

Cursus osteologicus : being a compleat doctrine of the bones ; according to the newest, and most refin'd notions of anatomy ... / To which is annex'd ... an excellent method of ... preparing ... the bones, to form a movable skeleton.

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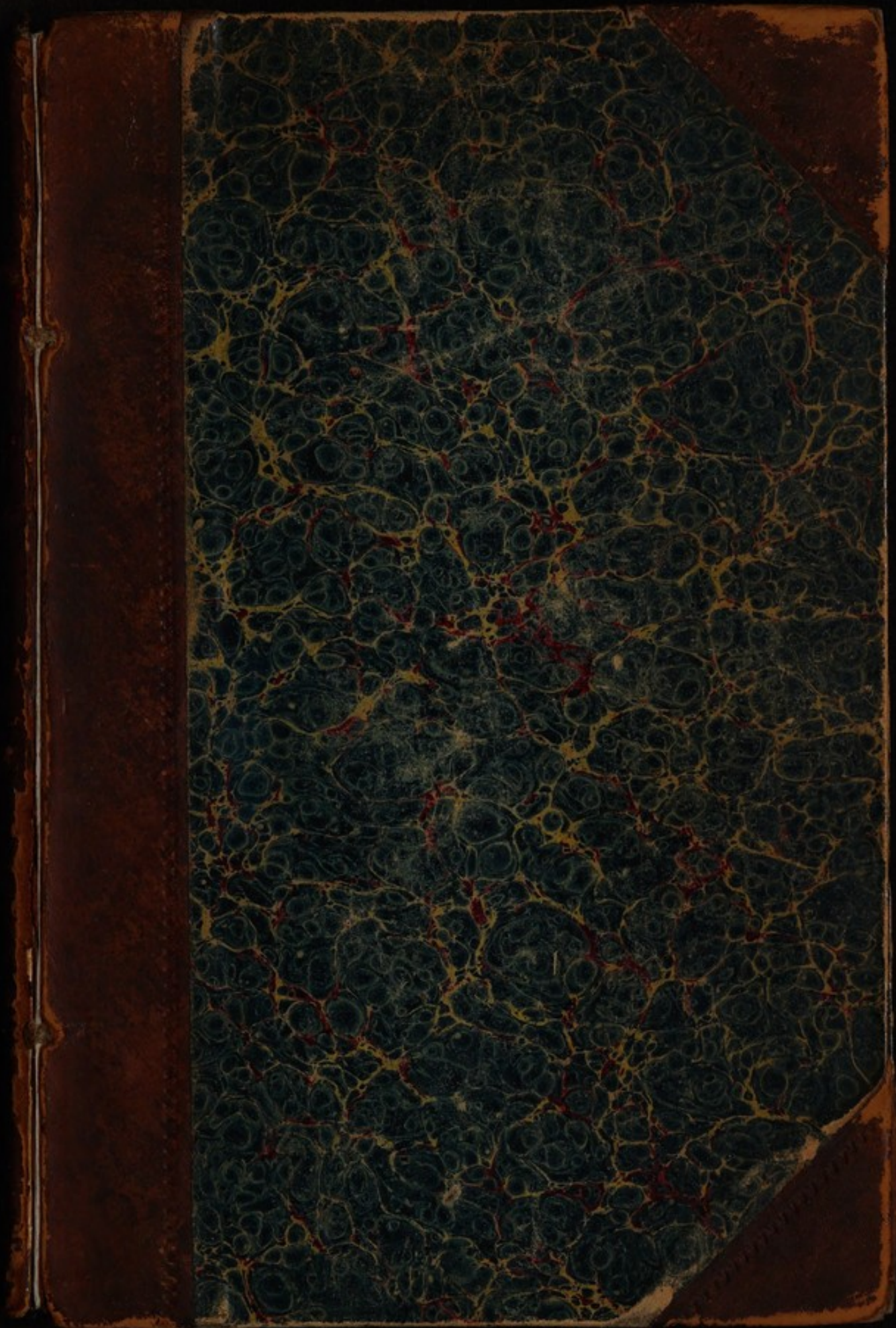
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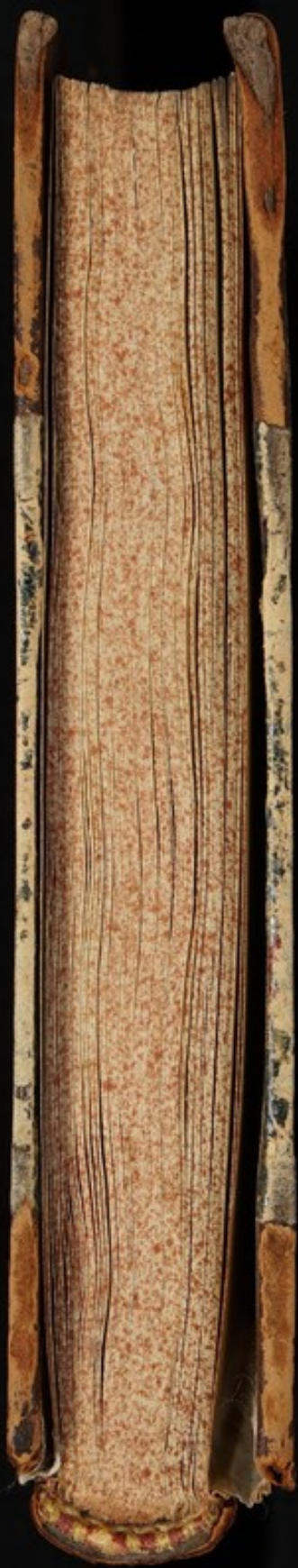


BAKER
ON THE
BONES

1697







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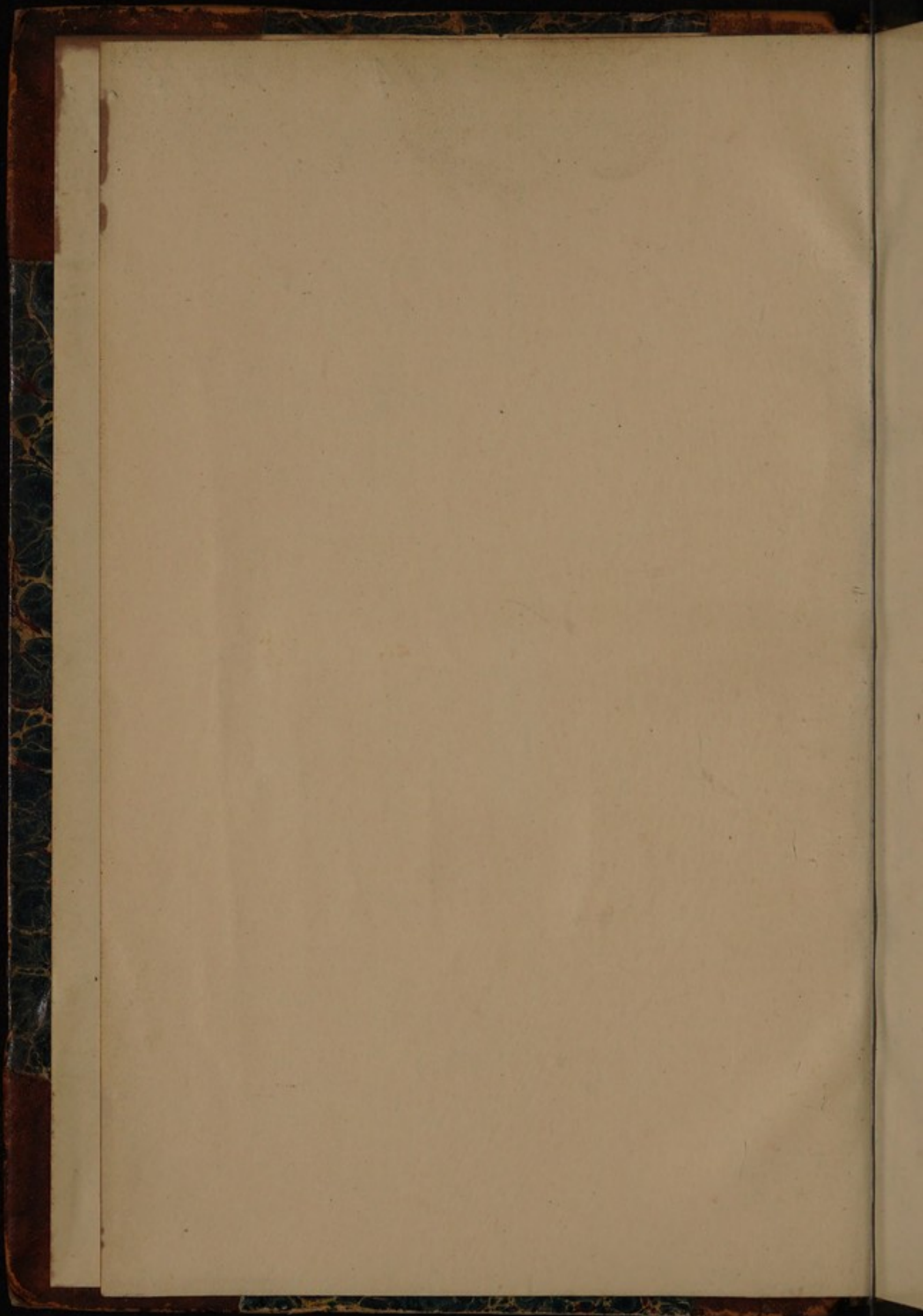
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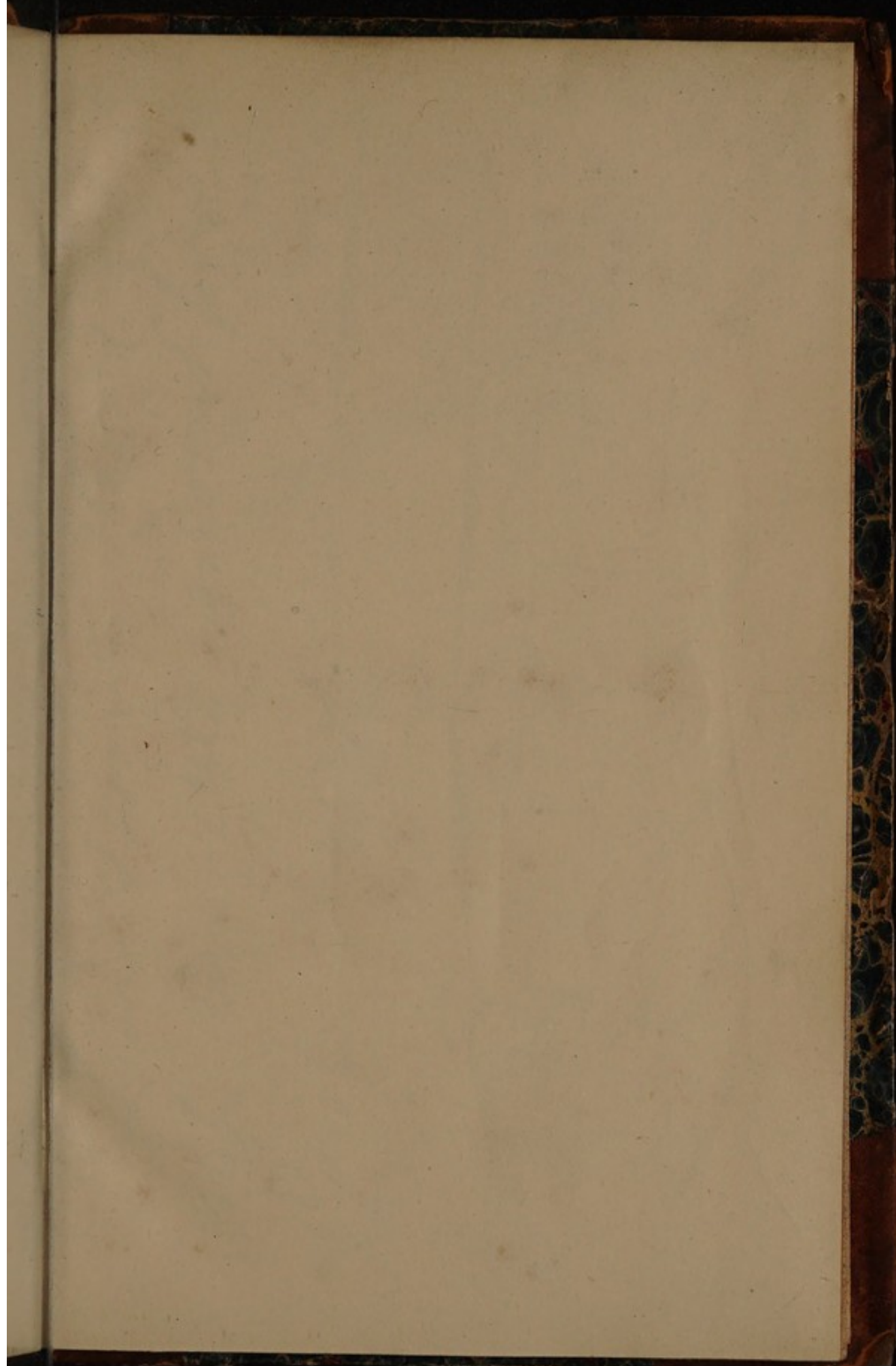
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... Thomas & Harris ...

2 Libris Thomæ Harris deo il
lustr. Avunculo honorabilissimo

Carolo Harris





Handwritten text in a cursive script, likely a signature or a list of names, located on the right side of the page. The text is written in a light brown ink and is somewhat faded. It appears to be organized into three columns, with the rightmost column containing the most legible words, possibly "John", "James", and "William". The middle and left columns contain more cursive, less legible text.

Cursus Osteologicus:
B E I N G A
Compleat Doctrine
O F T H E
B O N E S;

According to the Newest, and most
Refin'd Notions of ANATOMY.
Shewing their Nature, Substance, Compo-
sition, manner of Ossification, Nourish-
ment, &c. Also the various ways of
their Articulation; together with the
Parts to be consider'd in each particular
Bone of the whole SKELETON, as
Figure, Cavities, Protuberancies, *Fora-
mina*, Scituation, Connexion and Use;
with several Curious Observations rela-
ting to the BONES.

To which is Annex'd by way of *APPENDIX*,
An Excellent Method of Whitening, Cleansing,
Preparing, and Uniting the Bones, to Form a
Movable Skeleton, wherein the Bones may have
the same Motions as in a Living Subject.

The Whole being a Work very Useful and Necessary
for all Students in Physick and Chirurgery.

By ROBERT BAKER, Chirurgeon.

London, Printed by I. Dawks, for D. Browne, at the
Black Swan without Temple-Bar; and R. Clavell, at
the Peacock near St. Dunstan's Church. 1697.

Causes of Osteogenesis:
BEING A
Compleat Doctrine
OF THE
BONES:

According to the Newell, and most
Rein'd Notions of A. N. A. T. O. M. Y.
Shewing their Nature, Substance, Connec-
tion, manner of Ossification, Growth,
Increase, &c. Also the various ways of
their Articulation, together with the
Parts to be considered in the
Bones of the whole SKELETON,
Figure, Cavities, Pores, &c.
with several Curious Observations re-
lating to the BONES.

To which is Annex'd by way of APPENDIX
An Excellent Method of Whitening, Cleaning,
Preserving, and joining the Bones to form a
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London, Printed by J. DODD, at the B. House, in the
Black Swan without Temple, and at R. Clavel, in
the Parsonage near St. Dunstons Church.



INTRODUCTION.

Rectum est Regula sui,
& obliqui, is an un-
deniable Axiom among
the Mathematicians; the same
may be said of that thrice Noble
Science call'd Anatomy, it be-
ing the Grand Foundation, or if I
may so say, the Corner-stone both
of Physick and Chirurgery, espe-
cially the latter, it being the Ba-
sis on which we build all our Stru-
ctures towards the Cure of Distem-
pers, both External, and Inter-
nal; for how is it possible we
should pretend to Cure any Inter-
nal Affect, unless we know what
Part or Viscera is affected; the

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like may be said in Chirurgical Cases ; for what Surgeon can give a true Prognostick in Wounds, Ulcers, &c. or Restore Luxated or Fractured Limbs, or perform any Manual Operation, without a true Knowledge of the Oeconomy of Humane Body ; and this ought not to be a bare Knowledge only of the Parts, and where they lye (as many who are unwilling to give themselves the Trouble of Scrutinying into the more nice Composition of them) but we ought also to know the Figure, Structure, Use, what Juices they separate, and the like, all which the Doctrine of Anatomy teaches ; for to what a prodigious height is the Art of Medicine improved, since our most Ingenious and Accurate Countryman, Doctor Harvey, found

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found out and demonstrated the Circulation of the Blood; Jolivius the Lymphatick Vessels; Casper Aſellus the Venæ Lactææ; and Haver's the Articular Glands; with many more great Improvements, which are too long to mention; nay, the whole Method of Physick is almost alter'd; and this Great and Noble Work could ne'er have been perform'd, had those Learned Men contented themselves with a bare Knowledge of the Parts only; for suppose any had a Pile of Building to Erect, would they think you, employ any one who is Ignorant of what Figure or Size the Stones or Timber ought to be, and how to be join'd together? The same may be said of a Chirurgion, or Physician, who is ignorant of Anatomy;

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Introduction.

anatomy ; so that whoever is willing to perform the Duty of a Good and Conscientious Surgeon, ought to know the whole Fabrick of Man's Body ; and that as well in its perfect , and sound state, as morbid, that he may re-establish Health when lost, and restore unsound Parts to their former Sanity.

I shall not here Harangue, or run out in the many Praises which are due to Anatomy, or Treat of its Origin and Antiquity ; it being already so excellently well perform'd by the Learn'd Doctor Charleton, in the Preface to his Anatomic Prelections, but proceed to the Matter in hand.

Various are the Opinions of Authors, about the Parts we ought to begin with, in Anatomical Demonstrations.

