Fig. I. and at Tab. XXXVII. Fig. II.

Perforatus Pedis.

IT's so called upon its Tendons being perforated, and also *Flexor Secundi Internodii Digitorum*, from its Use and Situation, it arising fleshy from the lower and inner part of the *Os Calcis*, and having marched half way through the Sole of the *Foot*, it does divide its self 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 Insertions, these reaching no farther than the second *Internodes* of each lesser *Toe*.

This bends the Toes in the 2d. Joynt.

This you have at Tab. XXXVI. Fig. I, II. Tab. XXXVII. Fig. II. and at Tab. XXXVIII. Fig. I, II.

Perforans Pedis.

IT hath its Name from its Tendons passing thro' the former, it arising fleshy from the back part of the *Tibia*, then becoming 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 self into four Tendons, which passing thro' the perforated Tendons of the former Muscle, does terminate in the third Bone of every lesser *Toe*.

This bends the Toes in the 3d. Joynt.

This you have at Tab. XXXVI. Fig. I laid bare, and at Tab. XXXVIII. Fig. II. you have the same.

Lumbricales, or Vermiculares Pedis.

These bend
the Toes in
the 1st. Joynt.

THEY have their Names from the resemblance they bare with *Earth-worms*, both in their Make and Shape; as also *Flexores Primi Internodii Digitorum*, from their Situation and Uses, they arising round and fleshy from the *Tendons* of the *Perforans*, being inwardly inserted 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 *Musculus* 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 Insertions 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 rest.

THIS riseth nervous outwardly, and inwardly fleshy, from the outward parts of the *Calcane Bone*, and having attained half its progress, it becomes tendinous on the outside of the Foot; and there adjoining with its other fleshy part, which has its Origination from *Os Metatarsi* of the little Toe, they do make but one Tendon, and are inserted 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.

This brings
the small Toes
to the greater

THIS has its Name from its transverse Origination, and doth arise tendinous 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 lesser Toes towards it.

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 sliding aside, by drawing the *Metatarsæ* and *Toes*, and fixing them to the Floor, which being assisted by *Tibialis Anticus*, and *Peroneus Secundus*, which moving singly, the one is seen 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 *Peroneus 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 carried from one Limb to another, is seen to support the weight of the Body, in order to a new Step in progressive 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.

Interossei Pedis.

These have their Names from their Scituations among the Bones of the Toes, they arising fleshy from the sides of the Bones of the *Metatarsæ* of the lesser Toes, and becoming round Bellied, do grow tendinous at their Insertions to the first *Internode* of every lesser Toe laterally.

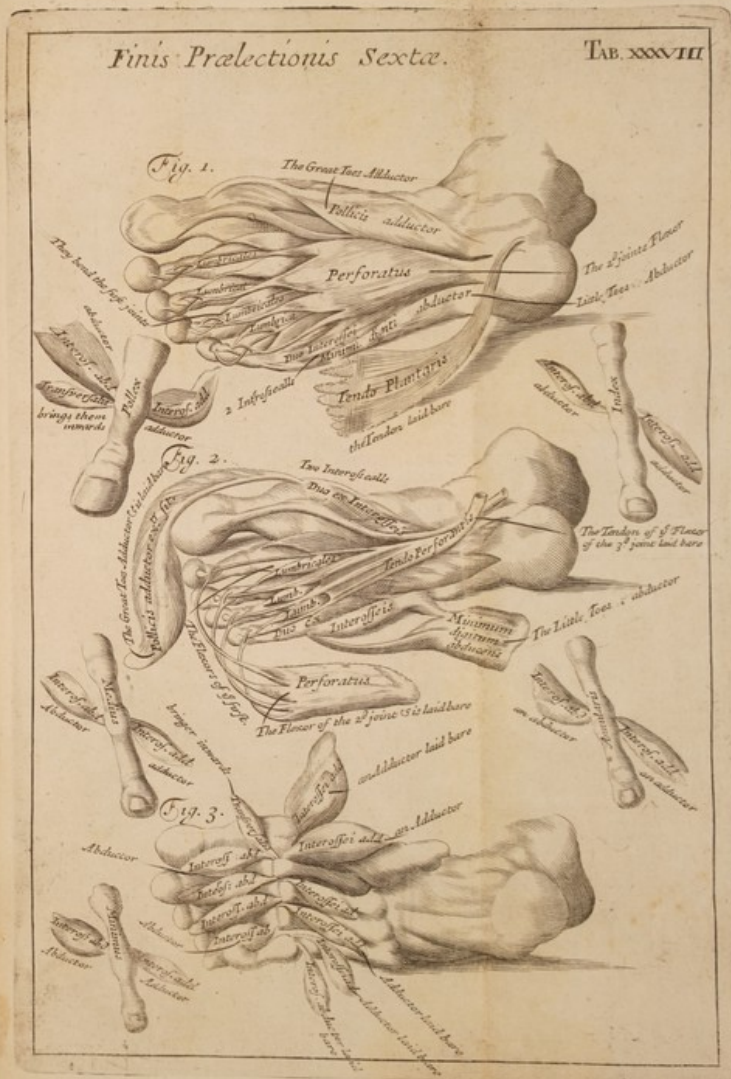
John Schenkius writes of Thomas Schweigker, about one and forty years Old, who was born without Arms, and performed many ingenious Tricks with his Toes; for with them he painted a Picture after the Life in a Silver Medal, by holding his Pencil between his Toes; and he shew a Copy so curiously writ with his Toes, and set off with such fine Flourishes, that few Writing-masters could mend it; besides, he cast Account so dexterously 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,

H u for

These more the Foot obliquely.

History.



for She in all Creatures with *distorted Members*, with *maimed*, or *debilitated Parts*, and other *Defects*, hath designed these something beyond their natural Offices, and allows them an extraordinary *Dexterity* and *Strength*, frequently purchased by long Use and Custom; as if one might say, their Perfection 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:
Namq; bibit Pedibus, Pedibus sua Fercula sumit,
Volvit & his Libros, præparat his Calamos;
Qui & Liturulas Pede tam bene pingere novit,
Artificis superet Grammata ducta Manu:
Maximus hoc Cæsar stupuit quondam Æmilianus,
Donaq; scribenti largus honesta dedit;
Omnia namq; potest vigilans Industria quodque,
Natura ipsa negat, perficit 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 *Cæsar* 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 Action: To whose Great Name therefore be ascribed, as is most due, all *Honour*, *Praise* and *Thanksgiving* both now and for evermore, *Amen*.

The TABLE, shewing the Reduction of the MUSCLES, each to their proper Place, Use, and Part.

THE Forehead 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 { Upwards by *Elevator*,
Downwards by *Depressor*,
Inwards by *Adductor*,
Outwards by *Abductor*;
Obliquely { Downwards outwardly by *Obliquus Minor*,
Upwards internally by *Obliquus Major*.

The Nose is { Dilated by { *Elevator*,
Dilatator,
Contracted by *Constrictor*.

The Lips are { Elevated by *Elevator*,
Drawn down sideways by *Abductor*,
Brought downwards by *Depressor*,
Purft up by *Sphincter Labiorum*.

The Cheeks are { Drawn down by *Platysma Myodes*, or *Quadratus*,
Drawn inwards by *Buccinator*, or *Constrictor*.

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 { Upwards by *Elevator*,
Downwards by *Depressor*,
Forwards by *Adductor*,
Backwards by *Abductor*.
Internally { by *Externus*, or *Laxator Externus*,
by *Internus*, or *Laxator Internus*.

The Tongue is moved { In Constriction { by *Lingualis*,
In Dilatation { Forwards by *Genioglossus*,
Backwards by *Hypoglossus*,
Upwards by *Myloglossus*,
Downwards by *Ceratoglossus*,
Laterally by *Styloglossus*,

The Os Hyoides is moved { Rightly { Upwards by { *Mylohyoideus*,
Geniohyoideus,
Downwards by *Sternohyoideus*,
Obliquely { Upwards by *Styloceratohyoideus*,
Downwards by *Coracohyoideus*.

The *Palate* is { Attolled by *Sphænopalatinus*,
Depressed by *Pterygopalatinus*.

The *Fauces* are { Dilated by { *Sphænopharyngæus primus*,
Sphænopharyngæus secundus,
Contracted by { *Oesophagæus*,
Cephalopharyngæus,
Stylopharyngæus.

The *Larynx* is { dilated { when the { Extended by { *Sternothyroideus*,
Thyroides is { Contracted by { *Crycoarytænoides Lateralis*,
shut { while the { Contracted { Directly by *Thyroarytænoides*,
Arytænoides is { Obliquely inwards by *Arytænoides*,
opened { Extended { Rightly by *Crycoarytænoides Posticus*,
Obliquely laterally by *Crycoarytænoides Lateralis*.

The *Head* is { Contracted by { *Mastoidæus*, if both work,
Laterally, if one works;
Extended by { *Splenius*, or *Triangularis*,
Trigeminus,
Recti Majores,
Recti Minores.

Turned about by { *Obliqui Superiores*,
Obliqui Inferiores.

The *Neck* is { Contracted by { *Longus*,
Scalenus,
Extended by { *Transversalis*,
Spinalis.

The *Thorax* is { Primarily by { Dilate in { Freely the *Diaphragme* alone con-
proper *Muscles*, { Breathing { tracted,
which do { Coactively the *Diaphragme* and Out-
ward *Intercostals*;
Constringe in { Freely the *Diaphragme* alone re-
Breathing { laxed,
Coactively the *Diaphragme* and In-
ward *Intercostals*;

moved { Extended by { *Latissimus Dorsi*, { which are { *Serratus Major* } *Postici*.
Semispinatus, { retain'd in { *Serratus Minor*
Sacro-lumbalis, { place by
Contracted by { *Musculi Recti*, { *Abdominis*.
Obliqui Ascendentes,
Turned about by *Transversi*,
Secondarily by the { Contracted by *Quadratus*,
Lumbal Muscles { Extended by *Sacer*.