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monstrations. Bartholinus says, We ought to begin with the Teguments, they being first in view, then proceed to the Viscera, and Muscles, and lastly, end with the Bones; and the Reasons he gives for it, are because the Bones cannot be examined before they appear, which they cannot do, (says he) 'till all the Muscles are separated from them; others begin with the Abdomen, or Lower Belly, so proceed to the Thorax, then to the Head, and lastly, to the Extremities; by reason the Belly is apt to send forth in a little time, very noisom and offensive Smells, which would hinder the Operator from prosecuting his intended Design: 'Tis true this is the best way, supposing we have but one Subject to work on,

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and that we be obliged to shew all, or most of the Parts on this one Subject.

Galen says we ought to begin with the Bones, and gives many Cogent Reasons to prove it; first, because they serve as Beams or Supporters of the whole Body. Secondly, they serve to fasten the Muscles too; for how can we tell the Origin or Insertion of any Muscle, if we be wanting in the true Doctrine of the Bones; nay, all the Parts seem as if design'd for their use; for when the Bones cease to grow, they also put a Period to the growth of all the other Parts.

Laurentius says, that in the Anatomical School of Alexandria, the Young Students in Medicine, always began their Anatomical

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Anatomical Course with the Osteology, and then proceeded to the Doctrine of the Muscles, several of which receive their Denominations from the Bones, which they pass by, or lye on, as the Tibialis Posticus, and Anticus the Peronii, Scapulares, Sternohyoidei, Mastoidei, &c. Lastly, the Knowledge of the Bones is of that great use to a Surgeon, that it's impossible for him to restore well a Fracture or Dislocation, who is Ignorant of the Structure, Figure, Articulation, &c. of the Fractured or Dislocated Bone.

All these Reasons are a sufficient Inducement to perswade us, that we ought to begin with the Skeleton, and then proceed in order, to the Rest of Man's Body.
The

Introduction.

The Skeleton is an Assemblage of all the Bones of the Body; it's either Natural, or Artificial; the Natural, is when the Bones are all excarn'd, but kept together by their proper Ligaments; the Artificial one, is when the Bones are Artificially Cleans'd, Whiten'd and Join'd together by Wiers.

That part of Anatomy which Treats of the Bones, is call'd Osteologia, which is as much as to say, A Discourse of the Bones.

We shall in this Tract examine what belongs to the Bones in general, and what belongs to each particular; which we shall divide in several Demonstrations.

Cursus

Cursus Osteologicus:

BEING A

Compleat Doctrine

OF THE

BONES, &c.

Demonstration I.

Of the Bones in General.

TH E Doctrine of the Bones in General, consists in these Eleven Things, as Definition, Substance, Composition, manner of Ossification, Vessels, Nourishment, Differences, Parts, or Things to be consider'd in the Bones ;
together

*What to be
consider'd in
the Bones in
General.*

Of the Bones in General.

together with their manner of Articulation, Number and Use; of all which in order.

Antient Definition.

Galen defin'd a Bone to be the most hard, firm, and terrestrious part of all the Body. *Laurentius* adds, and says, That it's ingendred by the formative Faculty, by reason of great heat, out of the most crass and terrestrious part of the *Semen*, to serve as a Foundation to all the Body, and to give it Shape and Figure; but this Definition, as it is not compleat enough, so on the other hand, the word Faculty, is a Term which they used to express themselves by, when they were at a loss for an Answer or Solution to any Question proposed; besides, it's not at all agreeable to the Idea we have of the formation of the Bones, or Use; yet it's certain the Antients made use of that Term to explain most of the Actions of the Body; for when they were to declare how the Chyle, or Blood was made, or how the Bones or Cartilages were form'd, nay, how the Senses acted; they answer'd, That the Stomach had a Chy-

Of the Bones in General.

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a Chylific Faculty, the Liver a Sanguifying; the Bones were form'd by an Ossific, and the Cartilages by a Cartilaginous Faculty, that the Eye saw by the Visive Faculty; & sic de ceteris.

This was a general Answer, by which they eluded (as well by their occult Qualities) all Difficulties proposed to them, so that their Pupils were as Ignorant at the finishing of their Studies, as at the beginning; but we at this Day explain all these Actions purely Mechanically; as I shall shew in demonstrating each part of the Osteology exactly, that the Action which it performs, absolutely depends on its Structure, so that it can do nought else, but what it does.

But to return from whence I have digress'd; the Moderns say a Bone is a similer part, most dry, cold and hard, without sense, (unless by some Preternatural Accident) inflexible, affording Stabiliment, Figure and Form to the whole Body.

*Modern
Definition.*

A

Of the Bones in General.

A Bone may be consider'd at two distinct times, either before or after the Birth.

*Nature and
Substance.*

In their beginning, or before the Birth, they are of a Membranous Substance, wrapt up, as it were, in very many folds, or *Laminae*; which at first are Gelatinous, in time grow Cartilaginous, and at last when sufficiently indurated by the *Offic Liquor*, are so strong as to resist all inward force, and their Parts which had before some Heterogeneous Bodies in their Interstices, being squeezed closer by the power and pressure of the Spirits, dis-engage themselves from those Bodies which lye between their *Laminae*, so grow more solid, wholly fixt, and void of motion, which is about the time when the Bones have attain'd their full perfection of growth, which also puts a period to the bulk and magnitude of the Body, so that they are no more extended or enlarged, either in breadth or length.

*Composition
of stringy
Fibrils.*

The Bones are composed of many strings, or threads, which have their course

Of the Bones in General.

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course according to the length of the Bones, or their Figure; for if the Bone be of an unequal, or irregular Figure, the strings are also unequal, and irregular; except in the *Cranium*, where the threads begin at a point, (sometimes two or more) for the most part in the Centre, and terminate in the Circumference of the Bone, as the Spokes in a Wheel; for which reason it's more thick, and compact there, than in the Circumference, the thready Fibrils being more close and united there, which is visible in the *Cranium* of a *Fœtus*; the Bones have also some transverse Fibres, to hold the long ones in; which may be seen in the Bones of the *Tarsus*, as also in the Extremities of most of the long Bones, where the Porosities are.

The Ossification begins not in the same place of every Bone; in the long Bones it begins in the middle, and towards each end; but in Bones of an irregular Figure in several places, as may be seen in the *Ossa Innominata* of a *Fœtus*, where it begins at three points or places at once, so that they seem

Where the
Ossification
begins.

Why the
Bones are
not totally
Ossified be-
fore the
Birth.

seem to be three distinct Bones united just in the middle of the *Acetabulum*, but in time, as the Ossification increases, they grow more strong, the fibrous threads join, and so make but one Bone; for if the Bones should have been totally Ossified before the Birth, how should the *Fætus* pass through the *Vagina* of the Womb as it doth? For it's without Dispute, that both the Bones of the Head, and also the Hips of the *Fætus*, give way somewhat in time of Exclusion; for it's observed, that those Animals which have long and small Heads, but big Bodies, have the Bones of their Head wholly Ossified before the Birth, but their Ribs not, so careful is Nature in this Affair.

In the Skull, and most broad thin Bones, as the *Sternum*, the Ossification begins at two, three, or more points, commonly about the Centre; Nature is also very cautious in Ossifying long Bones all at once; for if their Extremities had been Ossified as soon as their middle, the ligamentous and tendorous threads would not enter

Of the Bones in General.

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ter so easily their ends, to join them together, which they can do, being not totally Ossified. The Ossification, as I said afore of the *Ossa Innominata*, begins at three points, that they may have the greater solidity; but quite contrary in the Bones of the *Cranium*, for while the middle of most Bones of the *Cranium* are fully Ossified, their edges are only Membranous, that they may give way somewhat in time of Birth, which they would not, were the *Cranium* compleatly Ossified. These are the Reasons why Nature retards Ossification in some Bones, and advances it in others.

The Bones before they be through-ly indurated, have many Blood-^{Vessels.} vessels, which are obliterated, as soon as the Meduller Glands are large enough to separate the Oily Particles from the Arterial Blood, (which have a Property of keeping the Bones soft) then the Ossific Liquor which is emitted from the aforesaid Glands hardens them, and so presses the Parts closer together, and hinders the Blood from passing and repassing as usual, when

B they

they were softer, their bony threads gave way, and being then not prest so close; which Vessels are also bonified by the Ossific Juice, having lost their first use; yet some few remain, which serve only the Meduller Glands, for their Nourishment, the Pulsation of Blood in them having strength enough to scatter the Fibrils of the Bones in that Part, and so makes passages for themselves.

Nourishment two-fold.

When Membranous.

When Bony.

The Bones are nourished two ways, the one in their beginning, that is, when they are only Membranous, and is quite different from the Nourishment they receive after their Perfection; for now they are nourished as all other Membranes, with Blood immediately from the Arteries, so that if you then cut them, you'll find every thread bloody, which is not so when truly Ossified; for when the Bones have occasion of greater solidity, Nature then changes her way of Nourishment, which is by a peculiar Liquor of a Saline Tartarous Nature, prepared by the Meduller Glands, the more oily Particles being separated, and

Of the Bones in General.

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and kept in them, which is that we ^{Medulla} call the Marrow; this Liquor, I say, ^{Quid.} insinuates its self all along the bony strings, and is visible in a Fractured Bone, it appearing at their Extremities, and meeting together causes them to reunite, which we call *Callus*; ^{Callus Quid.} nay, we often find that the adjacent Parts are sometimes indurated by this Ossific Liquor, and the Limbs often grow Gouty, and has not its former nimble motion, the *Callus* growing too big; for if they were bloody Particles, which exuded forth of their bony threads, instead of generating a *Callus*, it would Impostumate, for all Blood shed out of its Vessels putrifies, this Liquor is of such an indurating Quality, that if the Fibrils of the Bones be any ways broken, that it sheds it self in any great quantity, it will Ossifie the very Tendons; I have seen the Marrow it self turn'd bony.

The Bones have Nerves (is plain) ^{Nerves, but} although no Sense, for when they ^{no Sense.} come to the solid Substance of the Bone, they are prest so close, that the Animal Spirits cannot enter their Substance,

Acids soften
the Bones.

stance, and so consequently can have no feeling, unless softened by Acids, which will cause them to have a dull Sense, as may be try'd by the use of Acids on the Teeth; which, as the acidity goes off, reassume their former hardness, and insensibility. Sometimes the Blood acquires such an acidity which is apt to cause a *Spina Ventosa*, which is nothing else but a Cariosity of the Bones, proceeding from an Acid Blood coming to the Meduller Glands for the Nourishment of the Bones; also Acid Acrid Humours in an Ulcer may cause a Cariosity.

Cause of a
Spina Ven-
tosa.

Differences
Nine.

The Differences observed in the Bones, may be derived from Nine Things, *viz.* from their Substance, Quantity, Figure, Situation, Uses, Motion, Sensibility, Generation, and Cavities.

(1.)

From their
Substance.

The First Difference is derived from their Substance, for some Bones have a very hard one, as the *Tibia*; others less hard, as the *Vertebrae*; and finally, others have a more soft and spongy one, as the *Sternum*.

The

Of the Bones in General.

II

The Second is derived from their (2.) Quantity, for some are very large, as those of the Thigh, Leg, Arm, &c. From their Quantity. others less, as those of the Head; some least of all, as those of the Fingers.

The Third proceeds from their Figure; some are long, as the *Os Femoris*, *Tibia*, &c. others short, as those of the Fingers, and *Metatarsus*, &c. some round, as the *Rotula*; others flat, as the *Ossa Palati*; others square, as the *Ossa Parietaria*; others triangular, as the first Bone of the *Sternum*, *Scapula*, &c. (3.) From their Figure.

The Fourth is from their Situation, (4.) as some are plac'd in the Head, others in the Trunk, and some in the Extremities; others are seated deeply, as the *Officles* in the Cavity of the Ear, &c. From their Situation.

The Fifth is from their Use, as some serve to sustain the Body, as those of Legs and Thighs, others to contain and defend the Parts, as the Ribs defend the Lungs, Heart, &c. *Ossa Innominata*, and *Os Sacrum*, the Bladder, Womb in Women, &c. *Cranium* the Brain. (5.) From their Use.

(6.) The Sixth is known by their Motion; for some have a more manifest motion, as the great Bones of the Extremities; others have a less, as those of the *Tarsus* and *Carpus*; others none at all, as those of the Head.

(7.) The Seventh is from their Sense, which is easily remarkt, for all the Bones, generally speaking, have no Sense, except the Teeth, and they only a very dull Sense; except, as I have already observed, they be softened by some offending Acid.

(8.) The Eighth is taken from the time of their perfect Generation, and Perfection; for some Bones are perfect in the Womb, or before the Birth, as the small Ossicles of the Ears; and others, which do not acquire their Perfection, but as the Subject advances in Age, as all the rest of the Bones of the Body, yet some of these Ossific quicker, as those of the lower Jaw; others slower, as the *Fontanella* of the Head.

(9.) The Ninth and last Difference is drawn from their Cavities, for some have great ones, and contain Marrow, as

as the Bones of the Extremities; and there be others which have no manifest Cavity, but only Porosities; which contain a Meduller Juice, as those of *Tarsus*, *Carpus*, &c. some have holes, by which Vessels pass and repass, as those in the *Basis* of the *Cranium* and *Vertebra*; others have only Trenches or Furrows, as those of the *Sternum*, *Ribs*; others have Sinusses, as the *Os Frontis*, and *Ossa Petroso*; lastly, some are pierced like the holes in a Seive, as the *Os Cibri-forme*.

The things to be consider'd in the Doctrine of each Bone are three; Threethin s consider'd in the Bones.
 1. The Apophisis. 2. Epiphisis. And
 3. Cavities, Furrows, and Sinusses.

First, The Bones not being of one (1.) even Form, or Figure, have at their Apophysis, or Process. Extremities several Prominencies, or Protuberancies, which are of two sorts, the one is a continued part of the Bone jetting manifestly out, above its superficies, ordain'd for the more commodious and strong insertion of

the Tendons of the Muscles, and is call'd an Apophysis, or Process.

(2.) The Second is an additional Bone growing to another by immediate contiguity, as if Nature had forgot to make the Bone long enough, and is generally more porous than the Bone it self; which will separate if you boil in Oil, for they will not separate if boil'd in Water never so long, unless the Subject be very young, it's call'd an Apendage, or Epiphysis; this in young Bodies may sometimes by great force be separated from the rest of the Bone, or to speak improperly, Dislocated.

If this Protuberance be round, it's call'd *Caput*, under which is the *Cervix*, as in the superior part of the *Os Femoris*; if it be flat, *Cordilus*; if sharp, *Corone*; others from their figure are call'd *Styloides*, *Mostoides*, *Coracoides*, *Ancyroides*, &c.

Embrions have not these Protuberances so large; for except some very few large ones, they are hardly visible.

These

Of the Bones in General.

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These Protuberances are either Natural, as the *Spina* of the *Scapula*; the rest are only Accidental.

The Accidental Protuberances of the Bones, (which are only manifest when the Bones are perfect) are caused by the Tendons of the Muscles or Ligaments, which always are inserted there; for the stringy Filaments of the Tendons and Ligaments, entering into the Bones (while soft) between their stringy threads, cause them to enlarge there into a bulk, which it must do of necessity, there being a double portion of Fibres united together; which are all Ossified as the bony Liquor increases.

Cause of the Protuberances.

It's a general Note, that where you find such Protuberances, some Ligaments or Tendons of Muscles are inserted there; although these Protuberances seem only to be accidental, yet they have many uses; first, by them the Muscles have a greater force to lift or pull up the Part. Secondly, they are of use to enlarge the Extremities of the Bones, that the Body be sustain'd.

Uses of the Protuberances.

The

(3.) The next part of the Bones, that
Cavities of three sorts. come under our Consideration, are the Cavities, which are either External or Internal: These Cavities are of three sorts, Holes, or *Foramina*; Trenches, or Furrows, and Sinusses.

(1.) A *Foramina*, or Hole, is a Cavity
Foramina, or holes. which is perforated in a Bone, or made up of two Bones join'd together, as may be seen in the *Basis* of the *Cranium*, lower Jaw, *Vertebra* of the Ribs. They are design'd for the passage of the Vessels and Nerves, which pass through them, also the great Cavity of the *Ischium* may be call'd a Hole.

(2.) A Trench, or Furrow, is not a Ca-
Trenches, or Furrows. vity through the Bone, but only a deep hole, or hollowness, long, or round, as the orbit of the Eye, &c. sometimes very shallow, as those in the inside of the *Cranium*, &c. some of a mean between both, as those in the Joints, to receive the Protuberances of other Bones; some call these Sinusses, but improperly.

(3.) A *Sinus* is a sort of Cavity in a Bone,
Sinusses. whereof the Orifice or Entrance is ve-

ry

Of the Bones in General.

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ry strait, and the bottom large, such are in the Frontal Bone, &c.

I shall declare the use of all these Cavities, when I Treat of each Bone in particular.

All the long Bones of the Body are hollow in the inside towards the middle, and contain a Marrow, which is only a heap of Membranous Vesicule, full of a fatty or oily Substance, call'd Meduller Glands; which, as I observed before, separated the more oily Particles from the Blood, so that the more saltish only remain'd, which has the Ossific Virtue of rendering the Bones hard: The Ends or Extremities are porous, somewhat like a Pumice Stone, containing a Meduller Juice, like thin Oil, and have very few Glands; it's probable that the Ligamentous strings entring the top of the Bones, divide and scatter the bony threads, which make it so porous.

The External Superficies of all Bones have a certain solid Cortex.

All the External Cavities which serve for Articulation, have at their Circumference an Eminence call'd a Lip,

*All long
Bones hol-
low.*

*Meduller
Glands.*

*Meduller
Juice.*

*Solid Cor-
tex in all
Bones.*

Lip, to which is fastned a Circular Ligament, which embracing the Head of the received Bone, fortifies the Articulation.

As for each particular Process and Cavity, we shall describe them in the Demonstrations of each particular Bone.

Before I mention the Articulation of the Bones, I think it convenient to observe these things.

*The Bones
not of the
same big-
ness in Wo-
men as in
Men.*

First, All the Bones are not of the same greatness, and that not only in Persons of different Stature, but also in those of an equal Height, or Stature; for some of these have their Bones smaller than others, and it's Beauty consists (as some have said it does) in the delicateness and smallness of the Bones, then Women have all the Reason imaginable to have a better Shape and Symetry than Men, by reason their Bones are smaller; the Bones also of their Face are finer and more smooth.

*Difference of
the Ossa In-
nominata.*

There's also a great difference between the Bones of the *Ossa Innominata*,

ta, which makes the *Pelvis*. In Men they are less and more unequal, but in Women larger, and smoother, to have a greater space to contain the Womb; also a Woman's *Os Sacrum* inclines more backwards than a Man's which makes their Buttocks more large.

We must also observe a difference in the Bones, according as we grow in Years; for from the Birth to the twentieth Year, or thereabouts, the Bones continually increase, and from that to the sixtieth they continue in the same stay, neither increasing or diminishing; but after that they daily diminish, by reason of the bony Fibres drying, approach nearer one another, and so must consequently have a less bulk.

Difference of the Bones according to Age.

The Colour of the Bones is not alike in all; for some have them very white, others less, but some almost greyish; so that if you take the same Pains in whitening two or three Skeletons, yet one will be doubtless whiter than the other.

Difference from the Colour.

It's

Perioſtion. It's true, as I have obſerved before, that the Bones have no ſenſe; yet they are Inveſted with a very ſenſible Membrane, call'd *Perioſtion*, as if we ſhould ſay a Membrane over or inverſing the Bone, it's very thin; all Bones have this, except the Teeth. I think there's a great Queſtion about its Uſe. Some affirm it's to convey bloody Veſſels to the Bones; but it's rather believed to be for the greater implantation of the Tendons of the Muſcles; for when you ſeparate the *Perioſtion*, the Muſcle comes off with it.

Articulation of the Bones.

I ſhall now proceed to the manner of the Articulation of the Bones; there's ſuch Art in the Conjunctions of the Bones, that they have ſerved as a pattern to many Artizans in their Curious Works; for they could find nothing in Nature more fit to copy by; and although there be ſo many various ways of Articulation, as almoſt Junctures, yet they are all neceſſary, otherwiſe Man could never move himſelf every way ſo compleatly as he does.

The

The Bones join'd together have either motion, or none, the former is call'd Articulation, the latter *Symphysis*, or growing together.

Articulation, is either for manifest, Articulation twofold. or obscure motion: The first is call'd *Diarthrosis*, or loose Articulation, the other *Synarthrosis*, or more close and compact.

Diarthrosis is Threefold, 1. *Enarthrosis*. 2. *Arthrodia*. 3. *Gynglimus*. 1. Diarthrosis threefold.

1. *Enarthrosis*, is when a large Enarthrosis. Head is received into a deep Cavity, as the *Os Femoris* in the *Acetabulum* of the *Ossa Innominata*.

2. *Arthrodia*, is when the Cavity Arthrodia. is shallow, and the Head of the received Bone also shallow and flattish, as the *Os Humeri*, with the *Scapula*, and the Bones of the *Metacarp* and *Metatarse*; with the first *Phalanx* of the Fingers and Toes.

Now the Bones which are Articulated by *Enarthrosis*, and *Arthrodia*, are capable of all sorts of motion, as upwards, downwards, forwards, back-

These two
all sorts of
motion.

backwards, and circularly ; yet the deeper the Cavity, and the more bony the Edges are, the motion is render'd more slow, and not so brisk and nimble as when the Cup is not so deep ; this is seen in the *Os Femoris*, and *Acetabulum*, for the *Os Humeri* being inserted in a more shallow Cup, is capable of all sorts of motion, and that to a great degree, yet about the Cup of the *Scapula* there are several Cartilages, which make it seem as deep as the *Acetabulum*, but at the same time by giving way, hinders not the very free motion of the *Humerus*.

Ginglimus
threefold.

Ginglimus, is when the same Bone both receives, and is received, and is Threefold. 1. *Ginglimus Proximus*. 2. *Longus*. 3. *Compositus*.

Proximus.

1. *Ginglimus Proximus*, is when a Bone is received by another, and receives the same, as the lower part of the *Os Humeri*, and *Ulna*.

Longus.

2. *Ginglimus Longus*, is when two Bones are join'd together according to their length, so that the one Bone having a Cavity in its side towards the end,

end, receives the head of the other, which has a Cavity likewise at its other Extremity, to receive a Protuberance of the first Bone, as the *Radius* and *Ulna*.

2. *Ginglimus Compositus*, is when a Bone receives one, and is received by another, as in some of the *Vertebrae* of the Back, where one receives the upper, and is received by the lower: *Ginglimus Compositus*, is also when a long Process of a Bone is inserted into another above it, and so turns in the Cavity as an *Axis* in a Wheel, as the second *Vertebra* of the Neck with the first.

As *Enarthrosis*, and *Arthrodia*, serve for all sorts of motion, *Ginglimus* serves only for Flexion, and Extension; yet in the *Radius* and *Ulna* it serves for Pronation and Supination.

When a Bone is join'd by double *Arthrodia*, it makes a sort of *Ginglimus*, as may be seen in the lower Jaw.

Synarthrosis, or obscure motion, is in the Ribs which have a little motion in their ends towards the *Vertebrae* in

Respiration; also most of the Bones of the *Tarsus* and *Carpus*, which in great pressure give way a little, for the more easie motion of the Part.

2. Symphy-
sis Three-
fold.

Symphysis, is only when the Bones are united without any motion at all, and is Threefold, as *Sutura*, *Harmonia*, and *Gomphosis*.

Sutura.

1. *Sutura*, is when the Bones are united together in their edges by little Points, or Teeth (as it were) unequally, as may be seen in the Bones of the *Cranium*.

Harmonia.

2. *Harmonia*, is an union of the Bones by a simple Line only, either streight or curved, as the Bones of the Nose, Face, Palate; but this is only in their outward part, for we always find them Internally Serratil, or Suture like.

Gomphosis.

3. *Gomphosis*, is when one Bone is fastned in another, as a Nail in Wood, so are the Teeth in the Jaws.

Some add to the *Symphysis* several other sorts of Articulations, as *Synchondrosis*, *Syssarcosis*, *Syneurosis*, vel *Syntenosis*.

Syn-

Of the Bones in General.

25

Synchondrosis, is when a Cartilaginous Substance interveens, as may be seen in the middle of the lower Jaw; which in young are two distinct Bones, but as the Ossific Liquor predominates, grow one; also the *Ossa Pubis* are united by it, so are the Bodies of the *Vertebrae* one to another.

Synchondrosis.

Syffarcosis, is when a Bone is fastned by Means of Flesh only, as the *Os Hyoides* in the Mouth, and the *Scapula* to the Ribs.

Syffarcosis.

Syneurosis, vel *Syntenosis*, is when Bones are united together by means of Ligamentous Parts, as the *Rotula* with the Bones of the Legs; but I think these are not properly Articulations.

Syneurosis.

The Bones of the Body in an Adult, are accounted 245. For Example, the Head has 64, the Trunk 57, the Arms and Hands 64, the Legs, &c. 60, which makes in all 245. Some perhaps may wonder why the Great Creator composed such a number of Bones; I Answer, how could the Hand or Arm perform all the Actions it does, and put it self in so many Thousand

Number
245.

Postures, had it not many Junctures and Articulations? For had the Part been compos'd but of one or two Bones, how Lame and Preposterously would it have acted? The same may be said of the Legs, &c. And if the *Spine* had not been made up of such a number of *Vertebrae*, how could we have bent, or mov'd it as we do? It was therefore convenient and necessary for the Perfection of Man and his Functions, to have as many Bones as he has.

Head 64.

The Head, as I said, is made up of 64 Bones, which are thus number'd, 6 proper of the Skull, 8 of the Ears, 4 in each, 3 Common of the Skull; Face 11, with the *Vomer*; *Os Hyoid* 1, lower Jaw 1, though some make it 2, Teeth about 32, which make 62; but if you add the *Ossa Spongiosa*, they make 64.

Trunk 57.

The Trunk consists of 57 Bones; *Vertebrae* 25, as 7 of the Neck, 12 of the Back, 5 in the Loins, and 1 in the *Os Sacrum*, which some say is made up of 5; 3 in the *Coccyx*; Ribs 24, *Sternum* 3, *Ossa Innominata* 2, which makes

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Place this between Page 26, and 27.

ONES.

with 1.
In whole Forminae
Auditoria are 8
Bones, 4 in each.
To which is annex'd
Oss. Spongiosa 2.
Oss. Frontalis.
Oss. Parietalia.
Oss. Temporalia.
Oss. Nasa.
Oss. Maxilla.
Oss. Palatina.
Oss. Vomer.
Teeth in both
Jaws 32.
Incisorii 8.
Canini 4.
Molaria 20.

Superior
are 11
pair
and odd one,
of Jaw.

Jaw 1.

A Table of the BONES.

The Bones of the Body are those; of the	Head,	Proper Bones 6, as,	{ <i>Os Frontis</i> 1. <i>Os Sincipitis</i> 2. <i>Occipitis</i> 1. <i>Temporum</i> 2.	{ In whose Foramina Auditoria are 8 Bones, 4 in each.	{ <i>Malleus.</i> <i>Stapes.</i> <i>Incus.</i> <i>Os Orbiculare.</i>																		
						Whose Parts are either of the <i>Cranium</i> , which has,	Common Bones 3 { <i>Os Sphenoides.</i> <i>Os Cribriforme.</i> <i>Os Jugale.</i>	{ To which is annex'd, <i>Os Spongiosa</i> 2.															
									Of the Bones of the Face,	{ In the Superior part are 11 Bones; 5 pair and an odd one, Upper Jaw.	{ <i>Os Triangularia.</i> <i>Os Lacrimalia.</i> <i>Os Mala.</i> <i>Os Nasi.</i> <i>Os Palati.</i> <i>Os Vomer.</i>												
												Lower Jaw 1.	{ Teeth in both Jaws 32.	{ <i>Incisivi</i> 8. <i>Canini</i> 4. <i>Molares</i> 20.									
															To which is Annexed, the <i>Os Hyoides</i> , join'd by <i>Symphysim</i> .								
															Neck, in which are 7 <i>Vertebrae</i> .								
															Breast, divided into the	{ Fore-part, in which are,	{ <i>Clavicles</i> 2. <i>Os Pectoris</i> 3.						
																		{ Lateral-part, in which are,	{ <i>Ribs</i> 24.				
																				{ Back-part, in which are,	{ <i>Scapulae</i> 2. <i>Vertebrae</i> 12.		
																						Loins, divided into the	{ Fore-part, in which are,
{ Lateral-part, in which are,	{ <i>Os Ilii</i> 2. <i>Os Coxendicis</i> 2.																						
		{ Back-part, in which are,	{ <i>Lumborum Vertebrae</i> 5. <i>Os Sacrum</i> , which some make 5. <i>Os Coccygis</i> 3.																				
				Superior, or Hands, divided into	{ <i>Os Humeri</i> 2. <i>Cubitus ejus</i>	{ <i>Radius</i> <i>Ulna</i>																	
							Lower-part, or Hand, strictly so called, whose Parts are,	{ The Wrist 8. <i>Metacarpus</i> 4. Fingers 15. To which are annex'd, some <i>Os Sefamoidea</i> .	{ Three in each.														
										Limbs, which are either,	{ Bones of the	{ <i>Thigh</i> <i>Patella</i>											
													Leg, strictly call'd,	{ <i>Tibia</i> <i>Fibula</i>									
															Inferior, or Feet, divided into	{ Lower-part, or Foot, strictly so call'd, in which is	{ <i>Tarsus</i> , Bones 7. <i>Metatarsus</i> 5. Fingers or Toes 14. To which are annex'd, <i>Os Sefamoidea</i> .						

makes up the number of 57. I once saw a Skeleton which had 13 Ribs on each side.

The upper Extremities, or Limbs, consist of 64 Bones, taking in the *Clavicula*, which I think we ought to do, ^{Upper Limbs 64.} since much of the motion of the Arms depends on them; there's 32 Bones in each Arm then, as *Clavicula*, *Scapula*, *Os Humerus*, *Radius*, and *Ulna*; 8 Bones of the *Carpus*, 4 of the *Metacarp*; and Bones of the Fingers 15, 3 in each, accounting the Thumb as one Finger, which added to the other Arm makes 64.

The Lower Extremities consists of ^{Lower Limbs 60.} 60, that is, 30 in each; as the *Os Femoris*, *Rotula*, *Tibia*, and *Fibula*; 7 in the *Tarsus*, 5 in the *Metatarsus*, and 14 in the Toes, which makes together with the other Leg 60.

Some augment the number, who make many of the *Os Hyoides*, 3 of the *Os Innominatum*, 2 of the lower Jaw, 5 of the *Os Sacrum*, and add the *Ossa Sessamoidea*, which are not often found, and then for the most part in the great Toes, which would then make up above 250.

Use of the
Bones.

I am come now to the last Consideration of the Bones in General, which is their Use.

They have many Uses; 1. They serve for the support of the Body, being as so many Beams or Pillars in a House. 2. For the Defence of some Noble Part, as the Skull for the Brain, Ribs for the Heart, Lungs, &c. *Offa Innominata* and *Sacrum*, which make the *Pelvis* for the Womb, Bladder, &c. 3. For the Progression and Motion of the Animal, of which with the Muscles, they are the only Instruments. 4. To give Shape and Figure to the whole Body; these are the General Uses, as for their Particular, we shall speak of them in the Demonstration of each particular Part.

Demon-

Demonstration II.

Of the Bones of the Skull.

WE now come to the Doctrine of the Bones in particular; we divide the Skeleton into three parts, as *Skeleton divided into three parts.* the Head, Trunk and Limbs.

By the Head we understand not only all the Bones of the Skull, but also those of the Face, even from the *Vertex* to the first *Vertebra* of the Neck; by the Trunk all that composes the Neck, Back, Loins, *Os Sacrum*, *Ossa Innominata*, *Sternum*, &c. By the Limbs those which make up the Arms and Legs, generally so called; of all which in order. The Head is subdivided into the Skull, properly so called, and the Face.

The Skull (I mean that upper part whose Bones compose, and make up a large Cavity, which contains the Brain, in which you must consider its Figure altogether) is globous, some-
Figure of the Skull.

what long, but flattish towards the sides, for the better Situation of the Temporal Muscles; which being on, make it look more round.

*Skull, two
Tables.*

*Diploe,
what.*

All the Bones of the Skull are made up of two *Lamine* or Plates, call'd Tables, one Internal, the other External, between which lyes a Medullar Juice, of a reddish Colour, call'd the Pith, or Diploe, which is very discernable in young Persons; but as we grow in Years, the Ossific Liquor invading, it bonifies.

*Cause of the
Furrows.*

The Exterior and Superior Superficies of the *Cranium*, is very smooth, and polished, having few inequalities; but where the Sutures are, the Internal Superior Superficies is not so equal, having many little *Sulci*, or Furrows, which are caused by the Vessels of the *Dura Mater*, when the Skull is but Membranous, being then capable of receiving any Impression, that the Pulsation of the Vessels give it, so make themselves Furrows; but its Internal Inferior Part is very unequal, by reason of the many Productions and Cavities found there.

The

The Bones of the Skull.

31

The *Cranium* has many *Foramina*, Foramina in General. which give way or passage to the Vessels passing and repassing, which fill up these holes so close, that no Fumes or Vapours, as the Antients believed, can get in, or come forth, unless by the Vessels themselves: we will shew all these holes, at the latter end of this Demonstration.

It's a Question, whether it be the *Cranium*, which gives greatness to the Brain; or whether the Brain gives form to the *Cranium*; I Answer, that The bigness of the Cranium, depends on the Brain. the bigness of the *Cranium* depends on that of the Brain, for two Reasons; First, the *Cranium*, while Membranous, especially towards the Sutures, extends it self more or less, as the Brain increases: The Second, is that the *Cranium* is not totally Ossified till the Brain is arrived to its full Magnitude; for we see in an Infant new-born, that although the Brain be perfect, yet at the same time, the *Cranium* is only Cartilaginous about the Sutures; though bony in the middle of every Bone, nay, the *Fontanella* does not Ossifie under some Years; from whence
also

also it is, that in Labour these Bones, as I have before observed, give way, and fold over one another, for the more easie *exit* of the Infant out of the Womb.

Sutures,
twofold.

The Bones of the *Cranium* are join'd together by Sutures, which are of two sorts, true, or false; or to speak more properly, common, or proper.

Proper,
three.

The Proper are ~~Eight~~ *Three*.

(1.)
Coronalis.

1. *Coronalis*, (*vel Frontalis*) because the Antients used to wear their Garlands on that part of the Head, it reaches from one Temporal Bone to the other, joining the *Os Frontis* to the *Ossa Parietaria*.

(2.)
Lambdoides.

2 *Lambdoides* being like the Greek Letter Λ , others call it *Triangularis*; this Suture is seldom wanting, whatever the rest are; it begins at the *Basis* of the *Os Occipitis*, and ascends obliquely to the middle of the back-part of the Head, and descends again to the other side of the Head; the Point in the middle is call'd *Vertex*, by reason the Hair on the Scalp commonly turns there; it joins the Occipital Bone

Vertex,
what.

to the Bones of the Temples, and *Ossa Parietaria*.

3. *Sagittalis*, because it runs length- (3.)
ways as an Arrow; it begins at the *Sagittalis*.
Vertex of the *Sutura Lambdoides*, and
marching strait forwards to the mid-
dle of the Coronal Suture; in Chil-
dren it divides the Coronal Bone, and
goes quite to the Nose, which as we
grow in Years ~~vanishes~~; yet I have
seen it in the *Cranium* of some A-
dults.

The Sutures being so united toge-
ther, make up a Figure almost like
this $\curvearrowright - \curvearrowleft$.