The <i>Abdomen</i> is compres'd	Laterally by { <i>Obliqui Descendentes,</i> <i>Obliqui Ascendentes,</i>
	Forwards by <i>Recti,</i>
	Downwards by { <i>Pyramidales,</i> or sometimes by <i>Transversi.</i>
The <i>Loin</i> is	Contracted by <i>Quadratus,</i>
	Extended by <i>Sacer.</i>
The <i>Testicles</i> are	raised by <i>Cremasteres.</i>
The <i>Bladder</i>	Retains by <i>Sphincter Vesicæ,</i>
	Excreates by { <i>Detrusor Urinæ,</i> <i>Pyramidales,</i> <i>Obliqui Ascendentes Abdominis.</i>
The <i>Clitoris</i> is	Raised by <i>Musculi Graafiani,</i>
	Depressed by <i>Musculus Labiorum Contractor.</i>
The <i>Anus</i> is	Pursed up by <i>Sphincter Ani,</i>
	Elevated by <i>Levatores Ani.</i>
The <i>Penis</i> is improp- erly said to be	Erected by <i>Erectores,</i> or <i>Directores,</i>
	Accelerated by <i>Acceleratores.</i>
The <i>Scapula</i> is moved	Variouſly by <i>Cucullaris,</i>
	Upwards by <i>Levator Patientiæ,</i>
	Backwards by <i>Rhomboides,</i>
	Forwardly upwards by <i>Serratus minor,</i>
	Forwardly downwards by <i>Serratus major,</i> } <i>Antici.</i>
	Forwards by <i>Pectoralis,</i>
	Upwards by { <i>Deltoides,</i> <i>Octavus Humeri Placentini,</i>
The <i>Os Humeri</i> is moved	Backwards by <i>Rotundus,</i>
	Is carryed about towards the { External Part by { <i>Superscapularis Superior,</i> <i>Superscapularis Inferior,</i> <i>Nonus Humeri Placentini,</i> Internal Part by <i>Subscapularis.</i>
The <i>Cubite</i> is	Extended by { <i>Gemellus Major,</i> <i>Gemellus Minor,</i>
	Contracted by { <i>Biceps,</i> <i>Brachialis,</i>
The <i>Radius</i> is	Pronated by { <i>Quadratus,</i> <i>Teres,</i>
	Supinated by { <i>Longus,</i> <i>Brevis.</i>
The <i>Carpus</i> is	Contracted by { <i>Flexor Carpi Exterior,</i> <i>Flexor Carpi Interior,</i>
	Extended by { <i>Extensor Carpi Exterior,</i> <i>Extensor Carpi Interior.</i>
	Contracted by { <i>Flexor Primi,</i> <i>Flexor Secundi,</i> <i>Flexor Tertii,</i> } <i>Internodii;</i>
The <i>Fingers</i> are	Extended by { <i>Primus,</i> <i>Secundus,</i> <i>Interossei,</i> } <i>Extendentium Digitorum;</i>