Some of our Modern Anatomical
Professors, will have the Sutures to
be Serratil only in the Superior Ta-
ble, but join'd by Harmony in the
Lower, but it's always found to the
contrary.

The Common are Five, or more; *Common,*
these are the Chief, 1. The Suture *five.*
Squamosæ, or Scale-like; because ap- *Squamosæ.*
ply'd as one Scale on another; they
are two, one on each side, which a-
rise from the outside of the Mastoid-
process, and circumscribing the Tem-
ple-

ple-bones, descend Circularly towards the *Basis* of the Ears.

Whatever Anatomists say, I think them true Sutures, being Serratil as well Internally, as Externally.

Orbalis.

2. *Orbalis*, it begins at the top of the *Sutura Squamosa*, and descending obliquely towards the Orbit of the Eye, crosses on the top of the Nose, so passes over the other Eye, and so on to the other Squamous Suture.

Nasalis.

3. *Nasalis*, which divides the Bones of the Nose.

Basilaris.

4. *Sutura Basilaris*, which separates the other Bones from the *Os Basilare*.

Ethmoides

5. *Sutura Ethmoides*, seu *Cribriformis*, dividing this Bone from the *Os Frontis*; some say that these Four last are rather *Harmonia*, than *Sutura*, but Demonstration shews the contrary.

Use of the Sutures.

The Sutures have many uses, the principal are these; 1. Many Ligamentous Fibres pass through them from the *Dura Mater* to the *Pericranium*, which suspends the *Dura Mater*, so are a sort of hinderance of too violent Concussions of the Brain, in any great motions of the Body; for by these

these Fibres the Brain is kept more tight; it's by this Communication, that when the *Pericranium* is wounded, an Inflammation often arises in the *Dura Mater*, as if it had received some offence it self: These Fibres also, by suspending the *Dura Mater*, and keeping it close to the Interior Surface of the *Cranium*, the Arteries in the Cortical part have a freer motion, which would be somewhat impeded, if it fell on the Brain. 2. They give passage to several Vessels, that are passing and repassing to the Diploe, for the Nourishment of the Bones of the *Cranium*. 3. They are of use in hindering Fractures from passing further than one Bone, for they always stop at the Sutures, which if the Skull were but one continued Bone, the Fracture would be apt to run over all the *Cranium*, as may be seen daily in any Earthen or Glass Vessel, when crackt by a stroke, it commonly runs almost quite over, or round. Some say, a fourth Use is, to give a vent or breathing to many Fuliginous Vapours gathered within the *Cranium*, but I much question

question this use; yet some say, that many who have had their Sutures too close, have been subject to insupportable Head-aches, Transpiration having been stopt, as they say; but I rather think it proceeded from the pressure of the Vessels which pass through them, which causing an Obstruction of the flowing Liquors, was a cause of these Pains.

*Some have
had no Su-
tures.*

There are many Observations in several Authentick and Learned Authors, of some who have had none, or very few Sutures, and others who have had more than usual. I saw a Skull lately in the Hands of an Ingenious Chirurgeon, my very good Friend, which had a Suture running transverse the Occipital Bone, and the Sagittal pass'd quite through the *Os Frontis*, and it was the Skull of an Adult; such is the various Disports of Nature; also in very Old Age the Sutures are almost obliterated, the Ossific Liquor then predominating.

*How the
Sutures are
made.*

Embryons have no Sutures, or at least not to be well distinguished, their Skulls being wholly Membranous; so while

while the Ossific Liquor, (which as I have said, begins at a point, &c. in the *Cranium*) insinuates it self along the bony Threads, and by degrees hardens them, some Fibrous and Vascular Strings passing from the *Dura Mater* to the *Pericranium*, hinders in those places the bony Liquor from uniting, so forms these Seams or Sutures; for in a *Fœtus* the Skull being as yet Membranous in its edges, wrap, or fold themselves as it were one over another, to take up less room in the Birth; for had the Skull been totally Ossified before the Birth, the Infant would for the most part endanger the Life of the Mother; this may be daily seen in young Children, where the Skull is wholly Membranous in the top of the Head between the Coronal and Sagittal Sutures, which place is call'd *Fontanella*.

Fontanel-
la, what.

The Bones of the Skull are either Proper or Common; the Proper are Six in number.

1. The *Os Frontis*, or *Coronalis*, the Forehead-Bone; of a Semicircular Figure,

Proper
Bones of the
Skull, Six.

gure, in its superior part, situated in the Superior part of the Face, and Anterior of the *Cranium*, bounded above by the Coronal Suture from the *Ossa Parietaria*, on the sides by the *Ossa Temporum*, below by the *Transversalis*, or *Orbalis* from the Nose, Eyes, &c.

The things to be consider'd in this Bone, are its Cavities and Proccesses.

Its outside is smooth, as are most of the Bones of the *Cranium*, no Tendons or Ligaments being inserted here.

1. Os Frontis.

The Ossification begins in this Bone at two Points, between the *Lamina* of this Bone there's a Cavity call'd *Sinus Frontalis*; it's oft times double, which by two small *Foramina* enter into the Nostrils; this *Sinus* makes the inside of this Bone arise in a ridge, which begins about the top of the Forehead, where the Hair grows not, and reaches to the *Crista Galli*; for which reason we must not Trepan here, lest we offend the *Dura Mater* on each side the ridge, whenas the middle is not perforated by much; the upper *Lamina* of this coming to the Eyes, where turning

turning inwards, makes up part of the Orbit on the upper side: This *Sinus* is lined with a thick Membrane full of Glands, which separate a *Mucus* to moisten the Nose; in Brutes it's very large, but not so in Men; yet once I saw a Skull which had it extreamly large, and divided in four or five Cells, quite round the *Basis* of the *Os Frontis*, so that the Internal Protuberances almost hid the *Crista Galli*; yet sometimes this *Sinus* is quite obliterated, and the Membrane turn'd bony, as the *Offic* Liquor increases, and we incline in Age.

In its lower part over each Eye is a *Foramina* small *Foramen*, through which passes a Branch of the five pair of Nerves to the Musculous Flesh on the Forehead.

It has Four Processes; the two greater at the Internal *Canthus* of the Eyes, the other two at the less; its inner *Lamen* about the Eye-brows towards the Nose, bunches inwards, so causes a hollownes there, which is part of the *Sinus Frontalis*.

2. The *Os Occipitis* is opposite to the Coronal, in the hinder part of the Head,

D

Head,

2. Os Occipitis.

Head, it's the thickest and strongest Bone of the Head; the reason whereof is this, we having no Eyes behind, Nature has framed it of a thicker consistence, to the end it may the better resist any stroke or blow it receives; it's five-corner'd, join'd to the *Ossa Parietaria* by the Lambdoid Suture, and to the *Ossa Temporum* by the Squamous Sutures, and it's bottom to the *Os Sphenoides*, by a sort of Harmony.

The things to be consider'd in this Bone, are its Sinusses, *Foramina*, and Processes.

*Sinusses, or
Sulci.*

Its Sinusses, or rather *Sulci*, are many, two on the External part just behind the *Foramen Medullare*; and seven in the Internal Superficies, the two largest of which contain the Protuberances of the *Cerebel*, the other are of small moment.

Foramina.

It has five *Foramina* or Holes, the lowest and largest call'd *Foramen Medullare*, the Spinal Marrow passing by this hole to all the *Vertebrae*; the other four are less, and only serve for the exit of the Vessels; two give passage
to

to the Nerves of the Tongue, and two to the *Arterie Cervicales*; these are proper *Foramina*, there are two others which are common both to it and the other Bones, one on each side the *Os Petrosum*, which give passage to the eighth pair of Nerves call'd *par vagum*, and to the two Internal Jugular Veins.

It has five Processes, four of which are on the outside by the *Foramen Medullare*; the two innermost are call'd *Condyli*, and are received by the two shallow *Sinus's* of the first *Vertebra* of the Neck, serving for the Articulation of the Head; in its Internal part it has a long Protuberance or Ridge, which ascends in the middle from the *Foramen Medullare*, and parts the Protuberances of the *Cerebellum*, this is its fifth Process.

There's another small Protuberance or Process, which is not describ'd by any Author; it lyes between the *Condyli*, from it passes a Ligament, which joins it to the first *Vertebra* of the Neck.

A sixth Process, not describ'd by any Author.

It has also several small Prominences towards its *Basis* on the outside, some Tendons being inserted there.

Third and fourth are the *Ossa Sincipitis, vel Parietaria*, because alike, or forming the Walls of the *Cranium*, as it were; they are the thinnest Bones of the Head, are join'd by the Coronal Suture to the *Os Frontis*, to the Occiput by the Lambdoidal, to the *Ossa Temporum* by the *Squamosa*, and to one another by the *Sagittalis*: They are very smooth on their outside, but somewhat unequal within, having many small *Sulci*, or Furrows, for the reception of the Vessels of the *Dura Mater*; they are thinnest towards the Sutures, as are all Bones of the *Cranium*; these Furrows are thus caus'd, while the Skull is Membranous, the Vessels by their Pulsation make themselves these Furrows.

Figure.

Bregma, what.

These Bones are of a Quadrangular Figure.

Anatomists call that the *Bregma* of the Head, where these two Bones are united together by the Sagittal Suture, towards the Coronal Bone.

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The fifth and sixth Bones are call'd *Fifth and sixth, Offa Temporum*, so call'd à *Temporibus*, because as a Man grows old, the Hairs on the Temples whiten the soonest; they lye on the sides of the Skull, being join'd above by the Squamous Sutures to the *Offa Parietaria*, before to the Process of the first Bone of the upper Jaw, below to the Sphenoidal Bone, and behind to the *Os Occipitis*; their superior part is smooth, thin, and semicircular, so sometimes call'd *Offa Squamosa*; their inferior thick, and hard, and call'd *Offa Petroso*.

Offa Squamosa & Petroso. Sinusses.

Their Parts to be consider'd, are Sinusses, Processes, and Holes.

These Bones have two Sinusses each; the first is large, and lin'd with a Cartilaginous Substance, plac'd between the *Meatus Auditorius*, and its long Process, which makes up part of the *Os Jugale*, call'd *Sinus Glenoides*, and receives one of the Processes of the lower Jaw, call'd *Condylus*; the other two are less, and lye on the inside of the aforesaid long Process.

Glenoides.

Each Bone has four Processes, three External, and one Internal.

Processes.

Styloides.

The First is call'd *Styloides*, being slender, sharp, and long; some take it to be an Appendix only; in Infants it's Cartilaginous; those Animals which want these Processes, their *Os Hyoides* have a double Horn, or Process which supplies its place, many Muscles arise from it.

Mastoides.

Secondly, *Mastoides*, or *Mamillaris*, because like a Cow's Teat; 'tis blunt, thick, and short, hollow within, plac'd at the bottom of the Auditory passage.

Jugalis.

Thirdly, *Processus Jugalis vel Zygomaticus*, very long, somewhat broad, and curved, it's thin, arising a little from the outside of the *Sinus Glenoides*, and meeting with another long Process belonging to the first Bone of the *Maxilla superior*, are join'd together by an oblique Suture, and make up the *Os Jugale*, or Bridge.

Petrosus.

Fourthly, The Internal Protuberance is call'd *Petrosus*, from its hardness, or *Auditorius*; it's somewhat long, and jets out towards the inner *Basis* of the Skull, or *Os Sphenoides*; it's hollow, and contains the Instruments

The Bones of the Skull.

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ments of Hearing: It has four little Bones within its Cavity.

Four small
Bones of the
Ear.

1. *Incus*, or the Anvil.
2. *Malleus*, the Hammer.
3. *Stapes*, the Stirrup.
4. *Os Orbiculare*, which lyes just on the top of the *Stapes*.

These Bones are as big and perfect at the Birth, as in Adults; they are Articulated after this manner, the *Apophysis* of the *Malleus* is fastned to the *Tympanum*, and Articulated by its Head in the Cavity of the *Incus*; this *Incus* has two Feet, the shortest of which is plac'd on the *Tympanum*, and the longer on the *Stapes*, on which lyes the *Os Orbiculare*.

Manner of
Connexion.

These Bones have many *Foramina* Foramina.
each.

The First is External, and call'd *Foramen Auditorium*, seu *Meatus Auditorius*, by which the Sound enters to the Organs of Hearing.

Meatus
Auditori-
us.

Its Second, Is narrow, short, and oblique, by which the Jugular Vein enters the inner Cavity of this passage.

The Third, Is between the Styloid and Mastoid Process, and ends in that which goes from the Ear to the Mouth.

Common
Bones, three.

The common Bones are three.

Os Sphenoides.

I. *Os Sphenoides, Basilare, vel Cuneiforme*, some call it *Polyforme*, from its strange Figure; it's not call'd *Cuneiforme*, as if it were like a Wedge, but by reason it's seated between the Bones of the Skull and upper Jaw; in Infants it consists of two or three Bones; it's very thick at its *Basis*, but thin towards the Temples. It's join'd to, or touches all the Bones almost of the *Cranium*, and some of the Bones of the upper Jaw, to which it's fastned by the Sphenoid Suture.

Its Parts to be consider'd, are either Processes, Sinusses, or *Foramina*.

Processes.

It has eight Processes, four Internal, and four External.

Clinoides.

The Internal are call'd *Clinoides*, they resembling the Feet of a Bed; these with the deprest *Sinus* in the middle, make up the *Sella Turcica*, being like the Seat of a War-saddle, on which

Sella Turcica.

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which lyes the *Glandula Pituitaria*.

Two of the External are call'd *Pterigoidei*, seu *Aliformes*, or the Bats Wings, being like the Wings of a Bat; the other two have no Name.

Pterigoidei.

The Sinusses are many. It has one in each Process, call'd *Pteregoides*, to give way to the *Musculi Pteregoides Interni*: It has also a very large one in the middle of the *Sella Turcica*, to receive the *Glandula Pituitaria*.

Sinusses. Pteregoides.

Within this Bone lyes a true *Sinus*, call'd *Basilaris*, which have the same Glands, and separate the same Juice, as the *Sinus Frontalis*, and has the same use.

Basilaris.

The *Foramina*, are either Common, or Proper.

Foramina.

The Common are those which lye between it and the *Ossa Petrosa*, through which the Jugulars pass; the proper are twelve, six on each side; the first pair is call'd *Transcolatores*, which serve as a discharge to the *Glandula Pituitaria*; the second *Foramina Optica*, by which passes the Optick Nerves; the third *Motoria*, by which

Transcolatores.

Optica.

Motoria.

passes

Croto-
phites.
Gustatoria.
Carotides.

passes the Motory Nerves; the fourth call'd *Crotophites*; the fifth *Gustatoria*, by which the Tasting Nerves pass; the sixth call'd *Carotides*, by which the Carotid Arteries pass.

Os Cribri-
forme.

The second Common Bone is call'd *Os Cribriforme*, being perforated like a Seive, the Fibrils of the Olfactory Nerves pass through these Holes; it's seated at the middle of the *Basis* of the Forehead, to which it's join'd by *Harmonia*; it's also join'd to the two Bones of the upper Jaw, and behind to the *Os Sphenoides*.

Crista Gal-
li.

On its inside it has an almost Triangular Process, call'd *Crista Galli*, the Coxcomb; it arises just where the Process of the *Sinus Frontalis* ends, and reaches about half way in the middle of the Bone; the *Falx* which divides the two *Lobes* of the Brain, is tyed to the point of this Process.

Septum
Nasi.

On its outside, just opposite to the *Crista Galli*; it has another very thin, but hard Process, call'd *Septum Nasi*, dividing the Nostrils.

To

The Bones of the Skull.

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To the *Os Cribriforme* is annex'd two other very fine and thin Bones, one in each Nostril, call'd *Ossa Spongiosa*, they be wrapt up, as it were, in many folds, and lin'd with a Membrane made up of the Expanded Fibres of the Olfactory Nerves; so that those Creatures, who have more of these *Lamine*, have a more exquisite smell, as Cats, Greyhounds, &c. for a Man has not above three or four folds, whereas the above-nam'd Creatures have very many; so that it's not difficult to judge of the acuteness of the smell, from the multiplicity of these folds; most Anatomists consider them as parts of the *Os Cribriforme*, using the one for the other promiscuously; but I think them to be different Bones.

The third Common Bone is call'd *Os Jugale*, *Os Jugale*, vel *Zygoma*, by some the Bridge, or Yoak-bone; it's not one distinct Bone, but made up of a long Process of the Temporal Bone, and another of the first Bone of the upper Jaw.

It's

*The Bones of the Skull.**Situation.*

It's situated on the outside of the Face, under the External *Canthus* of the Eye, there's one on each side.

Use.

Its use seems as if ordain'd by Nature, for the defence of the Temporal Muscle which passes under it; it also gives Origination to the *Musculi Masseteres*.

Demon-

Demonstration III.

Of the Bones of the Face.

IF the structure of the Bones of the *Cranium* be worthy our Admirati-
on, the Composition of the Bones of
the Face, which now comes under our
view, is no less surprizing; for al-
though that contains the Brain, which
is one of the most Noble Parts of the
Body; yet the Face where most of the
Senses are lodged, and for many Rea-
sons may be call'd the Image of the
Soul, since most, if not all the Passions
of the Mind, are fully demonstrated
in the Face, cannot merit less, especi-
ally in the wonderful structure of the
Bones which compose it. The Face
is also the Seat of Beauty, which
Charms and Attracts the Eyes of all
to behold it; and nothing contributes
more to this Beauty than a good For-
mation, and true Symmetry of the
Bones: *Ex. gratia*, if the lower part
of

*The Bones
give Figure,
Form, and
Beauty to
the whole
Body.*

of the Coronal Bone bunch out too much, it makes them Beetle-brow'd, as we call it: If the Bones of the Nose be too large, and rising from the Face, it makes them Hawk-nosed: If the lower Jaw be too sharp, or pointed, it makes an Out-mouth, and so of the rest; yet we may say the same of the Bones of the whole Body, they giving, as I have said, Shape and Figure to all; so that if they be any way deform'd or unproportioned, that part must of necessity be disfigured.

Division.

The Bones of the Face are divided into those of the upper and lower Jaw.

Bones of the upper Jaw, eleven.

The Bones of the superior Jaw are eleven in number, five on each side, and an odd one.

1, 2, Ossa Triangulares.

The *Ossa Triangulares* are big, of a hard and solid Substance, in Figure triangular, wherefore so call'd, plac'd on the lower side of the outward *Canthus* of the Eye's Orbit, the middle are advanced out, and rising, which forms the Balls of the Cheeks: One of their Angular Processes, as I said before, makes up the *Os Jugale*, being join'd with

with the long Process of the Temple-Bone ; they also make the inferior part of the Orbit of the Eyes, and is united to four Bones, viz. the *Coronalis*, *Sphenoides*, *Maxillary*, and *Os Petrosum*.

They have three *Apophyses* each; one ^{Apophisis, three.} of which makes an eminence, which forms the lesser Angle of the Eye ; the other advancing towards the Nose, makes the greatest part of the inferior Lip of the Orbit ; the third may well be call'd *Processus Fugalis*, which I have already mentioned.

The *Ossa Lachrimalia*, seu *Unguis*, ^{3, 4,} are very little and thin, in shape of a ^{Ossa Lachrimales.} Nail of a Man's Hand, seated in the great *Canthus* of the Eyes, within the Orbit ; there's a small *Foramina*, in each call'd *Lachrimale*, in which the Lachrimal Duct passes to the Nose, ^{Puncta Lachrimalia.} also through this hole passes a Branch of the fifth pair of Nerves, to the inner Membrane of the Nose.

These Bones are so small, that they be easily lost.

The *Ossa Mala*, some call them ^{5, 6,} *Maxillares*, are the thickest, greatest, ^{Ossa Maxillares.} and

and spongiest of all the Bones of the Face, and makes up the greatest part of the Cheeks and Palate.

Alveoli.

Sinus Max-
illare.

7, 8,
Ossa Nasi.

9, 10,
Ossa Palati.

Parts to be consider'd in these Bones, are first, many deep Cavities which are in their lower edge, call'd *Alveoli*, or Sockets, in which the Teeth are fastned: Secondly, each has an Internal *Sinus*, which is lin'd with the same sort of Glandulous Membrane, as the *Sinus Frontalis*, and of the same use, and is call'd *Sinus Maxillare*. There's also another long one, which runs along over the Roots of the Teeth, in which the Vessels pass which serve for the Nourishment of the Teeth.

The *Ossa Nasi* are two long, hard, and somewhat thick Bones, of a Pyramidal Figure each, being join'd, they make up the bony or superior part of the Nose; their lower Extrmities are somewhat unequal, for the more strong Connexion of the Cartilages of the Nose with it; they are join'd together by *Harmonia*.

The last pair are call'd *Ossa Palati*, are very broad, but thin, and being join'd by *Harmonia*, make up the Roof of

The Bones of the Face.

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of the Mouth; they are join'd to the *Ossa Maxillares* forwardly, and backwardly, sideways to the Pterygoid Apophisis, by the Sphenoidal Suture: Each Bone has a hole forwardly, call'd *Foramen Gustativum*.

The eleventh Bone of the upper Jaw is call'd *Vomer*, by reason the Antients say it resembles a Plough-share; it's situated in the middle over the Palate, edgeways, and is, as it were, a sort of *Septum*, dividing the interior part of the Nostrils.

11,
Os Vomeris

Before I pass to the lower Jaw, 'twill not be amiss to give a Description of the Orbits of the Eyes; they are two great Cavities plac'd at the inferior part of the *Os Frontis*, which serve as Habitations to the Eyes, and to defend them against all Injuries; their external part is quite round, but internally they grow Pyramidal, having at their bottom many perforations for Vessels, &c.

Orbita Oculorum

Each Orbit is made up of part of six different Bones, which altogether composes its Cavity.

Each Orbit
made up of
six Bones.

E

Five

Five of which are Common, and one Proper, which is call'd, as I have already demonstrated, *Os Unguis vel Lachrimale* : Of the Common, three belong to the *Cranium*, and two to the Face ; the first of those of the *Cranium*, is the Coronal, which forms the superior part ; the second is the Ethmoidal Bone, which forms part of the internal side next the Nose ; the third is the Sphenoidal, which makes up part of the internal Cavity ; the two of the Face compose all its lower part, the *Os Triangulare* forming that part towards the lesser *Canthus*, and the *Maxillare*, that next the greater.

Inferior
Jaw.

The lower Jaw is but one continued Bone in Adults, but in young Bodies is composed of two join'd together in the fore-part, by *Syncondrosis* ; they unite, and become one about the seventh Year, of a somewhat Circular Figure, or rather like the Greek Letter *U*, smooth and polished without, but a little rough within, several Muscles being inserted, and arising from thence.

This

The Bones of the Face.

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This in all Creatures is only moveable, except as some affirm in the Crocodile, who moves the upper only.

The Parts to be consider'd in this Bone, are its Processes, *Foramina*, and *Alveoli*.

It has two large Processes at each end, the first call'd *Condiloides vel Articularis*, it's received into the *Sinus* of the *Os Petrosum*, and fastned there by a strong Membranous Ligament; the motion of the Jaw depends on this Articulation; the other is call'd *Corone*, which from a large *Basis* ends in a sharp point; it lyes under the *Os Jugale*, the Tendon of the *Musculus Temporalis* is inserted into it; these Processes are in the superior part of the Bone. In its inferior part, just where it begins to turn up on each side, are its Angles, to whose outward part the *Masseter* Muscles are inserted, and the *Pterygoidei* to the interior.

This Bone is somewhat hollow within, containing a Meduller Juice.

It has four *Foramina*, two of which are at the Roots of the Processes in the inside, in which a Branch of the fifth

pair of Nerves, together with the sanguifying Vessels enter, and pass under the Roots of the Teeth, distributing Branches to each as they pass; the other two are in the fore-part of the Chin, out of which come two Twigs of the aforesaid Nerve, which are spent on the Muscles and Skin of the lower Jaw. It has also its *Alveoli*, or Sockets for the Teeth, as the upper Jaw.

Alveoli.

Uses.

The Uses of the lower Jaw, besides its adding to the Beauty of the Face, is to help Mastication, and serves to form the Voice.

Teeth.

The Teeth are the hardest of all the Bones of the Body, having a peculiar *Cortex*, are smooth, and fix'd in the *Alveoli* of the Jaws, by *Gomphosis*.

Number 32.

They are in number about Thirty-two, of three Ranks or Orders.

Incisores 8.

1. The *Incisores*, or Cutters, four in each Jaw plac'd in the fore-part, and have commonly but one Phang or Root; they are also call'd by some *Risores*, they appearing when we laugh.

2. *Canini*,

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2. *Canini*, or Dog-teeth, by some Canini 4. the Eye-teeth, two in each Jaw, one on each side the *Incisores*; they have sometimes two Roots, but strong, and crooked.

3. The last are call'd *Molares*, or Molares. Grinders, in number about twenty, five on each side the *Canini*, and have two or three Phangs.

The Teeth are not perfected all at once, nor appear before a certain time, when they force their way through the Jaws and Gums; yet there are Observations of some who have been Born with Teeth; the first that appear in Children, are for the most part the superior Incisives, which is sometimes sooner, sometimes later, but generally about the seventh, eighth, or ninth Month; then in time come the *Canini*, and lastly the *Molares*: When the Teeth come to about the number of twenty, there appears no more till about the seventh Year, about which time there appears four more: At fourteen there comes four more, and towards the twentieth Year the last four, which are call'd Teeth of
E 3 Wisdom,

Wisdom, because they come at an Age, when we ought to be Wise and Serious.

The first twenty Teeth are call'd Milk-teeth, which fall or shed about the seventh Year, and new ones come in their places.

I have seen some who have had new Teeth, when they have been upwards of Sixty Years, but this is not very usual.

Uses.

The Teeth have several Uses; first, they serve for Mastication, which is its chief, the Teeth being as so many Mill stones which bruise and grinde the Aliment, the *Incisores* cut the Morfel, and the *Molares* grinde it. Secondly, to help Articulation of the Voice, for we see those that lose their Teeth, especially the *Incisores*, do not speak plain, but lisp, as we call it; they are also Ornamental.

Os Hyoides.

Since we are demonstrating the Bones of the Head, it will not be amiss to mention the Bone which is at the Root of the Tongue, being united only by Muscles; it's call'd *Os Hyoides*, or *Ypsiloides*, by reason it's like the Greek ψ . It

It consists of two parts, the Body and Horns which receive the *Epi-glottis*.

The principal Use of this Bone, is *Use.* not to support the Tongue, as some pretend, but rather to facilitate the entrance of Air into the *Trachea Arteria*, also of the Aliments into the *Oesophagus*; many Muscles also are inserted into this Bone.

The Bones of the *Cranium* being join'd together, there are many *Foramina* or Holes, through which Vessels pass and repass; to begin then in order, these appear first, and are commonly by pairs.

Foramina, in the whole Cranium.

1. There's a Hole which lyes between the *Crista Galli*, and the Process of the *Sinus Frontalis*; it's a single Hole, and mentioned by no Author as I find: It may well be call'd *Foramen Nasale, vel Crista Galli*; through this Hole a Vessel passes from the *Sinus Longitudinalis* of the *Dura Mater* to the Nose, where it becomes double, one to each Nostril; this is the way how in great Commotions of the Brain,

Foramen, Crista Galli.

the Blood sometimes streams out, and that with violence, the Vessel being then more turgid.

Foramina Ethmoides 2. The *Foramina* in the *Cribriforme* Bone, for the passage of the Olfactory Nerves, and may be call'd *Foramina Ethmoides*.

Foramina Opticorum 3. The *Foramina Opticorum Nervorum*, number two.

Foramina Motorii. 4. Two for the *Nervi Motorii*, and other Vessels, they are very large long Holes.

Foramina Temp. 5. Two call'd the *Crotophite*, or Temporal Holes, through which passes two Branches of the fifth pair of Nerves, to the Temples.

Foramina Carotidum 6. Two for the *Arteria Carotides*, which lye just by the sides of the lower parts of the *Sella Turcica*.

Foramina Duræ Matris. 7. Two small ones, one on each side the Carotide Holes, call'd *Foramina Duræ Matris*.

Foramina Auditoria. 8. Two for the Auditory Nerves, which pass into the *Antra Auditoria*.

Foramina Jugul. 9. Two for the Jugular Veins.

Foramina Linguales. 10. Two call'd *Linguales*, through which passes Vessels to the Tongue.

11. Two

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11. Two more for the Cervical Arteries, and also for the *exit* of some Nerves of the fifth pair.

Foramina Nervor. paris 5.

12. Lastly, the great one, call'd *Foramen Medullare*, for the passage of the Spinal Marrow.

Foramen Medullare.

All these Holes are in the *Basis* of the Skull, or Internal Part.

There are also several *Foramina*, of great use in the External Part.

1. Are two *Foramina*, or Holes, one by the edge of the orbit of each Eye, call'd *Orbicularia*, through which passes a Branch of the fifth pair of Nerves, to the Lips.

Foramina Orbicularia.

2. The *Foramina seu puncta Lachrymalia*, in the Lachrymal Bones through which the Tears pass into the Nose.

Foramina Lachrymalia.

3. The *Foramina Palati*, they are plac'd in the fore-part of the Roof of the Mouth next the Teeth, the thinnest *Mucus* of the Nose is convey'd through these two Holes.

Foramina Palati.

4. Two in the back part of the Palate, through which Branches of the fifth

Foramina Alia.

fifth pair of Nerves pass to the Palate.

As for the *Foramina* of the lower Jaw, I have already mentioned them in the Description of that Bone.

Demonstration IV.

Of the Bones of the Trunk.

THE next part of the Skeleton Division, threefold. that is to be Demonstrated, is the Trunk, which we shall divide into Three Parts, as the Back or Spine, Ribs and Breast; and lastly, the Hips, or *Ossa Innominata*.

The Back, or rather Spine, is composed of many Bones, call'd *Vertebrae*, Vertebrae. or Spondils, all which being join'd or united together, may not unfitly be term'd a Pyramid of Bones; but before we Treat of them in particular, it will be requisite to say something of the Spine in General, in which several Of the Spine in General. Things are to be taken notice of.

1. All the Bones, from the first of the Neck, to the very Extremity of the *Coccygis*, are call'd the Spine, I suppose from the acute Processes each *Vertebrae* have, call'd *Spinales*. Denomination.

2. The

Figure.

2. The figure or shape of the Spine, is of great Consideration, for if you look on its Anterior or Posterior Parts, it appears streight; but if you look on its Lateral Parts, its curved in and out: First, the Spondils of the Neck bend inwards, for the better support of the *Oesophagus*, also to sustain the Head in an *Equilibrium*, then the *Vertebrae* of the Back jet themselves outward, to augment the Capacity of the *Thorax*, that the Heart and Lungs may have a larger room to play in; towards the Loins again, they bend inwards, not only to defend the great Vessels which lye on them, but also to Counterballance the better the weight of the Body; the *Os Sacrum* bends outward, that the *Pelvis* be enlarged to contain the Bladder, Womb in Women, and *Intestinum Rectum*; and lastly, the *Os Coccygis* bends inwards, that it might not be offended when we sit down, also that the *Intestinum Rectum* be tyed to it.

Bodies of
the Verte-
brae.

The third Thing to be observed in General, or Common to all, is that the Bodies of each *Vertebra* are of a spongy

spongy Substance, made up of many irregular bony Threads, containing a Medullar Juice, of a Convex Figure forwards, but Concave backwards, and plain above and below, being only join'd with Cartilages, which makes them Contiguous, & unites them there, which gives them a more easie motion, the Body also of each *Vertebra* gradually increases in bulk, till to the very *Os Sacrum*; for it's reasonable that those which support, should be larger than those which are supported, and at the same time as the *Spinalis Medulla* passes down, it grows less, losing of its bulk as the Nerves pass from it, and the *Foramina Medullares* of each *Vertebra* consequently less.

4. Each *Vertebra* have five Things to be consider'd, which belong to all;

1. Each, as I have said, have a Body.
2. Each have a great *Foramina*, through which the *Spinalis Medulla* passes, even to the very *Os Sacrum*, which may well be call'd *Foramina Spinalia vel Medullaria*; these holes are largest in the *Vertebrae* of the Neck, and so lessen as they descend, several Nerves,

Five things
to be consider'd in the
Vertebra.
Foramina
Spinales.

Cauda E-
quina,
quid ?
Seven Pro-
cesses in each
Vertebra.

Conjunction.

Nerves, as I have hinted before, passing from the Spinal Marrow, so lessens them; but the Bodies grow larger to sustain the rest, the Spinal Marrow reaches no further than the last *Vertebra* of the Back, where it begins to divide into many small Filaments, which are subdivided into smaller in the *Os Sacrum*, where it's call'd *Cauda Equina*, or the Horse-tail. 3. They have each seven Processes, four oblique ones, two superior, and two inferior, two transverse, and an odd one call'd *Acutus*, *vel Spinatus*, by some *Posterior*. 4. They are join'd one to another in their oblique Processes by *Ginglimus*, and by *Synchondrosis* in their Bodies; also on their inside, they are lin'd with a strong smooth Membrane, which reaches from the first, to the *Os Sacrum*. 5. They have many Sinusses, but the most remarkable, are those under their oblique Processes, which being united to others above the aforesaid Processes of other *Vertebra*, make certain *Foramina*, through which the Nerves of the Spinal Marrow passes, as also many Blood-vessels to
and

The Bones of the Trunk.

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and from the *Spinalis Medulla*; they may be aptly enough call'd *Foramina Nervina*. Foramina Nervina.

We come now to Treat of each *Vertebra* in particular; the *Vertebrae* are in number twenty-five; that is, seven of the Neck, twelve of the Back, five of the Loins, and one of the *Os Sacrum*, to which is annex'd the *Ossa Coccygis*. Of the Vertebrae in particular. Number 25.

The Neck has seven.

Seven of the Neck.

The first is call'd *Atlas*, by reason it sustains the Head, as *Atlas* was suppos'd to do the Heavens; its transverse Processes, as also all the other of the Neck, are not so long as those of the Back; it's Articulated to the Condiloid Processes of the *Os Occipitis*, by its superior oblique Processes, in which are two *Sinus*'s that receives the aforesaid Condiloid Processes; this Articulation is a sort of double *Arthrodia*, so is only capable of Flexion and Extension; it has very little, or no Body, but within has a small *Sinus* to receive the *Dens* of the second *Vertebra*; this *Sinus* is lin'd with a strong Ligament, which

I. Atlas.

which fastens the aforesaid *Dens*, the Spinal Process is a very little blunt knob, but all the other Spines of the Neck are forked, except the last. It has a small round Process in its upper part where the Body should be, from which passes a small Ligament, to another small round Process between the *Condiloides* of the Occipital Bone, close to the *Foramen Medullare*.

2. *Dentata*. The second *Vertebra* is call'd *Dentata*, *vel Epistrophous*, because between its two superior Processes, springs another very hard one, call'd *Dens*, being like a little Tooth, which being received into the above-mentioned *Sinus* of the first *Vertebra*, and encompassed with strong Membranous Ligaments; this moves in the *Atlas* as an *Axis*, as the Flexion and Extention depend on the first *Vertebra* with the Head; the Circular Motion depends on this and the first: When a Luxation happens here, the Neck is said to be broke.

The five following have no particular Name, and are much like one another, only increasing a little in bigness, and the Spinal Process of the last is not

The Bones of the Trunk

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not fork'd, beginning to grow somewhat like those of the Back; the transverse Processes, and spinous ones, are somewhat rough, for the better insertion of many Muscles, which are fastned there.

All the *Vertebræ* of the Neck, have ^{Foramina} two small *Foramina* each, which lye ^{Vertebra-} in the Head of the transverse Processes, ^{rum Colli} serving for the passage of the Vertebral Arteries.