The Thumb is	Moved Laterally by	$\left\{ \begin{array}{l} \text{Interossei,} \\ \text{Abductor Minimi,} \\ \text{Abductor Indicis.} \end{array} \right.$
	Contracted	First, by $\left\{ \begin{array}{l} \text{Flexor primi Internodii,} \\ \text{Flexor secundi Internodii,} \end{array} \right.$
		Secondly, by $\left\{ \begin{array}{l} \text{Primus} \\ \text{Secundus} \\ \text{Tertius} \\ \text{Quartus} \end{array} \right. \left. \begin{array}{l} \\ \\ \\ \end{array} \right\} \text{Flexores Internodii,}$
		Thirdly, by <i>Tertii Internodii Flexor.</i>
	Extended by	$\left\{ \begin{array}{l} \text{Extensor primus,} \\ \text{Extensor secundus.} \end{array} \right.$
The Thigh is	Moved	$\left\{ \begin{array}{l} \text{Laterally internally by Adductor,} \\ \text{Outwardly by Abductor.} \end{array} \right.$
	Extended Obliquely	$\left\{ \begin{array}{l} \text{Backwards by Gluteus major,} \\ \text{Forwards by Gluteus medius, and Gluteus minimus.} \end{array} \right.$
	Contracted	Directly by $\left\{ \begin{array}{l} \text{Psoas Magnus,} \\ \text{Iliacus Internus.} \end{array} \right.$
		Obliquely by $\left\{ \begin{array}{l} \text{Triceps,} \\ \text{Lividus.} \end{array} \right.$
	Moved about	$\left\{ \begin{array}{l} \text{Upwards by Pyriformis,} \\ \text{Inwards by Obturator Externus,} \\ \text{Outwards by Obturator Internus,} \\ \text{Backwards by Quadrigeminus, or Quadratus.} \end{array} \right.$
The Leg is	Contracted by	$\left\{ \begin{array}{l} \text{Sartorius,} \\ \text{Gracilis,} \\ \text{Seminervosus,} \\ \text{Semimembranosus,} \\ \text{Biceps,} \end{array} \right.$
	Extended by	$\left\{ \begin{array}{l} \text{Membranosus,} \\ \text{Rectus,} \end{array} \right.$
		$\left\{ \begin{array}{l} \text{Vastus} \\ \text{Externus,} \\ \text{Internus.} \end{array} \right.$
	Obliquely moved by	<i>Subpopliteus.</i>
	is Extended by	$\left\{ \begin{array}{l} \text{Gastrocnemius} \\ \text{Externus,} \\ \text{Internus.} \end{array} \right.$
The Ankle	Contracted by	$\left\{ \begin{array}{l} \text{Tibialis Anticus,} \\ \text{Peroneus secundus.} \end{array} \right.$
	Moved obliquely Lateral	$\left\{ \begin{array}{l} \text{Internally by Tibialis Posticus,} \\ \text{Externally by Peroneus primus.} \end{array} \right.$
	Contracted by	$\left\{ \begin{array}{l} \text{Perforans in the Third} \\ \text{Lumbricales in the First} \\ \text{Perforatus in the Second} \end{array} \right. \left. \begin{array}{l} \\ \\ \end{array} \right\} \text{Joynt.}$
The Four Lesser Toes are	Extended by	$\left\{ \begin{array}{l} \text{Interossei in the First Joynt,} \\ \text{Secundi Internodii Tensor,} \\ \text{Tertii Internodii Tensor.} \end{array} \right.$
	Obliquely moved by	$\left\{ \begin{array}{l} \text{Interossei,} \\ \text{Minimi Digiti Abductor.} \end{array} \right.$
The Great Toe is	Contracted by	<i>Flexor,</i>
	Extended by	<i>Tensor,</i>
	Obliquely moved by	<i>Abductor.</i>
The First of the Toes are kept together by <i>Transversalis Placentini.</i>		
The Skin		Of the Sole of the Foot is moved by <i>Plantaris,</i>
		Of the Palm of the Hand, by $\left\{ \begin{array}{l} \text{Palmaris,} \\ \text{Caro Musculosa Quadrata.} \end{array} \right.$

To the Ingenious
Orlando Bridgman, Esquire,

SON of the Learned

William Bridgman, Esquire,

One of the Clerks to His Majesty's most Honourable Privy-Council; Both Fellows of the R. S.

S I R,

THE 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 Sense 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, considering 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 Lipsiæ, and the Journals des Scavans, with the Transactions of Our own Society: And I dare promise, you'll make Discoveries suitable to the Difficulties 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 harsh 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.

The Characters in use among Mathematicians, and that are brought into this Paper, are,

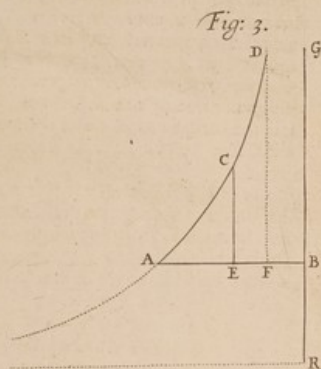
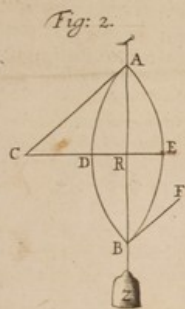
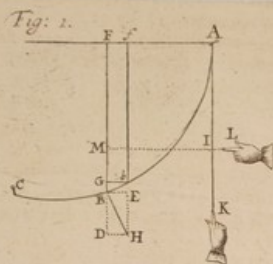
=	The mark of Equality.
+	Plus.
-	Minus.
::	Proportion.
M	Multiplication.

Mathematical Disquisitions concerning Muscular Motion; communicated in the Lypſwick Transactions by John Bernoullius M. D. at Baſil.

1st, I 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 another through the whole length of the moving Fibre, because of the loose union of the transverse Fibrils. 2^{dly}, That there is a sort 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 extrem part of the adjoining Nerve by this slight 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. 3^{dly}, When infinite numbers of drops are thrown, after this manner, out of the Orifices of the small Nerves through the whole body of the Muscle, (which is always bedew'd with Blood, like a Sponge) they do insinuate themselves into the Blood, by being determin'd into its thinner Particles by the force of their small 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:

FIG. I.