Their oblique Processes have this observable in them, their superior ones are somewhat hollowish, to receive the inferior Convex ones, that the motion of the Neck be freer.

The Back has twelve *Vertebræ*; yet ^{Back 12} I once saw a Skeleton that had thirteen, and thirteen Ribs; they are bigger than those of the Neck, but less than those of the Loins; their Spinal Processes are not fork'd but pointed, and lye one over another; the transverse are short, but large, and blunt, and have a Cavity to receive the Heads of the Ribs; the oblique are sharp, and smooth, and so consequently little motion, these are call'd ^{Vertebræ} ^{Costales,}

E

the

the Costal *Vertebra*; the eleventh *Vertebra* has its spinal Process, not lying over the other, as those above it.

The last *Vertebra* of the Back has this to be observed in it; it receives none, but is received; both by the eleventh of the Back, and first of the Loins; on this depends the greatest motion of the Back.

Loins 5.

The five of the Loins are larger than those of the Back, and their Articulation looser, their transverse Processes are more long and fine than those of the Back, which serve as Ribs, as it were, yet the first and fifth are shorter than the rest; their *Foramina Nervina* are excavated only out

N. B.

of the lower *Vertebra*, whereas those of the Back equally out of both, but those of the Neck only out of the superior; their posterior Spines, are short, blunt and thick, a little broad, and turn a little upwards, that the bending of the Body be no way hindered; and whereas in the other *Vertebrae*, the upper oblique Processes receive the lower, in these the lower receive the upper.

The

The Bones of the Trunk.

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The first of these *Vertebrae* is call'd *Renalis*.
Renalis, the Kidneys being lodged at
the side of it ; the other four have no
particular Name.

The *Os Sacrum*, or holy Bone, so
call'd, as some think, because the An-
tients used to save this part as Sacred
in Sacrifices ; but I think rather from
Ἱερον, as the Greeks call it, which
signifies *Magnum*, as well as *Sacrum*,
it being the biggest Bone of all the
Spine. It's immoveable, and serves
as a *Basis* or Pedestal to the whole
Spine ; it's of a somewhat triangular
Figure, with the point downwards ;
it's Concavous within, which helps
to form the *Pelvis*, also smooth ; be-
hind it's *Convex*, and unequal, many
Muscles arising, and being inserted
here, it seems as if it were composed
of five or six Bones, (as indeed it is in
Infants) its Ossification beginning at
so many points, but its edges, or ra-
ther, if you will, its transverse Pro-
cesses look but like one continued
Bone, as it is ; the *Foramen Spinale*
towards its lower part is very small ;
its *Foramina Nervina* are before and
behind,

behind, and not on the sides, as in the other *Vertebrae*; its spinal Processes are very small, the last being only a small round Protuberance, its oblique Processes are hardly visible, except the superior ones; the parts which compose the *Os Sacrum*, are plac'd in the number of the *Vertebrae*, not by reason of their use, but because of their resemblance, for otherwise they are immoveable: The *Os Sacrum* may be said to be divided into five *Vertebrae* of different bigness, whereof the superior is biggest, they diminishing as they descend, the last being the least; these separate easily in Infants, by reason the Cartilages which unite them, are not fully ossified; but in Adults, they all make up but one intire Bone.

Uses.

This Bone seems to have several Uses, the first is, as I have already remark'd, to serve as a Foundation to the whole Spine. Secondly, to help to contain the parts of the *Hypogastrium*, by forming a Cavity, as I have said. The third to defend them; the fourth to Articulate the Bones of the Hips;

Hips ; the fifth to give Origin and Insertion to many Muscles.

To the end of this Bone are annex'd ^{Offa Coccygis.} two or three little Bones call'd *Offa Coccygis*, the Cuckow's Beak ; some call them the Rump-bones : They have a somewhat loose Articulation, and tyed by Cartilages one to another, the last is the smallest : They have this loose Articulation, that they may give way to the *Fœtus* in the Birth, therefore in Women these Bones are always more bent backwards than in Men ; they end in a Cartilaginous point, to which is tyed the *Intestinum Rectum* ; they have nothing more material in them, having neither Process nor Cavity.

We shall now proceed to the Bones ^{Bones of the Breast.} of the Breast and Ribs, which is the second Division of the Trunk.

The Ribs are twenty-four in number, twelve on each side ; to be well-instructed in all which concerns the Ribs, we must observe several things, as their Substance, Figure, Connexions, Parts, Division and Use, of all which in order.

Ribs 24.

Substance of
the Ribs.

The substance of the Ribs is partly Bony, and partly Cartilaginous, that end next the *Vertebra*, being of a harder and more solid and thick substance than that towards the *Sternon*, which is flattish, so less capable of being broke; for that end towards the *Sternon* being more spongy in substance, all the Ribs end towards the Breast by Cartilages, increasing in length as the Ribs descend; and those Cartilages of the superior Ribs, are harder than those of the inferior; sometimes these Cartilages grow bony in Old People, so that they cannot be separated by a Knife.

Figure.

The Ribs have a sort of Semicircular Figure, making a sort of Arch; when two are together, they make a kind of a true Circle, Concave inwardly, to form the Capacity of the *Thorax*, and to contain the Lungs and Heart, and Convex outwardly, to resist outward force; the farther they depart from the *Sternon*, the more round they are in their own Body; they are not equally big, for the superior are shorter, the middle biggest of all,

all, and the inferior one least of all; their upper sides are thick, blunt, and broad; one edge is call'd the interior, the other the exterior Lip; their under edges are sharp, having in their inside a long *Sinus*, or Furrow, in which lye the Intercoastal Vessels.

The Ribs are Articulated by their Extremities, both to the *Vertebrae* of the *Thorax*, and *Sternon*; that Articulation with the Back is moveable, the other not; the long Head of each Rib is Articulated by a single *Arthrodia*; it has a small Protuberance cloathed with a Cartilage, which head is received into a *Sinus* of the transverse Process of the *Vertebra*; 'tis this Process which supports the Ribs, and hinders them from coming lower in Expiration: You must observe, that the back-part of every Rib is higher than the fore-part, till the Cartilage be join'd, which turning a little up, makes the two ends of an equal height, so that by the rising of the Ribs, the Breast is enlarged. We must also take notice, that almost all the Ribs have a Communication with the

Articulation.

N. B.

Sternon, either directly or indirectly ; that is, the superior ones are by a direct insertion, but the lower by an indirect, which is by Cartilages adhering to the superior.

All the Ribs make a sort of Angle by their Cartilages towards the *Sternon*, which serves to increase the Spring of the Cartilages, that the Ribs be brought down again, having been rais'd in Inspiration. It sometimes happens, though seldom, that these Cartilages are ossified, which occasions an Incurable *Asthma*; the last, or lowest Rib in Man, have no Cartilage as the rest; the lower the Ribs are, the longest and more movable, because Respiration in Man is downwards, but in Birds upwards.

N. B.

Ribs of two
sorts.

The Ribs are commonly divided in two sorts, as true or false, but I think they may well be all accounted true, except the last, (being join'd mediate- or immediately to the *Sternon* by Cartilages) which has none, so only may be term'd a false Rib; however it being a common received Opinion, I shall

shall make the division: the long or true are seven on each side, and are *True 14.* the superior ones; the first of which has no motion at all, it being as a prop for all the rest, but as they descend they increase in motion; they are Articulated to the *Vertebra* of the Back by a sort of double *Arthrodia*, which makes a *Ginglimus*, and to the *Sternon* by *Synarthrosis*, the three lowest of which are by some call'd the *Costæ Pectorales.*

The false or bastard are five on each *False, 10.* side, the four uppermost of which have at their Extremities towards the *Sternon* long Cartilages, bending upwards, and cleaving only one to another; that is, the lowest to the superior, so not directly united to the *Sternon*, as the first seven are; which was the Reason the Antients gave them the Name of Spurious: The last has no Cartilage at its end, the edge of the *Diaphragme* being tyed to it.

All the Ribs, as I have already demonstrated, are received both into the transverse Processes, and body of the *Vertebra*; except the two or three last,

last, which are only received into the body of the *Vertebrae*.

Use.

The Ribs are to defend the Heart and Lungs, &c. from all sorts of external Injuries, so that they be not prest, but have free motion, which were it not bony, would be always in danger of being offended; they also serve to sustain the Respiratory Muscles.

Use of the Cartilages.

The Cartilages of the Ribs have this Use, that is, when the Ribs are drawn something upwards in Inspiration, they draw them down again with a sort of Spring; for all Cartilaginous Bodies are indued with a sort of Elasticity, so that they always recover their first Figure.

&

This Mechanism is observed in various Animals, for in Birds the *Sternon* is immovable, because the flying-Muscles arise from thence; so that if the *Sternon* had any thing to do in Respiration, it would be hinder'd; therefore Nature has contrived another Artifice, which is this, between every Rib there's a little Bone, plac'd somewhat obliquely, so that if one moves,

moves, the other follow by consent.

All these Birds have no Diaphragm, but instead thereof two Bladders, which reach to the bottom of their Bellies, they serve for the *Diaphragma*, and also help to keep them suspended in the Air: Those Creatures which have a *Diaphragma*, breathe downwards, but Birds, &c. which have none, breathe upwards.

In Amphibious Creatures, as the Tortoise, &c. their Shell is in place of Ribs, and Frogs have only one Rib on a side, to defend the Lungs.

The Breast-bone is call'd *Sternon*, or *Os Pectoris*, situated in the middle of the Anterior part of the Breast, composed of two or three Bones, having the Productions of the Cartilages of the Ribs inserted into their sides, of a reddish fungous Substance.

Sternon
made up of
three Bones.

To consider it well, it must be examined at two different times; for in Infants it's almost all Cartilaginous, except the first Bone where the *Clavicles* are fastned. In Old People I have seen it all ossified, except the first with

with the second at its juncture, but in those of Middle Age, partly Bony, and partly Cartilaginous, the superior Bone always ossifies first, and the inferior last. In the *Sternum* of Infants you may perceive seven or eight Junctures, as if so many Bones, but in the seventh or eighth Year, they uniting, make up but three or four at most.

First Bone. The first or superior Bone of the *Sternum*, is more thick and solid than the rest, made in the shape of a Crescent almost, at each side of its superior part, it has a *Sinus* to receive the head of the *Clavicula*; at its top it has a Lunated *Sinus* call'd *Jugulum*; it has also a small long *Sinus* on its inside, to give way to the *Aspera Arteria*: It's immovable.

Second Bone. The second Bone is narrower, longer and thinner, having at its sides many Sinosities, to receive the Cartilages of the Ribs.

Third Bone. The third Bone is less than the second, but broader, at the lower end of which is annex'd a Cartilage call'd *Xiphoides*, *vel Macroconita*, *vel Ensisformis*,

The Bones of the Trunk.

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formis, the Sword-like Cartilage; it's Cartilago
Ensisformis of a Triangular Figure, it serves to defend the superior Orifice of the Stomach: It's this place which is call'd *Scrobiculus Cordis*, the Heart-pit; the *Diaphragma* is also fastned to it; a strong Ligament of the Liver, call'd *Suspensorium*, is tyed to it, for in In-
58spiration the Ribs being drawn upwards, then the Liver by its weight keeps this from moving, and when in Expiration the Ribs assume their former Figure, this by its Cartilaginous Spring assumes his also.

The Uses of the *Sternon* are, first, Uses of the
Sternon, to unite the Ribs, that their motion may be all at one and the same time, also to receive the *Clavicula*: Lastly, to fasten the *Mediastinum*, which is a Membrane that divides the Breast in two.

The third part that compose the Ossa Inno-
minata, Trunk, are call'd *Ossa Innominata*, because of a very strange Figure; they are in number two, one on each side of the *Os Sacrum*, having where they are united to it, many Depressions and Risings, for their greater Strength and
Con-

Articulati-
on.

Pelvis.

Each con-
sists of three
in Children.

Os Ileum.

Spina Ilei.

Connexion, being Articulated before by *Synchondrosis*, so make up that Cavity call'd the *Pelvis*, which contains the (Womb in Women) Bladder, and *Intestinum Rectum*, with other of the Guts.

In Children each Bone consists of three, all of them meeting in that deep Cavity, call'd *Acetabulum*, which receives the head of the *Femur*, but as we grow in Years they all make but one Bone, yet then, for better distinction, nam'd as three, as the *Os Ileum*, *Ischium*, and *Pubis*, of all which in order.

The *Ileum* is the superior part of the Bone, so call'd, because most part of the *Ileum-Gut* lyes on its Internal Face; from it's External arise the *Musculi Glutei*: It's the biggest of the three, and join'd with the *Os Sacrum*.

Things to be consider'd in this Bone, are, first, its Figure, which is Semi-circular. Secondly, its top, which is call'd the Ridg, Comb, or Spine, being covered with a Cartilage: Its Internal

ternal Face is Concave, and its Exterior Convex: It has three Protuberances, being rather so many parts of the Spine; one forwards, call'd *Spina Anterior Superior*; another below, call'd *Spina Anterior Inferior*, less than the former; and a third behind, call'd *Spina Posterior*. Three parts of the Spine.

The *Os Ischium*, or *Coxendicis*, is the lower part of the *Os Innominatum*, in which is to be consider'd two parts; first, It's Superior, which makes up the greatest part of the *Cotula*, or *Acetabulum*. Secondly, Its Inferior, or lower part, which we sit on, which is call'd *Tuberositas Ischii*; it has a Sinuosity on its inner side, where the *Musculus Obturator Internus* winds about; the Muscles of the *Penis*, and Elevators of the *Anus*, have their Origin from the Tuberosity of the *Ischium*. Os Ischium
Tuberositas.

The *Os Pubis*, or *Pectinis*, by us the Share-bone, is the fore-part of the *Os Innominatum*; it's join'd forwardly to its Fellow by *Synchondrosis*, the hinder part of it forms part of the *Acetabulum*; the Os Pubis.

Foramen
Ovale Offis
Pubis.

the superior part is call'd the Spine, to which the Muscles of the *Abdomen* are fastned ; where this joins with the *Ischium* there's a large *Foramen*, call'd *Ovale*, cover'd with very a strong Ligamentous Membrane ; above this *Foramen* there's a *Sinus*, by which the Crural Vessels pass to the Thigh.

All these Bones being join'd together in their middle, make up that deep Cavity call'd *Acetabulum*, vel *Coztula*, in which the head of the *Os Femoris* enters, which is tipt with a Cartilage, call'd *Supercilium*.

Offa Pubis,
largest in
Women.

These Bones are more ample and large in Women than Men, and those which have them most advanc'd, have the easiest Labour.

The Offa
Pubis do not
separate in
Labour.

The Antients believed, that in Labour the *Offa Pubis* separated for the more easie Delivery of the Birth, nay, *Bartholinus* is of this Opinion, for he says, that in a Woman newly Deliver'd, you may divide them with the back of a Knife ; but I presume it's not so, for they separate not the least ; 'tis only the *Os Coccygis* which gives way,

way a little by bending backwards, for most pain is felt when the *Fætus* passes by the Fundament; yet some have a more loose Articulation of their Bones, and so perhaps might bring them into this Error.

G Demon-

Demonstration IV.

Of the Bones of the Superior Extremities.

I Have Demonstrated all the Bones which make up the two parts of the Skeleton, there remains now only the third part, which is those of the Extremities.

*Extremi-
ties, Upper
and Lower.*

The Extremities, or rather the Limbs, are either Superior, as the Arms; or Inferior, as the Legs.

We will begin with the Superior; but first I must inform you, that since both Extremities are double, I shall only speak of them in the singular number, for by demonstrating one side, you at the same time shew the other.

Although there be no part which does not furnish us with some Subject of Admiration, yet we must all agree, that the Arm hath as great a share, if not more, than any other; for which reason *Aristotle* call'd it the Organ of
Organs,

Organs, and the Instrument of Instruments ; and since Nature has given to all Animals, something particular, either to defend themselves against others, and preserve themselves from external Injuries ; or else to offend ; we may say then, that Man has received two things preferable to Animals, to wit, Reason and Hands, the one for Counsel and Conduct, the other for Execution of our Will ; 'tis these Hands which gives him the Sovereign Command over all Creatures be he never so Cruel, Strong, or Swift ; for of what Advantage would all our Reason and Conduct be, if we had not Hands to perform what Reason dictates : I could say much more on this Subject, but that I am here on plain Demonstration, and not Philosophizing.

The Arm, generally so called, has Division:
Arm, five
parts. five parts, as the *Clavicula*, *Scapula*, *Shoulder*, *Arm*, and *Hand*, of all which in due course.

1. The *Clavicula*, which some place Clavicula: among the Bones of the Spine, but I think

Figure.

Articulati-
on.

Substance.

think it rather belongs to those of the Arms, as I shall shew in its use, the whole motion of the Arm depending on this Bone; It's call'd *Clavicula*, I suppose, being a diminutive from *Clavis* a Key, because the Keys in old time were like an *s*; in *Padua* they have such sort of Keys still, as I am inform'd by those who have been there; it's not so crooked in Women as in Men; it's Articulated by one end to the *Acromium* of the *Scapula*, and by the other to the upper part of the first Bone of the *Sternum*; by a sort of *Arthrodia*, yet has but little motion; the more crooked these Bones are, the more force and agility has the Arm. It's hollow in the middle, and contains Marrow, as all long Bones, but towards the ends Spongy; that end towards the *Acromium* is not very thick, but rough, and unequal, the end towards the *Sternum* smoother: It's also here outwardly Convex, but inwardly Concave, to give way to the Vessels which pass under it, otherwise it would have prest them; but towards the *Acromium*, Convex inwardly,

wardly, and Concave outwardly, for the more convenient situation of the Deltoid Muscle, which would otherwise appear too bulky, and make the Breast look deform'd.

They serve to uphold the *Scapula* ^{use.} and *Humerus* from falling on the Breast, which they do when this Bone happens to be Fractured; the whole motion of the Arm depends also on this Bone; for Brutes having no *Clavicula*, cannot move their Fore-legs so readily as a Man, or as some Animals which have them, as Monkeys, Squirrels, &c.

2. The *Scapula*, or Shoulder bone, ^{Scapula.} is situated on the back-part of the *Thorax*, being only fastned with Muscles, (so more loose, that the motion be freer and easie) except in its *Acromium* where it's Articulated with the *Clavicula*; it's of a Triangular Figure, ^{Figure.} whereof two Angles are Posterior, and one Anterior. Its inward Face is Concave, as well to accommodate it self to the Ribs whereon it lyes, as to contain a Muscle, but outward Gibbous, thicker on its edges than in the middle,

middle, being there transparent, and very thin; so that in a *Caries* of that part we cannot expect Exfoliation, no Medullar Glands being there, it's nourished from its sides.

Processes,
three.

Spine.
Acromium

Coracoides
Ancyroi-
des.

Cervix.

Parts to be consider'd in this Bone, are first, its Processes, which are three, first is a thin, but rising Process, in the middle of its outside, extending all its length, it's call'd the Spine; its Point or Extremity is call'd the *Acromium*, in which is a flattish *Sinus* to receive the *Clavicula*: Some say that this Process is a distinct Bone from the *Scapula*, because in Infants its only Cartilaginous, which ossifying by degrees, makes up but one Bone; the second is less, and plac'd at the superior part of the Neck, which advances above the Head of the Bone of the Arm: It's curved, and call'd *Coracoides*, the Crows-bill, or *Ancyroides*, some call it only *Processus Curvatus*, it strengthens the Articulation of the *Humerus*. The third, or middle one, is call'd *Cervix*, is which in a somewhat flat *Sinus* to receive the head of the *Humerus*, call'd *Glenoides*; the *Humerus* is tyed

tyed to it by a strong, but somewhat loose Ligament; the edges of this *Sinus* is tipt with a Cartilaginous Ligament, which hinders the *Humerus* from being too easily Dislocated; there's also a strong Ligament from the *Acromium* to the *Processus Coracoides*, which, together with the *Acromium*, hinders the *Humerus* from being too easily Dislocated upwards, except this Ligament or the *Acromium* be broken.

The edges of this Bone are call'd *Costa*. *Costa*.

It has three Angles, 1. The Inferior. 2. Posterior. 3. *Cervix*; that part which reaches from the Posterior to the Inferior Angle, is call'd the *Basis* of the *Scapula*. *Angles, three.* *Basis.*

It has two notable *Sinusses* one on each side the Spine, where the *Musculi Infra*, and *Supra Spinati* lye; the lower *Sinus* is largest; in its inside Concave part lyes the *Musculus Subscapularis*, *vel Immerfus*. *Sinusses.*

The *Scapula* has many Uses; first, *Use.* it gives Origin to many Muscles, it fastens also the Arm to the Body, and

serves to support it, to the end it may have all its motions.

Humerus.

The third part of the superior Limb is the *Os Humeri*, or Shoulder-bone, it's the strongest and largest of all that compose the Arm; it's long and round in its fore-part, but somewhat flat behind; its superior part is Articulated to the *Cervix* of the *Scapula* by *Arthrodia*; at its lower end with the *Cubitus* by *Ginglimus*; it also touches the *Radius* by *Arthrodia*.

Articulation.

To examine the parts of the *Humerus*, you must consider its Extremities, and Body.

Parts to be consider'd.

Body.

The Body is long and round, within it contains a Marrow; its Figure is not absolutely streight, but somewhat hollow inwardly, and bunching outwardly, to fortifie it in its Actions; there is observed a Line which descends and terminates in two Processes, which serve to fasten the Muscles inserted here.

Superior Extremity.

The superior Extremity of the *Humerus* is bigger and more spongy than the Inferior; and contains a Medullar Juice; it's call'd the Head, cover'd with

with a Cartilage: It's encompassed on all sides with Ligaments and Membranes, which proceed from the Glenoid Cavity of the *Scapula*; a little below this Head, there's a round part a little smaller, call'd the Neck; there's at the hinder part of this end two rough unequal Processes, into which several Tendons and Ligaments are inserted; so that great Care ought to be had in Wounds, or Ulcers of this Part, lest you mistake the Roughness for a Cariosity; between these inequalities there's a long Slit, or Sciffure, in which the Tendon of the *Musculus Biceps* passes.

Processes.

N.B.

The Inferior Extremity of the *Humerus* is less, flatter, and harder than the other; it has three Processes, two whereof are call'd *Condyli*, the Exterior and Interior: The Bone seems here to be divided in two parts. The third, or middle Process, is large, and call'd *Trochlea*, the Pulley; it has two large Sinusses, which receive the Processes of the *Ulna*, to which it's Articulated by *Ginglimus*; the back Sinus is large and deep, which receives the *Olecranon*,

Condyli.

Trochlea.

Olecranon, but that on its fore-part smaller.

Brachium,
two Bones.

The fourth part, or that which is strictly call'd the Arm, is composed of two Bones, the biggest and longest call'd *Ulna*, the lesser *Radius*; for had this part been made up only of one Bone join'd by *Ginglimus*, we could do nothing else but extend and draw up the Arm, and not turn it upwards and downwards, which is perform'd by means of the *Radius*, for which end it's Articulated by *Arthrodia*.

The two Bones are not both of a bigness, for which some distinguish them by the Names of *Major* and *Minor* *Focile*; in their middle they are somewhat distant the one from the other, for the more Commodious Situation of the Muscles, Passage of the Vessels, and principally for the Ease of Motion.

Ulna.

1. The *Ulna*, or *Cubitus*, so call'd, by reason it's this Bone which makes the Elbow; it's biggest at the superior part, and has two large Processes, that in the back-part is call'd *Olecranon*,

Olecranon.

vel

vel Ancon, which when the Arm is extended, is received into the large Posterior *Sinus* of the *Trochlea*, so stops the Arm from going further backwards, it's otherwise call'd the Elbow; the other is less, and received into the fore *Sinus* of the *Trochlea*, it stops the Arm from being bent too close forward; below this is another very small Process, into which the Tendon of the *Musculus Biceps* is inserted.

It has two small Sinusses, the Lat-
teral one receiving the Head of the
Radius, the other is between the two
large Processes, and receives the *Tro-*
chlea of the *Humerus*; it may be call'd
Sigmatoides, because it resembles the
Greek Letter *Sigma*.

Sinusses.

At the body, of middle of this Bone,
there's observed three Angles, where-
of the Inferior is call'd the Spine, and
is very streight; the other two are
oblique, the one of which is the Ante-
rior Angle, the other Posterior; one
side is very smooth and equal, the o-
ther pretty rough, some Tendons be-
ing inserted there.

*Three An-
gles in its
Body.*

The

The Inferior part of this Bone has two Eminencies, and one Cavity; the first of the Eminencies is seated at the lateral part, and is received by the Glenoid Cavity of the *Radius*: The second is at the very Extremity, and may be call'd *Styloides*, it serves to strengthen the Articulation; the Cavity or Sinuosity is at the end of the Bone, and helps to make the *Arthro-dia* with the *Carpus*: This Bone at its superior end receives the *Radius*, but is received by the *Radius* at its lower end.

Radius. The *Radius* is the second Bone of the Arm, (or as some call it, the Fore-Arm) so call'd, because it resembles the Spoke of a Wheel; it's Articulated in its superior part, two manner of ways: First, with the External Condyl of the *Humerus*. Secondly, with the *Ulna*, and both by *Arthro-dia*: It's likewise Articulated two manner of ways in its Inferior part, either with the Bones of the *Carpus* at its Extremity, or with the *Ulna* on its latter part: The *Radius* is smallest in its Superior, but largest in its Inferior part.

The

The Things to be observed in its ^{Superior} part.

Superior part are these: First, its Head, which is round and polished, at the end of which is a Glenoid Cavity, which as I have already remark'd, receives the External Condyl of the *Humerus*; the Neck is somewhat long. Now this is very observable, that the Ligament which comes from the other Bone to join it, is not inserted in it as in other Bones, but only encompasses this Neck as a Ring, so that it may turn, for its Prone, and Supine Motions, which had the Ligament been inserted into it, it could not have done, yet at the same time it's strong enough to keep it firm; the whole motion of the Wrist is perform'd by the *Radius*; the Tuberosity or Eminence is seated just below the Neck, and is received into the lateral Superior *Sinus* of the *Ulna*.

Ligamentum Admirabile.

In its middle it has an obtuse Angle, which some call the Spine, which gradually grows bigger as it inclines towards the *Carpus*, different from the *Cubitus*, which diminishes: It's in this that we may admire Nature, which

not

Body.

not being able to avoid making these two Bones unequal in their Extremities, has found means to make the Arm equally strong in all parts, by placing the weakest part of one Bone against the strongest of the other.

*Inferior
part.*

At its Inferior part many Sinuosities appear, which are as small Gutters, that so the Tendons be not incommoded; it has also a Cavity at its Extremity, which receives one of the Bones of the *Carpus*; at its lower end it has a blunt Process, call'd *Mastoides*: from the Internal Angle of this Bone, there's a long broad Ligamentous Membrane, which unites it to the Internal Angle of the *Ulna*, according to its length.

*Use of the
Radius and
Ulna.*

The *Ulna* serves only for Flexion and Extension, and the *Radius* for Pronation and Supination.

5. Hand.

The fifth and last part of the Arm, generally so call'd, is the Hand, which is subdivided into the *Carpus*, *Metacarpus*, and Fingers.

*Carpus,
eight Bones.*

The *Carpus*, or Wrist, is composed of eight small Bones plac'd in two ranks, four in a rank, three of the first

first rank are united very close on their sides, the two greatest of which are received into the Cavity of the *Radius* by *Arthrodia*, for the motion of the Hand in their Inferior part, they touch the three Bones of the second rank of the *Carpus*; the third of the first rank which is next in bigness, and received in the Cavity at the lower Extremity of the *Ulna*; the fourth of the first rank which lyes on the outside, a little out of its rank, is the least of the four: The four Bones of the second rank are join'd together on their sides by *Harmonia*, as the Bones of the first rank are, also one to another so; but at their ends, to the Bones of the *Metacarpus* by *Enarthrosis*, having an obscure motion: The first Bone of this rank is seated more within the Hand, that the Thumb be better sustain'd; the second and third sustain the first and second Bone of the *Metacarpus*; the fourth Bone of this second rank sustains the third and fourth Bones of the *Metacarp*, by its two *Glenoid Cavities*: All these Bones are Convex on the back-part, but hollow-
ish

Ligamen-
tum Anu-
lare.

Metacar-
pus, four
Bones.

Articulati-
on.

ish within, for the more safe passage of the Vessels, and Tendons of the *Musculi Flexores*, being likewise guarded by the *Ligamentum Anulare* which covers them, and joins together all these Bones.

The *Metacarpus* is composed of four long hollowish Bones, containing Marrow in their Internal Sinusses; there are some who make five Bones of the *Metacarp*, and for that end add thereto the first Bone of the Thumb, but it ought not to be numerated among those of the *Metacarp*, it having a manifest, but the others a very obscure Motion.

These four Bones are united by their Superior Extremities with the *Carpus*, as I have already mentioned, by means of strong Cartilaginous Ligaments, and with the first Bones of the Fingers by *Arthrodia*; they also touch one another in their lateral Parts, especially towards the *Carpus*; about the middle they are a little separated to give way to the *Musculi Interossei*: They are Convex, and smooth outwardly, but

but Concave inwardly ; all their Extremities are tip with Cartilages.

These four Bones are not of an equal bigness, for that which sustains the *Index* is the largest, that which sustains the middle Finger less, and so on to the very last, which is least of all.

The Fingers, counting the Thumb, *Fingers.*
are five, having three Bones each ; these Orders may be well call'd *Phalangi Digitorum*, the first largest, the *Phalangi Digitorum.*
second less, the third least of all ; their outward Face round, but plain, and even within, Articulated to each other by *Ginglimus*, except the first rank, which are join'd by *Arthrodia* to the *Metacarp*, and so have all sorts of Motion, but the other Joints have only Flexion and Extension : The least Bones are not hollow as the rest, but spongy.

The *Greeks* call the Hand in general *Cheir*, but the Thumb *Antichier*, as much as to say, an opposite Hand : The second Finger, counting the Thumb as one, is call'd *Indicator*, because we are apt to point it, when we intend to

H shew

shew something: The third is call'd the Middle-Finger, because of its situation, and is the longest of all: The fourth is call'd the Annular, by reason Rings are used the most upon this Finger: The fifth and least is call'd the Auricular, being most fit to pick the Ear with.

I will not speak here of the *Ossa Sesamoidea*, which are sometimes found in the Joints of the Fingers, till we explain the Bones of the Toes.

Demon-

Demonstration V.

Of the Bones of the Inferior Extremities.

WE come now to Demonstrate the
Bones of the Inferior Limbs,
which is the last part of the Osteo-
logy.

The Leg, generally so taken, may *Division*
be divided into the Bones of the Thigh,
Leg, and Foot.

We shall begin with the Thigh- *Os Femoris.*
bone, which is but one in each Leg:
It's the longest, largest, and strongest
Bone of the Body, being form'd to su-
stain the weight of the whole Body;
some saying that the word *Femur* is
derived from the Verb *Fero*, to carry
or bear; it's imbow'd a little on the
fore-part, but hollow in its back.

We must examine in this Bone se- *Things to be
examined in
it.*
veral Things.

H 2 First,

Articulati-
on.Caput.
Cervix.Trochan-
ters.

First, At its upper end it has a great round head, cover'd with a smooth Cartilage, and received into the *Acetabulum* by *Enarthrosis*, and tyed therein by a short, but strong round Ligament, which is fastned in the very middle of the Head; under this Head lyes the Neck, which is long, and lyes obliquely, otherwise the Head could never have entred conveniently into the *Acetabulum*, considering its posture in the Skeleton; and also the Neck carrying it self outwardly, puts these Bones the one from the other, and so causes that the Body be carried more conveniently and surely.

At this Extremity or End lyes two *Apophyses*, behind the Neck, call'd *Trochanters*, which are derived from the Greek word *Τροχας*, which signifies to turn, because many of the Muscles of the Thigh, especially the *Rotatores*, are fastned to these Protuberances, the Anterior and Upper one is the biggest, the Posterior and Lower the less; the outward part of this Bone is smooth, but rough within, many Muscles arising from thence: This Bone

Bone has a large long Cavity all its length, full of Marrow; it's of a crooked Figure, so that Surgeons in Fractures of this Bone, ought well to consider its sound Figure: Towards its lower end it grows thicker and larger, ending in two large heads, which are received into the two shallow *Sinus*'s of the *Tibia*; between these two Processes is a *Sinus* which receives a rising Process of the *Tibia*, so that here the Thigh-bone is Articulated by a loose *Ginglimus*; the fore-part of this Articulation is call'd the Knee, the Posterior the Ham.

The Leg, strictly so call'd, is composed of two Bones, the greater and internal call'd *Tibia*, the lesser and external *Fibula*, by many also *Focile majus & minus*. Leg.

The *Tibia* is the biggest, hollow Tibia. within, and full of Marrow, it's partly Triangular; its sharp Angle or Spine makes that we call the Shin; it has a ridge like a Process at its upper end, which is received by the *Sinus* at the extremity of the *Femur*; on each side of this Process, there's two longish,

Malleolus
Internus.

Fibula.

shallow Cavities, to receive the two lower Eminences of the *Femur* : These shallow Cavities are deepned by a lunated Cartilage, which is thick about the edges, but grows thin towards the Centre ; as this Bone approaches towards the *Tarsus* it lessens, but grows more solid ; at the lower part of the *Tibia* there's a notable Process which makes the Internal Ankle, which hinders the luxation of the Foot, in keeping it firm : At the bottom of the *Tibia* there's a *Sinus*, which receives the Convex head of the *Astragalus* ; this Bone supports the whole Body.

The *Fibula*, or *Perone*, is as long as the other, but much slenderer, plac'd on the outside of the Leg ; its superior head reaches not quite to the *Os Femoris*, but has a shallow *Sinus* on its side, which receives a small lateral Process of the *Tibia* ; this Articulation is fortified with a Ligament ; its Body is of a Triangular Figure as well as the *Tibia*, but a little more irregular ; the lower end is received by the *Tibia*, and extending it self to the side of the *Astragalus*,

Astragalus, makes the external Ankle; Malleolus Externus.
 both these Ankles, or rather Proceſſes,
 hinder the *Talus* from being too eaſily
 diſlocated.

These two Bones ſeparate a little
 one from another in their middle, to
 make room for the Muſcles and Veſ-
 ſels.

Upon the Knee lyes a ſmall round Rotula.
 Bone, gibbous, and plain without, ~~it~~
 but hollowiſh within, about two *Patella*
 Inches broad, ſomewhat like the Boſs
 of a Buckler, the middle being thick,
 and thinning towards its edges, call'd
Rotula, *Patella*, the Knee-pan; it's
 movable, and Articulated by a ſort of
Ginglimus, cover'd with the *Aponeu-
 roſis* of four Muſcles, being the Exten-
 ders of the Leg; internally it has a
 very ſmooth Cartilage, to facilitate its
 motions.

Some believe it's to ſtrengthen the Uſe.
 Articulation of the Joint, but it's no
 ſuch thing, it being rather plac'd to
 cauſe a greater force in extending the
 Leg, by reaſon the Tendons of the
Muſculi Extenſores paſs over it; for if ~~it~~
 the Tendons had not this hillock, as

it were, to pass over, but lain flat on the Bones, they could not have had so much force, as by this means to extend the Leg.

Substance. It's of a hard Substance, but somewhat spongy within, and tyed loosely by Ligaments.

Offa Pedis. The Foot is subdivided into the *Tarsus*, *Metatarsus*, and Toes.

Tarsus. The *Tarsus* is made up of seven Bones, differing much in shape and bigness; four of which have particular Names, the other three no other but *Offa Cuneiformia* in general.