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 $= x$ its differential $Ff = dx$; the Applicate $FB = y$, its differential $GB = dy$; the Curve $AB = s$, 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 Diagonal is the very BH : BE will be $= ndy$ and $BD = ndx$, because of the likeness of the Triangles BGb and BDb . But because the sustaining power in A is always the same wheresoever the thread is fixt, except in C , as 'tis plain



plain to any considering person; let it be put $= a$; but it is evident from the Mechanics, that that power should be as great as if, instead of the curve thread AB , 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 KI , the former whereof is equivalent to all the Horizontal powers BE , and this to all the Vertical BD taken together: But all in BE are equal to the whole ndx , which is $= nx$; 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 say, (as Mr. Varignon teacheth us in his fundamental Proposition about suspended Weights) as the Sine of the Angle AIB , or its compliment to two Rights KIB , to the Sine of the Angle MIB *b. e.*, as IM is to MG , or as G is to GB *b. e.* 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 KI , this will all be sustained 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 K , or nx , to the partial power $\frac{ny dy}{dx}$; and so we shall make out this different Equation $\frac{ny dy}{dx} + nx = a$, 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 $yy + xx = \frac{2ax}{n}$; which Equation shows, that the proposed Curve ABC is circular, whose Radius or Semidiameter $= \frac{1}{2}a$; which was to be found. Wherefore if a Muscle were not stretch'd and drawn out in length by the resistance 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 firmness, 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 sustaining Force, or requisite Strength, of the Fibre, *b. e.* if when the powers in n or BH 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 BH be put $= mds$, and the sustaining power in A or $B = b$, and we shall have the Equation $yy + xx = \frac{2bx}{m}$; But because the Radii are put equal, $\frac{b}{m}$ will be $= \frac{a}{n}$, and therefore $nm : a b$, *b. e.* the sustaining powers, or requisite strengths, of the Fibres are in the same Ratio with the inflating powers: which my Brother found 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 Curvature of a Sail.

(3) These things being premised, we may easily reckon the proportion that's betwixt 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,

Y y z

BDA

FIG. II.

BDA and BEA , C the Center of the Arch AEB , and the Radii CA , CE being drawn, the former to the Extremity, and the other through the middle of the Machine, so that DE 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 $= RAC + ACR$, the Angle EAR will be $= ACR$, and therefore the Arch AE is the measure of the Angle EAR , or the double BEA the measure of the double EAD . Wherefore the half length of the Machine be , of the Arch AE in 100000 equal parts, and half of the Angle of dilatation EAR , being given, we may find the sublevation of the resistance z , it being double to the excess by which the Arch AE is more than its right Sine AR ; which is thus done: Say as the circumference of a Circle to the Radius, *b.e.* as 44 is to 7, so is the number of the degrees of the Circumference 360 to a fourth $57\frac{1}{4}$, $\frac{1}{4}$ which will be equal to the Radius in degrees. Then say as the number of degrees of the Angle EAR , or the Arch EA is to $57\frac{1}{4}$; so the number of the 100000 equal parts of the length of the Arch EA is to a fourth, which will be equal to the number of equal parts of the Radius AC , of which the Arch EA contains 100000: and hence we shall have the length of AR its self, by saying, that as the whole Sine is to the Sine of the Angle EAR , or of the Arch EA , so the number of the parts of the Radius AC already found is to a fourth, for this fourth is equal to the number of equal parts of AR its self, whereof the Arch EA contains 100000: and therefore the double excess of the Arch AE over and above the Sine AR now found, will be the desir'd Sublevation of the Resistance Z . $QE I$.

(4) Now we have discover'd the Sublevations, we shall determine the respective dilating force after this manner. We put before ($N^o 1$) the Curve power in any point, or rather in any differential of the Curve pressing perpendicularly $= n ds$: therefore the dilating power, or the absolute Force of the Elasticity of the motive Air, whereby the Sides of the Machine are dilated, is express'd by n , but by putting the sustaining 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 Resistance Z is to the Sustaining power in B , whose direction is the Tangent BF , as the Sine of the Angle EBD to the Sine of the Angle EBR , therefore is $a = \frac{z M \text{ Sin. of } EBR}{\text{Sin. of } EBD}$ and so the value of $\frac{1}{n} a$ 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) $= \frac{z M \text{ of the Sine } EBR}{n M \text{ of the Sine } EBD}$; and therefore the absolute force of the Elasticity of the motive Air $n = \frac{z M \text{ of the Sine } EBR}{r M \text{ of the Sine } EBD}$: and consequently the force, by which the half-side of the Machine is prest, *b.e.* $n AE$, will be $= \frac{100000 z M \text{ Sin. } EBR}{r M \text{ Sin. } EBD}$. By means of this Calculation, I have contriv'd a Table like that *Borellus* made for his Hypothesis; which, if compar'd 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 $AEBD$ can never be entirely of a Circular Figure, because the absolute force of the Elasticity should be infinitely greater than the Resistance, which cannot be;

be; and because the greatest contraction of the Machine, or sublevation of Resistance, which is not equal to 72728 parts of those of which the half length of the side 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 small 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 Resistance bears a very great proportion to the absolute force of the Elasticity of the motive Air: since if we suppose the Angle $E A R$ of 30 minutes, the Resistance is to the power of the Elasticity, as 22900000 to 1; so that the least inflation of Muscles is able to counterbalance any great Resistance, and that therefore a very tender Infant may raise any weight whatsoever: but the Sublevation becomes the more insensible, the greater the Resistance is than the motive power of the Elasticity.

(4) *When we would know the quantities of Animal Spirits which are expended on every Resistance, while the sublevation of Resistences 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 sustaining Powers by *n.z.* But because (by *Verignonius's* Proposition) the sustaining Powers are, in the Ratio of the Resistences Z , the Resistences must also be proportional to the Elasticities, while the Sublevation of the Resistance remains, or the Angle $E B D$ is always the same. 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; *b.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 search after this way.

In a determined Volume *a*. I conceive, that the Particles of Air take up the space *b*, and that the *Materia Subtilis*, the remainder of the Volume, possesses the Space $a - b$. Now I conceive another quantity of Elastical air *C* in an equal volume *a*, so 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 Aether*: 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 possess'd by the *Materia Subtilis*, and a direct one of Spaces fill'd with Air, as, *viz.* $a b - b c$ is to $a c - b c$; 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 $A C D$ to the Axis of $A F$ of this sort, that $A B$ 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 $A E$, $A F$ be taken for the densities of the Air contain'd in the Volume express'd 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 $A B = a$, and another taken at will $B F = f$, $D F = g$, the Abscissa $A E = x$, and the Applicate $E C = y$, and we shall find this Equation $f g x = a a y -$

$Z z$

$a f y$

FIG. III.

$afy - axy + fxy$, 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 Asymptoten G B to R, so that B R may be a fourth Proportional to A F, F D, and B F; the transverse half-axis is equal to the mean proportional between B R and the double of A B. 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 since we have taken the Densities of motive Air of the same volume proportional to the quantities of animal Spirits expended in producing it, while they fermented with the Blood, and the Elasticities are proportional to the Resistences, we may conclude, that the very same Hyperbola A C D does also determine the relation of Resistencies to the quantities of expended Spirits, *b. e.* if C E, D F design the Resistencies, A E, A F will denote the quantities of expended Spirits. Now let the volume of the Muscular Machine, or, which is the same thing, let the volume of all the Machines of a Muscle taken together (which volume is represented by A B) be of ten parts, B F or $f = 1$, F D 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 rais'd 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 consumed in a far lesser proportion than the Weights to be rais'd. In example; if we are to raise any thing of a double weight, it is not requisite 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 side shown.

AN APPENDIX OF THE HEART and its Use:

WITH THE
CIRCULATION of the BLOOD, and the Parts
of which the *Sanguinary Mass* is made, &c.

THE 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 Certainty 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 Vessels 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 considered 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 Consideration 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 Vessels disse-

minated through the *Lungs*, which are affixed and implanted into it.

The *Heart* of its self is a firm *Muscular*; that is, a fleshy and fibrous part, not wholly solid, but having two Cavities allowed it, commonly called the *Right* and *Left Ventricle*s; Again, being the Orifice of the *Vena Arteriosa*, 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 Arteriosa*.

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 Arteriosa* 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 Passage out of the *Artery* into the said *Ventricle*, it is likewise most evident, that what *Blood* passeth out of the *Arteria Venosa* into the *left Ventricle*, be conveyed out of the *left Ventricle* into the *Aorta*, or Great *Artery*: And thus have we clearly brought the *Blood* out of the *Vena Cava*, through most manifest open Channels, framed by Nature her self, through the *Ventricle*s of the *Heart*, and the Vessels of the *Lungs* into the Great *Artery* or *Aorta*.

That the *Blood* may thus march, and that Nature design'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 demonstrated.

At every *Pulse* of the *Heart*, there is a small Quantity of *Blood* forced out of the *Left Ventricle* into the *Aorta*, and
this

this is manifest 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 left *Ventricle* into the *Aorta*, than the quantity of the whole *Mass* of *Blood* in the *Body* amounts to; but whatsoever cometh into the left *Ventricle*, must come out of the *Arteria Venosa*, and whatsoever comes out of the *Arteria Venosa*, must first come thro' the *Vena Arteriosa*, whatsoever 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: Therefore *à Primo ad Ultimum*, whatsoever Quantity of *Blood* cometh into the *Aorta*, must consequently come out of the *Cava*, but a quantity exceeding the whole *Mass* of *Blood* cometh into the *Aorta*, in the space of an Hour; therefore the same *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 left *Auricle*.