Talus. First, The *Talus*, vel *Astragalus*, is of a very strange figure, in which is to be consider'd its six Faces: First, the Superior, which is very smooth and convex, Articulated with the *Tibia*, hedged in by both *Malleoli*: Secondly, its Anterior, which is a great head which enters the Cavity of the *Os Naviculare*, with which it's strongly Articulated: Thirdly, the Posterior, which has a Protuberance received by the *Os Calcis*: Fourthly, the Inferior, which is rough and unequal, rising

Bones of the Extremities.

III

rising in some places, and sinking in others: The fifth and sixth are the two Lateral Faces, hedged in, as I said, by the *Malleoli*; it serves as a *Basis* to sustain the *Tibia*, which supports the whole Body.

The second Bone is the *Os Calcis*, or Heel bone, the biggest and largest of the seven, but most porous of all; it's this Bone which hinders the Body from falling backwards, being seated at the Posterior part of the Foot; it lyes under the *Talus*, to which it's Articulated; it's also join'd with a flat head to the *Os Cuboides*; behind it has a long Process, to which is tyed the great Tendon, call'd *Nervus Hectoricus*, *vel Achilles*; it has a large *Sinus* on its inside, by which the Tendons pass under the Foot, it's very unequal on its outside, for the insertion of Ligaments and Tendons.

The third is call'd *Os Scaphoides*, *Cymbiforme*, *vel Naviculare*, the Boat-like Bone, behind it has a large Cavity, wherein the head of the *Astragalus* is received; but before it has three Eminences, which unites it to the *Osse Cuneiformia*.
The

Os Calcis.

Os Naviculare.

Os Cuboi-
des.

The fourth has a somewhat unequal Figure of six irregular sides, therefore call'd *Cuboides*, the Die-like Bone, by some *Multiforme*; in its fore-part it's join'd to the fourth and fifth Bone of the Metatarse, behind to the *Os Calcis*, its inside to the *Ossa Cuneiformia*; it lyes on the outside of the Foot, and sustains the little Toes.

Ossa Cu-
neiformia.

The other three are call'd *Ossa Cuneiformia*, or Wedge-like Bones, and lye all in a rank, but differ in bigness one from another, join'd behind to the *Os Naviculare*, and before to the three first Bones of the *Metatarsus*: These Bones are Convex outwardly, but hollowish within, for the more safe passage of the Vessels; there's a broad Ligament which passes from the *Os Calcis* to the Bones of the *Metatarsus*, under which the Vessels and Muscles lye; for if there were no such, in long standing on the Foot, the action of the Muscles, and circulation of the Juices would have been hindred: It's a sort of *Ligamentum Annulare*.

Ligamen-
tum Latum.

Metatarsus.

The *Metatarsus*, or Instep, is composed of five long Bones, placed at the side

side of each other, to sustain each a Toe, very close where they are united to the *Tarsus*, but part a little in their middle, to give place to the *Musculi Interossei*; convex outwardly, but hollow within, for the better lying of the Muscles, and passage of the Vessels; their lower ends are round, and received into the Cavities of the first Phalanx of the Bones of the Toes by *Arthrodia*; that which sustains the great Toe the biggest, the next less, and so on to the least of all.

The Bones of the Toes are in number 14, for all have three Bones each, except the great Toe, which has only two; their Articulation the same as in the Fingers, and the same Observations.

There are sometimes found in the Articulations of the Fingers, but especially in the Toes, some very small Bones, call'd *Ossa Sessamoidea*, Seed-like Bones, because they resemble much the *Semina Sesami*; they are fastned only by Ligaments, in number uncertain, sometimes more, sometimes less, in some none at all.

They

Use.

They have the same Use as the *Patella*.



The Bones of the Foot being all united together, may well be compar'd to a Lever plac'd under any great weight, which we intend to raise; for the convex part of the *Talus* being plac'd just under the *Tibia*, which, as I have shew'd, sustains the whole Body; the long hinder Process of the *Os Calcis*, being, as it were, the handle of this Lever, and so rais'd, (as by the Hands) by the *Nervus Hæctoricus*, which is strongly inserted there: This Nerve, or rather Tendon, is composed of three or four Tendons of several Muscles of the Leg, as *Solaris*, *Gastrocnemii*, &c. and with it the whole Body is rais'd, as may be seen when we rear our selves on our Toes.

N. B.

There's one thing very Curious to observe, in the bending of the Joints of the Skeleton; for all the Junctures of the Arms, as Elbow, Wrist, and Fingers, bend upwards, but otherwise in the Legs; for at the Thigh it bends forwards, that we may sit when weary; at the Ham backwards, at the Ankle forwards again, and the Toes backwards: All these several bendings give us a greater strength, both to walk, and rise when down, which we could not do, if the bendings were otherwise disposed.

A N
APPENDIX
TO THE
Doctrine of the Bones ;
SHEWING,

The Best Method of Whitening,
Cleansing, and Preparing the Bones
of Man's Body, for making a Mova-
ble Skeleton, wherein the Bones
may have the same Motions, as in
a Living Subject ; together with
the manner of Uniting them toge-
ther.

When you have a Body, that you in-
tend to save the Bones, towards
forming a Skeleton, proceed in this man-
ner:

First,

No Bone to
be lost.

First, Take Care that in Decarning the Bones, you lose none, although never so small, for by so doing you will spoil the Beauty of your Skeleton; also be Cautious lest you cut away any of the Substance of the Bones with your Knife, which if you are not aware you may do, especially when you come towards the more Spongy, and Cartilaginous Extremities of them; as in the Bones of the Breast, Cartilaginous parts of the Ribs, and *Cartilago Ensiformis*, also the *Processus Styloides* of the *Basis* of the *Cranium*, is very apt to be separated, unless you are careful, especially in young Subjects; but if by chance you lose any of the small Bones, get one in its place from any other Skeleton, and about the same bigness; also if you happen to break any Bone, join it again with *Lithecolla*, the same as Masons use to join their broken Stones together; or a Preparation of Wax and Rosin.

Method to
be observed
in boiling
and separa-
ting the
Parts.

That you be at the less trouble in preparing your Skeleton for boiling, you ought to divide it in several parts, before you put it into your Chaldron to boil, which you must perform thus; first, Artificially bare from the Muscles, the first and second *Vertebra* of the Neck, on which the whole Head turns, and separate them gently one from another, so that the first *Vertebra* be still fastned to the *Cranium*, then Saw off the

the upper
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Wire
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Inferio
Vertebra
Fifthly
Neck

the upper part of the *Cranium* to take out the Brain, and with a slender piece of Wire a little hooked, strive to extract the Ossicles of the Ears by the *Foramen Auditorium*, which will be more easily extracted after a little boiling of the *Cranium*, so that by the use of the aforesaid Wire they will come out; when they are extracted, keep them by themselves till you have occasion to use them. Secondly, separate the last *Vertebra* of the Back from the first of the Loins, and the Thighs from the *Ossa Innominata*, and the Arms from the *Scapula*'s, so you have all most movable Parts separated. Thirdly, separate the Clavicle from the *Scapula*, and also from where it's join'd to the first Bone of the *Sternum*, and put them by themselves, always taking Care by some mark to distinguish the Right side from the Left. Fourthly, divide the Cartilages from the bony Extremities of the Ribs in their very Coalition; then separate every Rib from the *Vertebra* of the *Thorax*, tying them one below another in order, in a piece of Packthread, to distinguish them rightly, observing also always the side they belong to; take Care in separating them, they having a double Insertion, as well with the Bodies of the *Vertebra*, as with their transverse Processes. Fifthly, separate every *Vertebra* of the Neck and Back one from another, hanging them

them in order on a small Cord, that you be not at a loss in uniting them again when boil'd, also the *Vertebra* of the Loins in the same order from the *Os Sacrum*; and divide the *Ossa Coccygis* from that, and the *Ossa Innominata* from the *Os Sacrum*, so that you may command, and cleanse each in order more commodiously. Sixthly, come to the Limbs, beginning first with the Arms; as for Example, separate the *Os Humeri* from the *Cubitus*, and that from the *Carpus*, which when you come to, take Care in separating the Flesh and Tendons from them, that you may keep them as much as possible in their due places; for which end, I think it will not be amiss to drill two or three holes quite through each rank, in which pass a Wire or two that will hold them in their right Situation, in time of boiling, they having been before separated from the Bones of the *Metacarpus*, which four Bones you must also separate from each Finger, making some fitting Marks with Thread, or the like, which sustains one Finger, and which another; and as for the Fingers, put them in the Fingers of a Glove, according to order; so there will be less danger of Confusion; the Leg is to be separated after the same manner as the Arm, always making some distinguishing Character, which belongs to the Right side, and which to the Left.

Some

Appendix.

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Some Bones require a longer time of boiling than others, and some will not endure boiling at all, as the *Sternon*, with its annex'd Cartilages; the large Bones admit of longer boiling than the small; now suppose it be the Skeleton of a young Subject, boil not above an Hour, or an Hour and half at most, lest the Cartilaginous tips of the Bones come away; but in an Adult you may boil longer, the older the Subject is, the longer time is required in boiling; but before you put the long Bones into your boiling Vessel, bore a hole in their Extremities, large enough, according to the bigness of the Bones, that the Medullar Parts may have free *exit* in boiling; to further which, run up the Bones so drill'd, a red hot Wire to and fro, to make a quicker dispatch of the fatty Particles, then cast them into your boiling Water; for it's this fatty Substance only, which in many Skeletons makes them look so muddy and dull; when you think your Bones sufficiently boil'd, let them be presently taken out and cleaned one after another, as fast as you can; it's very good to rub the Bones with Masons Dust, which fetches off the *Periostion*, and levigates them very well; or you may wash them in boiling Lye made of Ashes, which scowers and cleanses them very well; after they are thus cleansed, throw them in clean cold Water, in which

let them lye about half a Day, then take them out, and wipe them dry, putting them still in the same order as they were before you boiled them, and observing to make the same marks of distinction; when they are thus dried, place them on the Leads of the House for some Days and Nights, especially when the Dews fall most, but keep them from the violent heat of the Sun, that being apt to make them brittle; by this means they will become as white as Ivory.

The Sternon not to be boiled.

The *Sternon*, as I have told you, is not to be boil'd at all, by reason the Cartilages will shrink, and go out of their true Figure, so that you cannot bring the Cartilages to their true Shape, to be annex'd to the ends of the Ribs from whence they were separated, which will make your Skeleton deform'd, neither will it endure too great a heat in drying, so that you must use very great Caution in preparing it, which you may do thus, After you have Artificially and Neatly separated it, as I have already taken notice of, cleanse it as carefully from the Flesh as you can, then let it dry moderately in the shade, always striving to keep the Cartilages in their true Figure, and now and then be picking away what you find of fleshy Particles; when you think you have cleansed it well, rub it all over, especially the Cartilages, with this mixture,

mixture, made of Wax, Rosin, and Turpentine, used very warm, for so you will hinder them from drying, and growing brittle, which they would be apt to do otherwise, and likewise defend them from the Worm and Moth, as also from Corruption, so keep it whole by you till you have occasion to use it, in making up your Skeleton.

When your Bones are thus clean'd and dry'd, then begin to unite your Bones towards forming your Skeleton. Since the Spine is the prop of all, and the *Os Sacrum* the *Basis* of that, you ought to begin with it, as your Shipwrights do in making a Ship, who always begin with the Keel, to which they annex the other parts towards compleating the Vessel; the Spine therefore may well be call'd the Keel of Man's Body, to which the rest of the Bones of the Skeleton are join'd.

*Method of
uniting your
Skeleton.*

First, Therefore prepare a fitting Rod of Steel, so order'd that it may have an Elastic Property, that is, when you bend it, to return to its first Figure of streightness; let it not be too thick, yet strong enough to support all the *Vertebrae*; for by this means you will have the Spine perform all its motions. It must be a little more than three Foot long, that it may pass through all the *Vertebrae*, and come out of

the top of the *Cranium*, to hang the whole Skeleton on; it must be smaller towards its top than bottom, by reason the Bones of the *Vertebra* grow less towards the superior part of the Spine; then Drill a hole in the very Body of the *Os Sacrum*, through which pass your Steel Wire, which you must Artificially fasten at the lower end of the *Os Sacrum*, to sustain all the rest, then pass on the same Wire the rest of the five Bones of the Loins, according to their order, holes being Drill'd through the very Bodies of all the *Vertebra* in the very Centre, that they may fit exactly each other; in the same manner pass on the twelve *Vertebra* of the *Thorax*, one by one, to which join the Ribs likewise in order, beginning with the lowest; this union must be made with Brass Wire, as well to the Bodies of each *Vertebra* as transverse Processes, then pass on the Steel Wire to the *Vertebra* of the Neck in their order, except the last, which is call'd the *Atlas*, which must be join'd to the Condiloid Processes of the Occipital Bone, by two fitting Brass Wires, so that the Head may have its due flexion and extention; this being done, pass the Steel Rod through the Medullar Foramen of the *Atlas*, into the very Capacity of the *Cranium*, to pass through a hole Drill'd on the top, that the Head and Spine may hang regular, so the Head will have its Circular motion;

motion, as well as flexion and extention, that being perform'd by the first and second *Vertebra* of the Neck, as this by the first only, being join'd by a double *Arthro-dia* to the *Os Occipitis*; when you have so done, unite the lower Jaw by its Condiloid Processes into the Glenoid Sinusses of the *Ossa Petrosa*; then fasten the Teeth in their proper *Alveoli*, with a preparation of Rosin and Wax; then in its place hang the *Os Hyoides*, also at the outward part of the *Foramina Auditoria* hang the Ossicles of the Ear in order; when you have done this, fasten the *Sternum* and its Cartilages to the Ribs, holes being Artificially Drill'd through their Extremities, to fasten them with Brass Wire; then fasten the *Clavicula* to the *Sternum*, to which unite the *Scapula*, which is not only to be fastned with its *Acromium* to the *Clavicula*, but also to the Body of the Ribs, to which its flat side lyes on, then pass to the inferior part of the Spine, and fasten strongly the *Ossa Innominata* to the sides of the *Os Sacrum*, so as to be join'd even before at the *Ossa Pubis*, which must be join'd together with Wires, so the *Pelvis* will be form'd, and to the Extremity of the *Os Sacrum*, fasten the *Ossa Coccygis*, and so you will have the Trunk with the Head extraordinary well fitted.

Then

Then pass to the Limbs; first take the *Os Humeri*, to whose lower Extremity unite the *Ulna* by two Hooks, one fitly adapted to receive the other, which Hooks must be fastned one in the Extremity of each Bone, so as the Bones sit close one to another, for which end you may hollow a little the Extremity of the *Humerus* with a Graver, to make the Junctures the closer; then to the side of the *Ulna* fasten the *Radius*, so that it may have its Prone and Supine motion, which may be done thus, Encompas its Neck pretty close with a Ring of Brass Wire, (after the same manner as the *Ligamentum Admirabile* doth, which comes from the *Ulna*) which you must fasten in the lateral *Sinus* of the Head of the *Ulna*; then adapt fitly, and in their due order, the Bones of the *Carpus*, and they having but little, or very obscure motion, you may only fasten them by their sides with Brass Wire, holes being first Drill'd through their very middle, also fasten the first rank to the other according to Art; when the *Carpus* is thus form'd, unite the Bones of the *Metacarp* to them in their due order; for which end, you must have four little Brass Hooks, fitted close in the Bones of the *Carpus*, to receive in order four other little Hooks, one in each Bone of the *Metacarp*, to be engaged in the four first Hooks, fasten them so as the Bones

may

may touch close, and yet at the same time, the Juncture to have its proper motions; also fasten the sides of the *Metacarp* one to another with a piece of Brass Wire, yet so as the proper distance be kept where it ought; then fasten the first *Phalanx* of the Bones of the Fingers to the *Metacarpus*, then the second, and then the third, all in their due place, which must be fastned with fitting Hooks, as in the Bones of the *Metacarp* with the *Carpus*; lastly, join the *Carpus* to the *Radius* and *Ulna*, so that it may have its proper motions: When you have thus finished the whole Limb, then fasten it to the Trunk, but so as you may take it off when you please, which may be done by only fastening a Hook on the very Head of the *Os Humerus*, just where its Ligament is, which is to be hung on a curved Brass Wire, which must be fastned in the Cavity of the *Scapula*; the lower Extremity must be managed after the same manner, observing fitting Circumstances, which must be also made to take off and on, as occasion requires.

I only design'd this *Appendix* as a hint towards the forming of a Skeleton, which cannot be so well exprest by Writing, as by often Working, and seeing it done.

F I N I S.

Books Printed for, and Sold by Daniel Brown, at the Black Swan and Bible without Temple-Bar.

A Treatise of the Gout, wherein both its Cause and Cure are demonstrably made appear. To which are added some Medicinal Observations concerning the Cure of Fevers, &c. by the Means of Acids. By *John Colbatch*, Physician, a Member of the Royal Colledge of Physicians, *London*.

Officina Chymica Londinensis. Sive exacta notitia Medicamentorum Spagyricorum, quæ apud Aulum Societatis Pharmaceutiæ Londin. Præparantur, & Venalia prostant. Consilio Pharmacopœorum, & Approbatione Collegii Medicorum Londinensium exhibitum. Opera & Studio Nicolai Staphorst, Oper. Chym. dict. Societatis.

Catalogus Plantarum quæ in Insula Jamaica sponte proveniunt, vel vulgò coluntur, cum earundem Synonymis & locis natalibus; adjectis aliis quibusdam quæ in Insulis Maderæ, Barbados, Nieves, & Sancti Christophori nascuntur. Seu Prodomi Historiæ Naturalis Jamaica Pars prima. Autore Hans Sloane, M. D. Coll. Reg. Med. Lond. nec non Soc. Reg. Lond. Soc.

Curiosities in Chymistry: Being new Experiments and Observations concerning the Principles of Natural Bodies. Written by a Person of Honour, and Published by his Operator, H. G.

Secrets of the Famous Læzarus Revesius, Counsellor and Physician to the French King, and Professor of Physick in the University of Montpelier.

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