The *Blood* in the *Vena Cava*, is by the Right *Auricle* forced 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 passeth 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 left *Auricle*, each of these *Ventricles* having two large Vessels annex 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* annex to it, by which it dischargeth the *Blood* into the *Lungs*, which it received from the abovesaid *Auricle*: In like Manner the left *Ventricle* hath annex to it the left *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* annex to it, by which it dispenfeth 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 *Sigmoidal*; the *Tricuspidal Valves* being planted in the *Ventricles* for the Admission of *Blood* into the *Heart*, and hindring its Reflux into the *Veins*. The *Sigmoidal* 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 considered 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 any 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 *Trunk* 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 *Arteries* 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* ^{of} 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 absolved 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 Physicians* into the four Humours; but rather content my self with that Division Nature her self maketh, when the *Blood* is out of the Body. In the Body of a sound Man, take what quantity you please away by *Pblebotomy*, and let it stand some few hours, and in it you will find two distinct Substances, of different Colours, Tasts, 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, insomuch that all the *Whitish 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, set 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 roasted Egg; which is the true Connatural Nourishment of the parts, whose Colour and Constitution are the same.

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 assimilated to the part, sends the rest with the *Blood* into the *Capillary Veins*, and so 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 self, by the Addition of this *Nutritional Juice*; and without which, the *Artificer* can do nothing, becoming the *Architect* 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 *Minime Particulæ* preserves it in its usual Vigour, and so long as its Fluidity continues, as the proper Effect 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 *Nutritional 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 Consistence 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 such a Stability, Firmness, and consequently, Dryness, that they do not admit any longer *Nutritional Juyce* into them, or their proper Substance, whereby they seem 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 Resistance 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 so long as the *Blood* does move, there is said 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 fibrous, and gets into its self a kind of dryness, which
makes

makes it unfit and incapable 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 further Capacity of making use of their own proper *Menstruum*: 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 some *Vessels* to receive, as does the Cistern and Pipes; and Thirdly, Strength to propel or drive out: And such a Part as this, in every respect is the *Heart*, which is furnished with *Ventricles* to contain, with *Vessels* annex 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 Vivifying 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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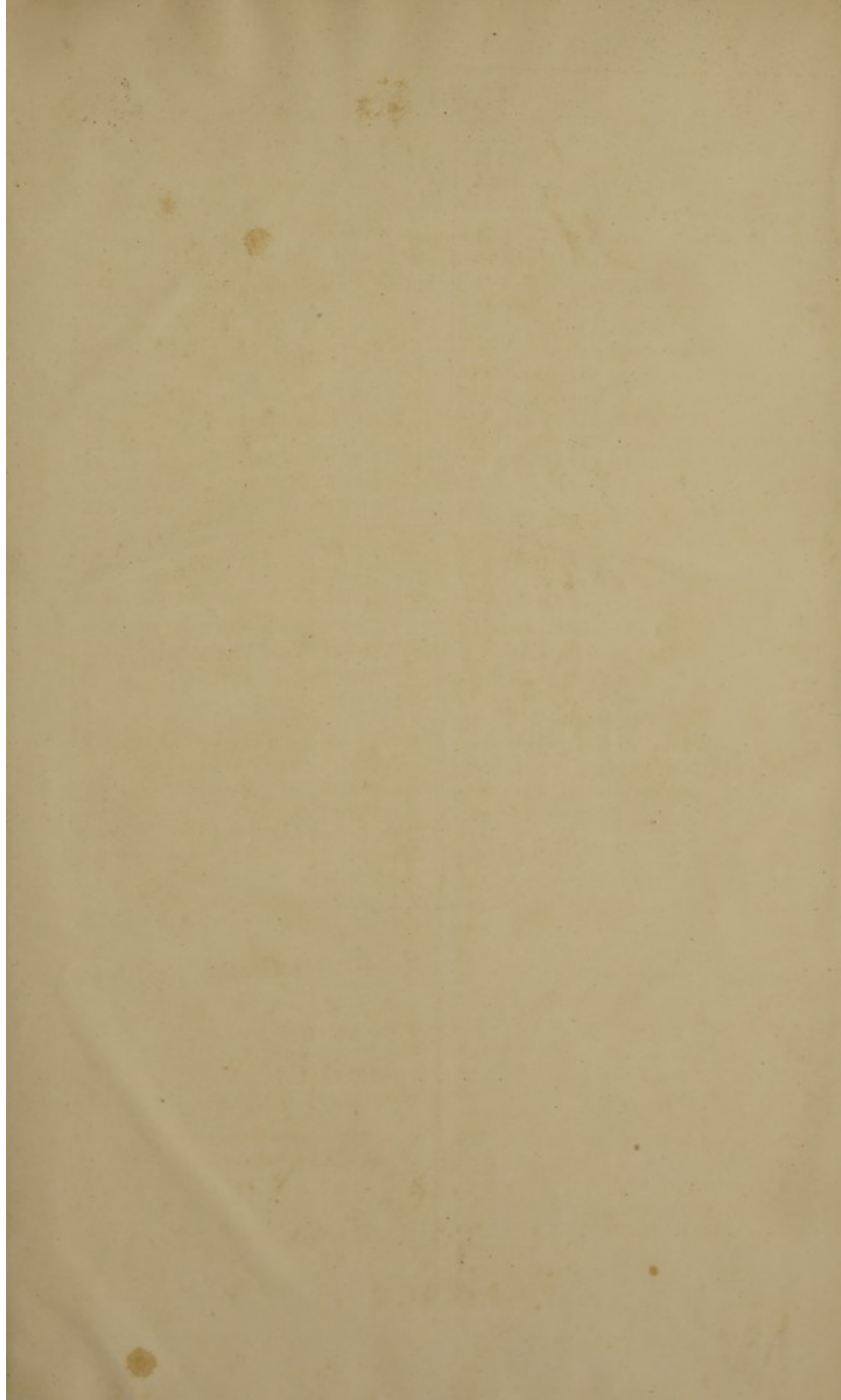
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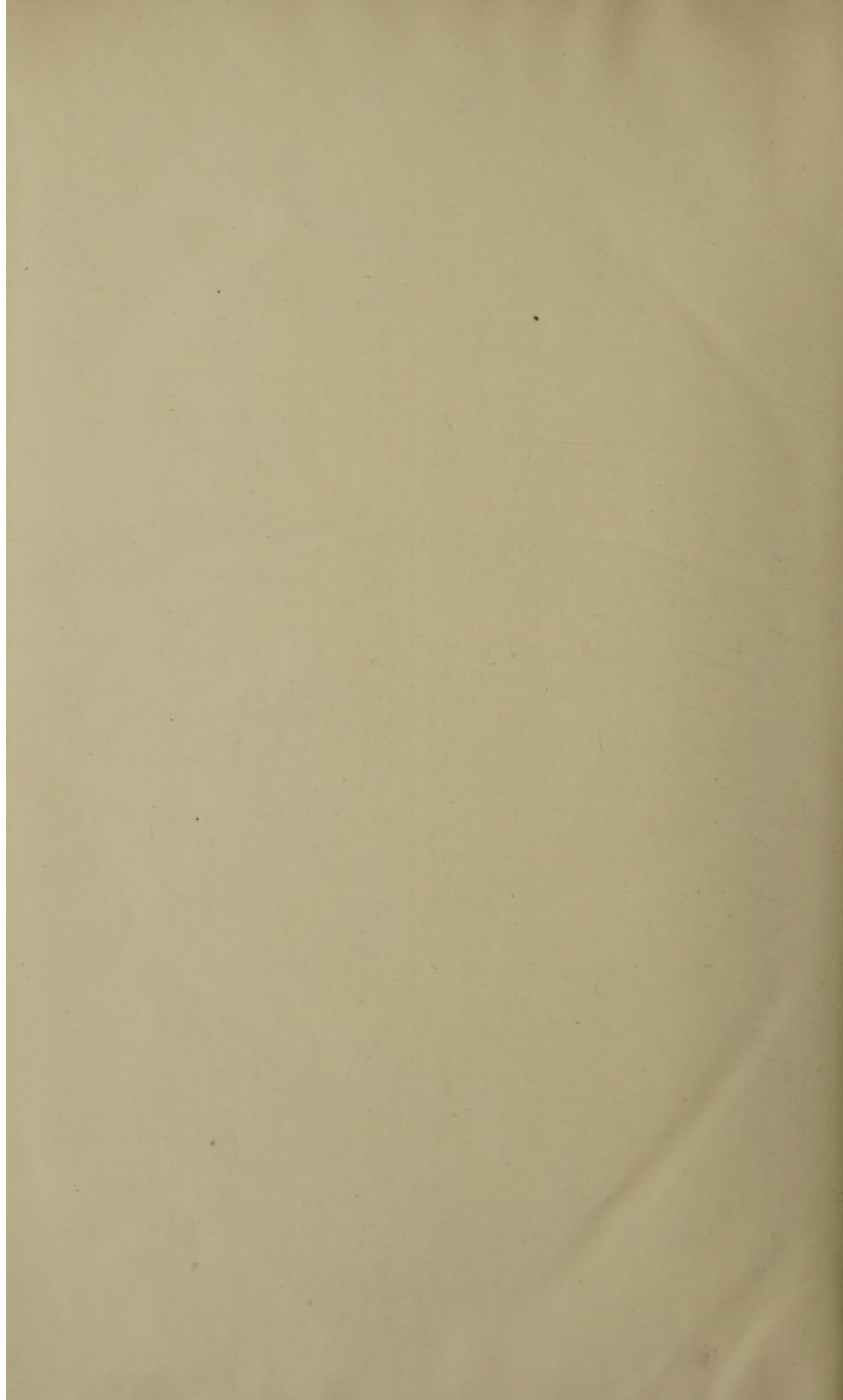
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